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Encyclopaedias l

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VOL. I.

INDOCTI DISCANT, ET AMENT MEMINISSE PERITI.

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BRITISH MUSEUM

PREFACE.

THE mind of man has been by ſome authors called a *tabula raſa*, and compared to a ſheet of clean paper. But this principle, however generally received, may perhaps admit of ſome heſitation; eſpecially if it ſhould be found leſs ſalutary in its conſequences than could be wiſhed. One ſhould imagine, that the human intellect, by its original conſtitution, eaſily admits and retains ſome impreſſions, as congenial to its nature, and faithful to their objects; whilſt it repels others with averſion or diſdain, as ſubverſive of its happineſs, and falſe to the things which they repreſent. Hence our frame, from its very origin, ſeems marked by the hand of nature with indubitable ſignatures of pre-eminence and diſtinction. Hence man aſſumes the important characters of a rational being and a moral agent. Hence his deſires of happineſs and truth are inſatiable, and his capacities of enjoying them indefinite.

From the feebleſt efforts of infancy to the laſt convulſive ſtruggles of departing life, theſe grand objects, theſe irreſiſtible attractions, actuate all his powers, and animate all his enterpriſes, through every gradation of his progreſſive being. It muſt, however, be acknowledged, that, in theſe ſublime purſuits, the mind is obnoxious to error and deception: but ſtill the ends which ſhe propoſes are the ſame, though ſhe may err in ſelecting the proper means by which alone they can be attained. We may further obſerve, that though truth and happineſs originally appear to the mind in different forms; yet, in nature, they are inſeparable: for nothing that is falſe can be a ſource of endleſs and univerſal happineſs; nor can any truth, as truth, be productive of unmixed and permanent miſery.

Whether the ſuperior deſires and capacities with which our nature is inveſted neceſſarily reſult from the inherent excellence of its powers, or from the advantages of its ſtructure and organization, or from both, we cannot at preſent ſtay to inquire. Theſe queſtions will more properly find their ſolution in other departments of ſcience. It is ſufficient for the purpoſe which we have now in view, to obſerve this important fact eſtabliſhed, That the original powers of man are ſuſceptible of culture and refinement to a very high degree; and that the proper exertion and application of theſe faculties are not only conducive, but eſſential, to his happineſs, whether conſidered as an individual, or a ſocial being. Every attempt, therefore, to enlarge his views, to improve his talents, to direct his efforts, and to form his nature for its ſublime deſtiny, ſhould certainly command the public regard and attention; and the only apology which can be offered for the cold reception too generally given to ſuch laudable endeavours, ariſes either from their multiplicity, or from their want of merit and conſequently of ſucceſs. It would be at the ſame time an endleſs and a faſtidious taſk, to enumerate the various methods by which men of leiſure and ſpeculation have eſſayed to cultivate the public underſtanding and taſte, or to trace literature through all the various forms in which it has tried to gain the general attention.

Abſtract truths have, as it were, been clothed with a body, that, by the drapery of narrative and allegory, they might be more effectually recommended to our notice, and more agreeably inculcated. The various topics of art and ſcience have been ranged in a ſyſtematic order, and volumes profeſſedly written upon each. But the taſte for novelty ſtill demanded various gratification. Hence unconnected miſcellanies, and detached eſſays, appeared. But theſe periodical effuſions of genius and learning, that they might be obvious to all capacities, were generally too flimſy and ſuperficial either to attract or deſerve the attention of a cultivated mind. To exhibit art and ſcience in all their extent and luſtre, it was at laſt thought neceſſary to reunite the detached parts in one work, that their proportions, their relations one to another, and to the general ſyſtem of which they are conſtituents, might be more clearly and obviouſly perceived. With this intention, Dictionaries of Arts and Sciences have been compiled; and it is certain, that ſuch a plan, regularly and ſucceſsfully proſecuted, may be productive of numberleſs utilities and advantages. But when topics, far from being digeſted into a ſyſtem, or diſpoſed in their natural order, are violently dilacerated, and, without any regard to their proper poſitions, huddled together as the order of the letters which conſtitute their technical terms determine, ſuch a work ſhould rather be called a book of ſhreds and patches, than a Dictionary of Arts and Sciences. We do not deny, that every article, as an article, may have conſiderable merit: but, as it ſtands connected in nature with what ought to precede or to follow it, we affirm, that it cannot have the ſame influence upon the mind without its antecedents and conſequences; and that an underſtanding formed upon ſuch models, is rather a chaos of detached and heterogeneous ideas, than a regular intellect. It is only by thinking in method, by reducing our ideas to a proper and natural order, by obſerving what they poſſeſs in common, and what are their relations or differences, that our reaſoning faculties are capable of making any progreſs at all. Without theſe aſſiſtances, we might be ranked amidſt ſenſitive or conſcious beings, but could never attain the human or rational character. At the ſame time, it muſt be confeſſed, that there is ſome inconvenience in being reduced to the neceſſity of peruſing a whole ſyſtem when we only want to conſult a particular topic. To avoid theſe diſagreeable extremes, the compilers of the Encyclopædia Britannica have endeavoured to give a compendious, yet clear and ſatisfactory, account of each particular ſcience or art, under its proper denomination; whilſt the ſubordinate articles in each are likewiſe explained under their technical terms. Thus the ſyſtematic reader will be fully and regularly informed by turning to the general name of the ſcience which he wiſhes to explore; whilſt the perſon who, already acquainted with the whole, wiſhes only to conſult particular topics, or others who are willing to content themſelves with partial and detached views of things, will find them illuſtrated under the articles by which they are denominated. To be more explicit upon this head: Detached articles may be divided into three kinds. The firſt conſiſts of ſuch as, independent of particular ſyſtems, admit of a full and complete illuſtration as they ſtand; the ſecond, of ſuch as require partly to be diſcuſſed under the ſyſtems to which they belong, and partly under their own proper denominations; the third, of ſuch as are ſufficiently elucidated in the ſyſtems to which they appertain. Thoſe of the firſt kind need no references. Thoſe of the ſecond, being only partially explained under their particular denominations, demand references to the ſyſtems where the illuſtrations are completed. For thoſe of the laſt, as no explication is found neceſſary under the terms, we refer to the ſyſtems of which they are conſtituents, where the ſubjects are fully diſcuſſed. Theſe our readers may conſult as emergencies require or their own diſpoſitions impel them.

To accompliſh a taſk ſo arduous and important, neither labour nor expence has been ſpared. The beſt authors on each particular ſcience have been collected, and compared. Such as could be abridged without diſadvantage, have been epitomized with all poſſible care: others who were more conciſe and tenacious of their ſubjects, have been more cloſely purſued, and more faithfully retained. When topics have been obſcurely or imperfectly treated, the utmoſt endeavours have been uſed to ſupply theſe defects; and upon ſuch parts of ſcience as the compilers have not found properly illuſtrated by other authors, original eſſays are inſerted. Nor do theſe amount to an inconſiderable number. To each particular art or ſcience, a hiſtory of its origin, progreſs, and revolutions, is prefixed, ſo far as theſe can be collected or deduced from hiſtorians, or from other authors by whom the ſubjects are occaſionally treated. But where theſe are defective, careleſs, or inconſiſtent, in their narrations; neither can abſolute certainty, nor circumſtantial accuracy, be expected from us. This taſk, therefore, demands no ſmall degree of induſtry and perſpicacity, becauſe the various events relative to the diſcovery or improvement of literature have often been either entirely neglected, or only obſcurely hinted, by their contemporary authors. A few inſtances will ſhow how inauſpicious to learning theſe omiſſions have proved, and of what importance the diſcovery of ſuch events muſt be, not only as they gratify mere unmeaning curioſity, but as they elucidate the particular ſciences in which they are found. Every one who has the leaſt acquaintance with navigation, muſt obſerve the ineſtimable utility of the mariners compaſs; which, by rendering voyages more ſafe and expeditious, gives a facility and ſucceſs to the buſineſs of commerce, which it could not have attained by any other means. Yet the name of its inventor, the æra and occaſion of its diſcovery, are extremely uncertain: for though, in the year 1260, it was produced as his own invention by Paulus Venetus, it was not applied to the purpoſes of navigation for a long time afterwards, when it was again exhibited by Gioya of Amalphi, who likewiſe claimed the diſcovery as his own. Nothing has more effectually contributed to render knowledge acceſſible and diffuſive than the art of printing: yet the ſame culpable inattention of authors had left its origin, and the gradations of its improvement, difficult to be inveſtigated. The wonderful powers of magnetiſm and electricity long remained undiſcovered, and longer ſtill unapplied to the purpoſes of utility. Nor have we, perhaps, at this enlightened period, derived from them all the advantages of which they may be found productive: a conſideration which ought inceſſantly to ſtimulate our induſtry in acquiring ſuch improvements as have been already made, or to actuate our inventive powers for enlarging the ſphere of diſcovery.

In the theories of arts we may reaſonably hope to find a higher degree of ſatiſfaction. Particular care has therefore been taken to deduce them, with all poſſible accuracy, in a ſeries of concluſions drawn from intuitive truths, or from principles previouſly diſcovered. But wherever ſuch a ſeries has been left interrupted by others, and where it appears impoſſible from the ſtate of learning to ſupply that deficiency, we muſt be forgiven for only exhibiting, as certain, ſuch as have been made; without impoſing on the public conjectural for real improvements,

ments, which from the former ſtate of learning have ſeemed, and from its preſent may ſtill ſeem, unattainable. Yet, through the whole of this department, wherein ſuch regions of heſitation and conjecture occur, we have not remained ſilent and ſupine. A number of probable ſolutions not commonly met with have been offered to the public attention. In diſputed points, arguments and objections have been diſplayed in their full force; a method which is ſo far from leading to ſcepticiſm, that it not only appears the moſt efficacious but the only real means of diſcovering and eſtabliſhing truth. Thus every reader will ſee his favourite ſyſtem attacked and defended in ſuch a manner that his own judgment may determine the victory; and thus, by comparing it with other ſyſtems, he may either ſee the merit of his own, or rectify its errors, or adopt any other which may appear preferable. Thus likewiſe the compilers will preſerve their eſſential character, which, by aſſuming the ſpirit or tenets of any party as their own, would be entirely deſtroyed.

To make the peruſal of this comprehenſive work as eaſy and ſucceſsful as poſſible, marginal references are made from general ſyſtems to particular articles, and reciprocally from the latter to the former. Thus the diligent inquirer after truth will no longer find himſelf under a neceſſity of hunting the letters of the alphabet through all their arbitrary forms and poſitions, nor tantalized at laſt by the unſatisfactory glance of an object which the whole art or induſtry of man could not poſſibly explain in ſuch a ſolitary and inſulated ſituation. The utility of this expedient will ſufficiently appear from the following inſtance; andfrom hence we may likewiſe ſee how abortive and impotent the attempts of ſome authors have proved who by references have tried to direct us how we may form a full ſyſtem from independent topics. From the preface of Chamber's Dictionary the ſubſequent may be quoted as an example. "AGRICULTURE, or the *Tillage* and improvement of *Soils*, *Clay*, *Sand*, *Earth*, &c. by the operations of *Ploughing*, *Fallowing*, *Burning*, *Sembradore*, *Semination*, *Manuring*, &c. to produce *Corn*, *Hemp*, *Flax*, *Liquorice*, *Saffron*, &c. for *Malt*, *Farina*, &c. *Granary*, *Threſhing*, &c. The culture of *Trees*, *Timber*, &c. by *Planting*, *Shrowding*, *Barking*, &c. for *Coppice*, *Park*, *Paddock*, *Hedge*, *Paſture*, &c. But how extremely difficult it would be to follow a ſubject through ſuch a multitude of references, as well as new ones which ſpring up at every one of them, any perſon may eaſily conceive.

Whilſt, however, we prove the expediency of references from ſciences to articles, and from articles to ſciences, we regret, that unavoidable contingencies in the progreſs of the work have ſometimes put it out of our power to obſerve this rule with all the fidelity which we could have wiſhed. For in ſeveral articles relating to the ſciences of Optics and Medicine, inſtead of marginal notes, an index at the end of theſe articles is referred to. This, it muſt be owned, is attended with ſome little inconvenience; but it was inevitable on account of a variety of communications received after the work was begun, ſo that proper references could not be made to the numbers originally placed on the margin, the plan of theſe diſſertations being ſomewhat altered. Beſides, when the nature of a work ſo extenſive and multiform is duly conſidered, it will immediately occur to every reader of candour and indulgence, how eaſy it is for the utmoſt care and aſſiduity to fail in ſome inſtances. Theſe, however, it is hoped, will be found few and of little importance; the work, during its whole progreſs, having been ſuperintended with unremitting vigilance and aſſiduity.

After ſurveying any particular ſcience, it will be found equally uſeful and entertaining to acquire ſome notion of the private hiſtory of ſuch eminent perſons as have either invented, cultivated, or improved, the particular art or ſcience in which our attention has been recently engaged. This has induced the compilers to enrich the Encyclopædia Britannica with a new department, which is not to be found in any other collection of the ſame kind, except in the French Encyclopedie. Of all hiſtorical purſuits, Biography is perhaps the moſt delightful and inſtructive. Its tendency to illuſtrate particular paſſages in general hiſtory, and to diffuſe new light through the arts and ſciences in which the perſons whoſe lives are related were employed, is too obvious to require explication. Beſides, it exhibits the human character in all poſſible forms and ſituations. It not only attends its hero through all the buſtle of public life, but purſues him to his moſt ſequeſtered retirements. It ſhows, how diſtinguiſhed characters have been involved in misfortunes and difficulties; by what means they were extricated; or with what degree of fortitude and dignity they have diſcharged the various functions, or ſuſtained the different viciſſitudes, of a chequered and fluctuating life. For theſe reaſons it is, that every man of learning and genius has eſteemed the biographical labours of Plutarch among the moſt precious and valuable remains of antiquity. The lives and characters, therefore, of ſuch perſonages as have either excelled in the arts of war or peace, of ſuch as have either diſtinguiſhed themſelves in the theatre of action or in the receſs of contemplation, will be found under their proper names alphabetically diſpoſed.

When we read of the perſons by whom, and the occaſions on which, any particular branch of human knowledge has been cultivated, we naturally wiſh to know ſomething of the places where thoſe tranſactions have paſſed. This curioſity, ſo natural and laudable, has frequently been felt by the compilers of this work. And, in order to gratify a deſire ſo uſeful and congenial to the human mind; beſides the general ſyſtem of Geography, they have ſubjoined to the name of each particular place, an account of its ſituation, its climate, its ſoil, its peculiarities, its inhabitants, its revolutions, laws, and government, with whatever elſe appeared neceſſary for the reader's information, and comprehenſible in a work of ſuch variety and extent.

In treating of ſuch matters as are peculiar to certain authors, the obligation is generally acknowledged by the compilers of this Dictionary; but, in ſuch ſubjects as were common to many writers, they did not imagine thoſe acknowledgements required either by their own gratitude or the curioſity of their readers. Yet, that all poſſible means of improvement may be put in the power of ſuch as wiſh to cultivate their taſte or genius, a liſt of thoſe authors who have been moſt diſtinguiſhed and ſucceſsful in the various departments of art or ſcience will be added. It will eaſily occur to the reader, that theſe are the authors chiefly uſed in this compilation; and by this he will be enabled to conſult each particular author in his own province. But ſo much pains have been taken to ſelect and extract from each whatever is valuable, that it is hoped the neceſſity of this reſearch will be in a great meaſure ſuperſeded. From the catalogue propoſed to be given, it muſt appear what a conſiderable and extenſive library would be required to afford ſo much knowledge as this work contains, and what an immenſe diſparity there is between the expenſe of purchaſing it, and that of procuring the books from whence it was derived.

We have already hinted the almoſt inſuperable difficulty attending the execution of a plan ſo various in its nature, and ſo conſiderable in its extent. To redreſs, therefore, as far as poſſible, the inconveniences ariſing from caſual omiſſions, an Appendix may be thought indiſpenſably neceſſary. But though the plan propoſed ſhould be accompliſhed in a manner equal to our own or our readers moſt ſanguine expectations, ſuch an Appendix would ſtill be found a moſt important addition. For even though the work ſhould be as perfect as poſſible according to the ſtate of arts and ſciences at the time of its exhibition, ſtill revolutions may happen, and improvements may be made, in various branches both of theoretical and practical knowledge, which an Appendix will give the compilers a proper opportunity of inſerting. This acceſſion, therefore, to the original plan, our readers will be pleaſed to find.

In a collection ſo large and multifarious as that which is now recommended to the public attention, the critic muſt be ſevere, and the genius minute, who could ſtop to animadvert upon every trivial inaccuracy of ſtyle. We think it indeed indiſpenſably incumbent on every author who would be read with intelligence and pleaſure, after ſufficiently attending to the nature and importance of what he ſubmits to the public obſervation, that he ſhould, in the next degree, regard the vehicle by which it is conveyed. But where the ſubjects are ſo indefinitely varied, and where propriety requires that each ſhould be expreſſed in a manner ſuitable to its nature; it can ſcarcely be imagined, that the ſame exactneſs and uniformity ſhould equally prevail in this as in compoſitions of a nature leſs extenſive and complex.

After all, though the compilers are conſcious of having done their utmoſt to render this work as extenſively and generally uſeful as it could poſſibly be; yet, ſince no human production, even from the origin of literature to the preſent period, has ever been found perfect in its kind, it would be cruel, if not unjuſt, to expect abſolute perfection in the preſent attempt. From every candid and benevolent inquirer after truth, therefore, they hope, that the merit of their intention and the utility of their plan will in a great meaſure atone for ſuch trivial or unavoidable faults as may be found in its execution. Such was the ſpirit in which one of the nobleſt and wiſeſt of ancient critics peruſed his contemporary poets:

Verum ubi plura nitent in carmine, non ego paucis
Offendar maculis, quas aut incuria fudit,
Aut humana parum cavit natura.—— Hor.

But where the beauties more in number ſhine,
I am not angry, when a caſual line
(That with ſome trivial faults unequal flows)
A careleſs hand, or human frailty, ſhows. Francis.

A NEW
DICTIONARY
OF
ARTS, SCIENCES, &C.

A, THE character of the firſt letter of the alphabet in Latin, Engliſh, French, and moſt of the preſent languages of Europe. The firſt character in the Hebrew alphabet is called *aleph*, in the Greek *alpha*, in the Arabic *eleph*, and in the Syriac *oleph*.

A has deſervedly the firſt place in the alphabet on account of its ſimplicity, very little more being neceſſary to its pronunciation than opening the mouth.

A, an article. See **Article.**

A, among the ancients, was a numeral letter, and ſignified 500; and when a daſh was added on the top, $\bar{A}$, 5000.

A, in the Julian calendar, is the firſt of the ſeven dominical letters *. It had been in uſe among the Romans long before the eſtabliſhment of Chriſtianity, as the firſt of the eight *nundinales* † *litteræ;* in imitation whereof it was that the dominical letters were firſt introduced.

* See *Aſtronomy*, n° 310.
† See *Nundinal.*

A is alſo an abbreviature, uſed with different intentions. Hence,

A, among logicians, is uſed to denote an univerſal affirmative propoſition; according to the verſe,

Aſſerit A, negat E, verùm generaliter ambæ.

Thus, in the firſt figure, a ſyllogiſm conſiſting of three univerſal affirmative propoſitions, is ſaid to be in Bār-bā-rā; the *A* thrice repeated, denoting ſo many of the propoſitions to be univerſal, *&c.* See **Barbara.**

A, among the Romans, was uſed in the giving of votes or ſuffrages.—When a new law was propoſed, each voter had two wooden ballots put in his hand; the one marked with a capital *A*, ſignifying *antiquo*, q. d. *antiquam volo;* and the other with *V. R.* for *uti rogas*. Such as were againſt the law, caſt the firſt into the urn: as who ſhould ſay, I refuſe it, I antiquate it; or, I like the ancient law, and deſire no innovation.

A, in the trials of criminal cauſes, alſo denoted abſolution: whence Cicero, *pro Milone*, calls *A*, *littera ſalutaris*, a ſaving letter.—Three ballots were diſtributed to each judge, marked with the letters, *A* for *abſolvo*, I acquit; *C* for *condemno*, I condemn; and *N. L.* for *non liquet*, It is not clear. From the number of each caſt into the urn, the prætor pronounced the priſoner's fate. If they were equal in number, he was abſolved.

A, in the ancient inſcriptions of marbles, &c. occaſionally ſtands for *Auguſtus*, *ager*, *aiunt*, &c. When double, it denotes *Auguſti;* and when triple, *aurum*, *argentum*, *æs;* and ſometimes its meaning can only be known by the reſt of the inſcription. Iſidore adds, that when it occurs after the word *miles* (ſoldier), it denotes him young. On the reverſe of ancient medals, it denotes them ſtruck by the city of Argos, ſometimes by that of Athens; but on coins of modern date, it is the mark of Paris.

A, as an abbreviation, is alſo often found in modern writers: as, A. D. for *anno domini;* A. M. *artium magiſter*, maſter of arts, *&c.*

A, the letter a, with a line above it thus, ā, is uſed in medical preſcriptions for *ana*, of each; ſometimes it is written thus, āā: e. g. ℞ Mel. Sacchar. & Mann. ā, vel āā, ℥j. i. e. Take of honey, ſugar, and manna, of each one ounce.

A. A. A. The chemical abbreviation for Amalgama, or Amalgamation.

AA, the name of ſeveral rivers in Germany and Swiſſerland.

AACH, a little town in Germany, in the circle of Suabia, near the ſource of the river Aach, and almoſt equally diſtant from the Danube and the lake Conſtance. It belongs to the houſe of Auſtria; and is twelve miles north-eaſt of Schaffhauſen, and twenty-five north-weſt of Conſtance. E. Long. 9. 0. Lat. 47. 55.

AAHUS, a little town in Germany, in the circle of Weſtphalia, and biſhoprick of Munſter. It is the capital of Aahus, a ſmall diſtrict; has a good caſtle; and lies north-eaſt of Coesfeldt. E. Long. 7. 1. Lat. 52. 10.

AAM, a Dutch meaſure of capacity for liquids, containing about 63 pounds avoirdupois weight.

AAR, the name of two rivers, the one in Swiſſerland, the other in Weſtphalia. Alſo the name of a ſmall iſland in the Baltic.

AARON, high-prieſt of the Jews, and brother to Moſes, was by the father's ſide great-grandſon, and by the mother's grandſon, of Levi. By God's command he met Moſes at the foot of mount Horeb, and they went together into Egypt to deliver the children of Iſrael: he had a great ſhare in all that Moſes did for their deliverance; the ſcriptures call him the prophet of Moſes, and he acted in that capacity after the Iſraelites had paſſed over the Red Sea. He aſcended mount Sinai with two of his ſons, Nadab and Abihu, and ſeventy elders of the people; but neither he nor they went higher than half way, from whence they ſaw the glory of God; only Moſes and Joſhua went to the top, where they ſtaid forty days. During their abſence, Aaron, overcome by the people's eager intreaties, ſet up the golden calf, which the Iſraelites worſhipped by his conſent. This calf has given riſe to various conjectures. Some rabbies maintain that he did not make the golden calf; but only threw the gold into the fire, to get rid of the importunities of the people; and that certain magicians, who mingled with the Iſraelites at their departure from Egypt, caſt this gold into the figure of a calf. According to ſome authors, the fear of falling a ſacrifice to the reſentment of the people by giving a refuſal, made Aaron comply with their deſire: and they alledge alſo, that he hoped to elude their requeſt, by demanding of the women to contribute their ear-rings, imagining they would rather chooſe to remain without a viſible deity, than be deprived of their perſonal ornaments. This affair of the golden calf happened in the third month after the Iſraelites came out of Egypt. In the firſt month of the following year, Aaron was appointed high-prieſt by God, which office he executed during the time that the children of Iſrael continued in the wilderneſs. He died in the fortieth year after their departure from Egypt, upon mount Hor, being then an 123 years old; A. M. 2522, of the Julian period 3262, before the Chriſtian æra 1452. With regard to the attempts of the Egyptian magicians to imitate the miracles performed by his rod, ſee ſome remarks under the article MAGIC.

AARON Ben Aſer, a celebrated rabbi, who, in the fifth century, had a ſhare in the invention of the Hebrew points and accents.

AARON of Alexandria, a Chriſtian prieſt and phyſician, who flouriſhed in Egypt about the year 621. He is the moſt ancient author who has treated of the ſmall-pox.

AARON Hariſchon, a learned rabbi and caraite * in the 13th century, wrote an Hebrew grammar, printed at Conſtantinople 1581; probably the ſame with Aaron the caraite, who wrote a commentary on the five books of Moſes, which is in MS. in the French king's library.

AARSENS (Peter), a painter, called in Italy Pietro Longo, becauſe of his ſtature, was born at Amſterdam 1519. He was eminent for all kinds of ſubjects; but was particularly famous for altar-pieces, and for repreſenting a kitchen with its furniture: he had the pain to ſee a fine altar-piece of his deſtroyed by the rabble in the inſurrection 1566, though a lady of Alcmaer offered 200 crowns for its redemption.

AB, the eleventh month of the civil year of the Hebrews, and the fifth of their eccleſiaſtical year, which begins with the month Niſan. It anſwers to the moon of July; that is, to part of our month of the ſame name, and to the beginning of Auguſt: it conſiſts of thirty days. The Jews faſt on the firſt of this month, in memory of Aaron's death; and on the ninth, becauſe on that day both the temple of Solomon, and that erected after the captivity, were burnt; the former by the Chaldeans, and the latter by the Romans. The ſame day is alſo remarkable among that people for the publication of Adrian's edict, wherein they were forbid to continue in Judea, or even to look back when at a diſtance from Jeruſalem in order to lament the deſolation of that city. The 18th of the ſame month is alſo a faſt among the Jews; becauſe the lamp in the ſanctuary was that night extinguiſhed, in the time of Ahaz.

AB, in the Syriac calendar, is the name of the laſt ſummer-month. The firſt day of this month they called *Saum Miriam*, the faſt of the virgin, becauſe the eaſtern Chriſtians faſted from that day to the fifteenth, which was therefore called *Fathr-Miriam*, the ceſſation of the faſt of the virgin.

ABA (or rather **ABAU**) **HANIFAH**, ſirnamed Al-Nooman, was the ſon of Thabet, and born at Coufah in the 80th year of the Hegira; this is the moſt celebrated doctor of the orthodox Muſſulmans, and his ſect holds the principal eſteem among the four which they indifferently follow. Notwithſtanding this *, he was not very well eſteemed during his life, inſomuch that the khaliff Almanſor cauſed him to be impriſoned at Bagdat, for having refuſed to ſubſcribe to the opinion of abſolute predeſtination, which the Muſſulmans call Cadha. But afterwards Abou Joſeph, who was the ſovereign judge or chancellor of the empire under the khaliff Hadi, brought his doctrine into ſuch credit, that it became a prevailing opinion, That to be a good Muſſulman was to be a Hanifite. He died in the 150th year of the hegira, in the priſon of Bagdat aforeſaid. And it was not till 335 years after his death, that Melick Schah, a ſultan of the Selgiucidan race, built for him a magnificent monument in the ſame city, whereto he adjoined a college peculiarly appropriated to ſuch as made a profeſſion of this ſect. This was in the 485th year of the hegira, and Anno Chriſti 1092. The moſt eminent ſucceſſors of this doctor were Ahmed Benali, Al Giaſſas, and Al Razi who was the maſter of Naſſari; and there is a moſque particularly appropriated to them in the temple of Mecca.

ABACATUAIA, in ichthyology, a barbarous name of the zeus vomer. See **ZEUS**.

ABACH, a market-town of Germany, in Lower Bavaria, ſeated on the Danube, ſix miles ſouth-weſt of Ratiſbon, and twenty-nine north of Landſhut. It is remarkable for Roman antiquities, and for ſprings of mineral waters which are ſaid to be good for various diſtempers. E. Long. 11. 56. Lat. 48. 53.

ABACK (a ſea-term), the ſituation of the ſails when their ſurfaces are flatted againſt the maſts by the force of the wind. The ſails are ſaid to be *taken aback*, when they are brought into this ſituation, either by a ſudden change of the wind, or by an alteration in the ſhip's courſe. They are *laid aback*, to effect an immediate retreat, without turning to the right or left; or, in the ſea-phraſe, to give the ſhip *ſtern-way*, in order to avoid ſome danger diſcovered before her in a narrow channel, or when ſhe has advanced beyond her ſtation in the line of battle, or otherwiſe. The ſails are placed in this poſition by ſlackening their lee-braces, and hauling in the weather ones; ſo that the whole effort of the wind is exerted on the forepart of their ſurface, which readily puſhes the ſhip aſtern, unleſs ſhe is reſtrained by ſome counteracting force. See **BACKING**, and **BRACING**. It is alſo uſual to ſpread ſome ſail aback near the ſtern, as the mizzen-top-ſail, when a ſhip rides with a ſingle anchor in a road, in order to prevent her from approaching it ſo as to entangle the flukes of it with her ſlackened cable, and thereby looſen it from the ground.

ABACOT, the name of an ancient cap of ſtate worn by the kings of England, the upper part whereof was in the form of a double crown.

ABACTORS, or **ABACTORES**, a name given to thoſe who drive away, or rather ſteal, cattle by herds, or

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* See *Caraite*.

* Herbelot, *Bibl. Orient.* p. 21.

Abaci, various.

or great numbers at once; and are therefore very properly diſtinguiſhed from *fures*, or thieves.

ABACUS, among the ancients, was a kind of cupboard, or buffet. Livy, deſcribing the luxury into which the Romans degenerated after the conqueſt of Aſia, ſays, They had their *abaci*, beds, *&c.* plated over with gold. (Dec. IV. Lib. ix.)

Abacus, among the ancient mathematicians, ſignified a table covered with duſt, on which they drew their diagrams; the word in this ſenſe being derived from the Phœnician *abak*, duſt.

Abacus, in architecture, ſignifies the ſuperior part or member of the capital of a column, and ſerves as a kind of crowning to both. Vitruvius tells us the abacus was originally intended to repreſent a ſquare tile laid over an urn, or rather over a baſket.—An Athenian old woman happening to place a baſket, thus covered, over the root of an acanthus; that plant ſhooting up the following ſpring, encompaſſed the baſket all round, till meeting with the tile, it curled back in a kind of ſcroll. An ingenious ſculptor paſſing by, took the hint, and immediately executed a capital on this plan; repreſenting the brick by the abacus, the leaves by the volutes, and the baſket by the vaſe, or body of the capital. Such was the riſe of the firſt regular order.—The form of the abacus is not the ſame in all orders: in the Tuſcan, Doric, and Ionic, it is generally ſquare; but in the Corinthian and Compoſite, its four ſides are arched inwards, and embelliſhed in the middle with ſome ornament, as a roſe or other flower. Scammozzi uſes *abacus* for a concave moulding on the capital of the Tuſcan pedeſtal; and Palladio calls the plinth above the echinus, or boultin, in the Tuſcan and Doric orders, by the ſame name *.

* See Pl. I. fig. 1.

Abacus is alſo the name of an ancient inſtrument for facilitating operations in arithmetic. It is variouſly contrived. That chiefly uſed in Europe is made by drawing any number of parallel lines at the diſtance of two diameters of one of the counters uſed in the calculation. A counter placed on the loweſt line, ſignifies 1; on the 2d, 10; on the 3d, 100; on the 4th, 1000, &c. In the intermediate ſpaces, the ſame counters are eſtimated at one half of the value of the line immediately ſuperior, *viz.* between the 1ſt and 2d, 5; between the 2d and 3d, 50, &c. See Plate I. fig. 2. A B, where the ſame number, 1777 for example, is repreſented under both by different diſpoſitions of the counters.

Chineſe Abacus. See Chineſe-Swanpan.

Abacus *Pythagoricus*, the common multiplication-table; ſo called from its being invented by Pythagoras.

Abacus is alſo uſed by modern writers for a table of numbers ready caſt up, to expedite the operations of arithmetic. In this ſenſe we have *Abaci* of addition, of multiplication, of diviſion; an *Abacus logiſticus*; *Abacus* of ſquares, of cubes, &c.

Abacus *Logiſticus* is a rectangled triangle, whoſe ſides, forming the right angle, contain the numbers from 1 to 60; and its area, the facta of each two of the numbers perpendicularly oppoſite. This is alſo called a *canon of ſexageſimals*.

Abacus & *Palmulæ*, in the ancient muſic, denote the machinery, whereby the ſtrings of polyplectra, or inſtruments of many ſtrings, were ſtruck with a plectrum made of quills.

Abacus *Harmonicus*, is uſed by Kircher for the ſtructure and diſpoſition of the keys of a muſical inſtrument, whether to be touched with the hands or the feet.

Abacus *Major*, in metallurgic operations, the name of a trough uſed in the mines, wherein the ore is waſhed.

ABADDON, is the name which St John in the Revelations gives to the king of the locuſt, the angel of the bottomleſs pit. The inſpired writer ſays, this word is Hebrew, and in Greek ſignifies Ἀπολλυων, *i. e.* a *deſtroyer*. That angel-king is thought to be Satan or the devil: but Mr le Clerc thinks *, with Dr Hammond, that by the locuſt which came out of the abyſs, may be underſtood the zealots and robbers, who miſerably afflicted the land of Judea, and laid it in a manner waſte, before Jeruſalem was taken by the Romans; and that Abaddon, the king of the locuſt, may be John of Giſchala, who, having treacherouſly left that town a little before it was ſurrendered to Titus, came to Jeruſalem, where he ſoon headed part of the zealots, who acknowledged him as their king †, whilſt the reſt would not ſubmit to him. This ſubdiviſion of the zealot-party brought a thouſand calamities on the Jews.

* Hamm. on Rev. ix. & le Clerc's *Suppl.*

† Joſeph. *de bel. Jud.* lib. iv. c. 2, 7. Haverc.

ABADIR, a title which the Carthaginians gave to gods of the firſt order. In the Roman mythology, it is the name of a ſtone which Saturn ſwallowed, by the contrivance of his wife Ops, believing it to be his new-born ſon Jupiter: hence it ridiculouſly became the object of religious worſhip.

ABÆ, or Aba, a town of Phocis in Greece, near Helicon; famous for an oracle of Apollo older than that at Delphi, and for a rich temple plundered and burnt by the Perſians. (Strabo.)

ABAFT, a ſea-term, ſignifying the hinder part of a ſhip, or all thoſe parts both within and without which lie towards the ſtern, in oppoſition to Afore; which ſee.—*Abaft*, is alſo uſed as a prepoſition, and ſignifies *further aft*, or *nearer the ſtern*; as, the barricade ſtands *abaft* the main-maſt, *i. e.* behind it, or nearer the ſtern.

ABAISED, *Abaiſſe*, in heraldry, an epithet applied to the wings of eagles, &c. when the tip looks downwards to the point of the ſhield, or when the wings are ſhut, the natural way of bearing them being extended.

ABALAK, a town in Siberia, two miles from Tobolſkoi, where there is a famous picture of the Virgin Mary, that is conſtantly viſited by a great number of pilgrims: the clergy carry this image every year in proceſſion to Tobolſkoi, where it is kept for a fortnight. E. Long. 64. 10. Lat. 57. 1.

ABALIENATION, in law, the act of transferring one man's property to another.

ABALIENATUS, among phyſicians, means corrupted. When applied to the body, it ſignifies that a part is ſo deſtroyed as to require extirpation. When applied to the ſenſes, it expreſſes their total deſtruction.

ABALLABA, now *Appleby*, a town in Weſtmoreland, remarkable only for its antiquity, having been a Roman ſtation. (Notitia Imperii.) See Appleby.

ABANA, (Bible,) otherwiſe *Amana*, a river of Phœnicia, which, riſing from mount Hermon, waſhes the ſouth and weſt ſides of Damaſcus, and falls into the Phœnician ſea, to the north of Tripolis, called *Chryſorrhoas* by the Greeks.

ABANGA, the name of the fruit of the palm-tree, in the iſland of St Thomas. The tree is the *Palma Ady*

Inſulæ S. Thomæ, C. B. The fruit is like a lemon externally; and the inhabitants give three or four of the kernels two or three times a-day as a reſtorative *.

ABANO, a town of the Paduano, in the republic of Venice, famous among the ancients for its hot baths. It is five miles ſouth-weſt of Padua, and fifteen ſouth-eaſt of Vicentia. E. Long. 10. 7. Lat. 45. 20.

ABANTES, a people who came originally from Thrace, and ſettled in Phoceca, a country of Greece, where they built a town which they called Aba, after the name of Abas their leader; and, if we may credit ſome ancient authors, the Abantes went afterwards into the iſland Eubœa, now called Negropont: others ſay the Abantes of Eubœa came from Athens. The Abantes were a very warlike people, cloſing with their enemies, and fighting hand to hand. See next article.

ABANTIAS, or Abantis, a name of the iſland Eubœa, in the Egean ſea, extending along the coaſt of Greece, from the promontory Sunium of Attica to Theſſaly; and ſeparated from Bœotia by a narrow ſtrait, called Euripus. From its length the iſland was formerly called *Macris:* afterwards *Abantias*, or *Abantis*, from the Abantes, a people originally of Thrace, called by Homer ὄπισθεν κομόωντας, from wearing their hair long behind, having in a battle experienced the inconvenience of wearing it long before; and from cutting their forelocks, they were called *Curetes*. (*Abantæus*, the epithet; Ovid.) See Abantes.

ABAPTISTON, in ſurgery, the perforating part of the inſtrument called a trepan. The word is from the negative α, and βαπτω to ſink under. This inſtrument hath had various contrivances to prevent its ſinking ſuddenly upon the membranes of the brain when the operator was ſawing the ſkull: whence its name. But the preſent practice proves all precautions needleſs, unleſs the operator is attentive and careful when he uſes this inſtrument.

ABARA, a town in the Greater Armenia, under the dominion of the Turks: it is often the reſidence of the archbiſhop of Nakſivan, from which place it is twenty miles north. Long. 46. 25. Lat. 39. 45.

ABARANER, a town of Aſia, in Grand Armenia, belonging to the Turks. It is ſeated on the river Alingena, twenty miles north of Nakſivan. Long. 46. 30. Lat. 39. 50.

ABARIM, high mountains of ſteep aſcent, ſeparating the country of the Ammonites and Moabites from the land of Canaan, where Moſes died. According to Joſephus, they ſtood oppoſite to the territory of Jericho, and were the laſt ſtation but one of the Iſraelites coming from Egypt. Nebah and Piſgah were parts of theſe mountains.

ABARIS, the Hyperborean; a celebrated ſage of antiquity, whoſe hiſtory and travels have been the ſubject of much learned diſcuſſion. Such a number of fabulous ſtories * were told of him, that Herodotus himſelf ſeems to ſcruple to relate them. He tells us only †, that this Barbarian was ſaid to have travelled with an arrow, and took no ſuſtenance: but this does not acquaint us with the marvellous properties which were attributed to that arrow; nor that it had been given him by the Hyperborean Apollo. With regard to the occaſion of his leaving his native country, Harpocration ‡ tells us, that the whole earth being infeſted with a deadly plague, Apollo, upon being conſulted, gave no other anſwer, than that the Athenians ſhould offer up prayers in behalf of all other nations: upon which, ſeveral countries deputed ambaſſadors to Athens, among whom was Abaris the Hyperborean. In this journey, he renewed the alliance between his countrymen and the inhabitants of the iſland of Delos. It appears that he alſo went to Lacedæmon; ſince, according to ſome writers ||, he there built a temple conſecrated to Proſerpine the Salutary. It is aſſerted, that he was capable of foretelling earthquakes, driving away plagues, laying ſtorms ‡, &c. He wrote ſeveral books, as Suidas † informs us, *viz.* Apollo's arrival into the country of the Hyperboreans; The nuptials of the river Hebrus; Θεογονια, or the Generation of the Gods; A collection of oracles; &c. Himerius * the ſophiſt applauds him for ſpeaking pure Greek; which attainment will be no matter of wonder to ſuch as conſider the ancient intercourſe there was between the Greeks and Hyperboreans.—If the Hebrides, or Weſtern Iſlands of Scotland, (ſays Mr Toland †), were the Hyperboreans of Diodorus ‡, then the celebrated Abaris was of that country; and likewiſe a druid, having been the prieſt of Apollo. Suidas, who knew not the diſtinction of the inſular Hyperboreans, makes him a Scythian; as do ſome others, miſled by the ſame vulgar error; though Diodorus has truly fixed his country in an iſland, and not on the continent. And indeed the fictions and miſtakes concerning our Abaris are infinite: however, it is by all agreed that he travelled quite over Greece, and from thence into Italy, where he converſed familiarly with Pythagoras, who favoured him beyond all his diſciples, by inſtructing him in his doctrines (eſpecially his thoughts of nature) in a plainer and more compendious method than he did any other. This diſtinction could not but be very advantageous to Abaris. The Hyperborean, in return, preſented the Samian, as though he equalled Apollo himſelf in wiſdom, with the ſacred arrow, on which the Greeks have fabulouſly related * that he ſat aſtride, and flew upon it, through the air, over rivers and lakes, foreſts and mountains; in like manner as our vulgar ſtill believe, particularly thoſe of the Hebrides, that wizards and witches fly whitherſoever they pleaſe on their broomſticks. The orator Himerius above mentioned, tho' one of thoſe who, from the equivocal ſenſe of the word Hyperborean, ſeem to have miſtaken Abaris for a Scythian, yet deſcribes his perſon accurately, and gives him a very noble character. "They relate (ſays he) "that Abaris the ſage was by nation an Hyperborean, appeared a Grecian in ſpeech, and reſembled "a Scythian in his habit and appearance. He came "to Athens, holding a bow in his hand, having a "quiver hanging on his ſhoulders, his body wrapt up "in a plad, girt about the loins with a gilded belt, "and wearing trowzers reaching from his waſte downward." By this it is evident (continues Mr Toland) that he was not habited like a Scythian, who were always covered with ſkins; but appeared in the native garb of an Aboriginal Scot. As to what relates to his abilities, Himerius informs us, that "he "was affable and pleaſant in converſation, in diſpatching great affairs ſecret and induſtrious, quick-ſighted "in preſent exigencies, in preventing future dangers circumſpect, a ſearcher after wiſdom, deſirous of friendſhip, truſting indeed little to fortune, and having every "thing

Abaris the Hyperborean.

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* See *Ady.*

* Jamblich. *Vita Pythag.*

† Lib. iv. cap. 36.

‡ Under the word Ἀβαρις.

|| Pauſanias, lib. iii. p. 94.

‡ Porphyry in *Vita Pythagor.*

† Under the word Ἀβαρις.

* Fragment of his Oration preſerved by Photius in his *Bibliotheca*, p. 1136.

† Account of the Druids, in his *Poſthumous Works*, vol. i. p. 161.

‡ Diod. Sic. lib. ii, iii.

* Jamblichi *Vita Pythag.* p. 128.

“ thing truſted to him for his prudence.” Neither the Academy nor the Lycæum could have furniſhed a man with fitter qualities to travel ſo far abroad, and to ſuch wiſe nations, about affairs no leſs arduous than important. And if we further attentively conſider his moderation in eating, drinking, and the uſe of all thoſe things which our natural appetites inceſſantly crave; joining the candour and ſimplicity of his manners with the ſolidity and wiſdom of his anſwers, all which we find ſufficiently atteſted; it muſt be owned, that the world at that time had few to compare with Abaris.

ABARTICULATIO, in anatomy, a ſpecies of articulation admitting of a manifeſt motion; called alſo Diarthroſis, and Dearticulatio, to diſtinguiſh it from that ſort of articulation which admits of a very obſcure motion, and is called Synarthroſis. See Articulatio.

ABAS, a weight uſed in Perſia for weighing pearls. It is 1-8th leſs than the European carat.

Abas, in the heathen mythology, was the ſon of Hypothoon and Meganira, who entertained Ceres, and offered a ſacrifice to that goddeſs; but Abas ridiculing the ceremony, and giving her opprobrious language, ſhe ſprinkled him with a certain mixture ſhe held in her cup, on which he became a newt or water-lizard.

Abas (Schah) the Great, was third ſon of Codabendi, 7th king of Perſia, of the race of the Sophis. Succeeding to his father at 18, in 1585, he found the affairs of Perſia at a low ebb, occaſioned by the conqueſts of the Turks and Tartars. He regained ſeveral of the provinces they had ſeized; but death put a ſtop to his victories in 1629, after a reign of 44 years. He was the greateſt prince that had reigned in Perſia for many ages; and it was he who made Iſpahan the metropolis of Perſia: his memory is held in the higheſt veneration among the Perſians.

Abas (Schah) his grandſon, 9th king of Perſia, of the race of the Sophis, ſucceeded his father Sefi at 13 years of age: he was but 18 when he made himſelf maſter of the city Candahar, which had ſurrendered in his father's reign to the Great Mogul, and all the province about it; and he preſerved it afterwards againſt this Indian emperor, though he beſieged it more than once with an army of 300,000 men. He was a very merciful prince, and openly protected the Chriſtians: he had formed a deſign of extending the limits of his kingdom toward the north, and had for that effect levied a powerful army; but death put a ſtop to all his great deſigns, at 37 years of age, in 1666.

ABASCIA, or Abcas, a country in Aſia, tributary to the Turks, ſituated on the coaſt of the Black Sea. The people are poor, thieviſh, and treacherous, inſomuch that there is no trading with them without the utmoſt caution. Their commodities are furs, buck and tyger ſkins, linen yarn, boxwood, and bees-wax: but their greateſt traffic is in ſelling their own children, and even one another, to the Turks; inſomuch that they live in perpetual diſtruſt. They are deſtitute of many neceſſaries of life, and have nothing among them that can be called a town; though we find Anacopia, Dandar, and Czekorni, mentioned in the maps. They have the name of Chriſtians; but have nothing left but the name, any more than the Mingrelians their northern neighbours. The men are robuſt and active, and the women are fair and beautiful; on which account the Turks have a great value for the female ſlaves which they purchaſe from among them. Their cuſtoms are much the ſame as thoſe of the Mingrelians; which ſee. E. Long. from 39 to 43. Lat. from 43 to 45.

ABASSI, or Abassis, a ſilver coin current in Perſia, equivalent in value to a French livre, or tenpence halfpenny Sterling. It took its name from Schah Abas II. king of Perſia, under whom it was ſtruck.

ABATAMENTUM, in law, is an entry to lands by interpoſition, *i. e.* when a perſon dies ſeized, and another who has no right enters before the heir.

To ABATE, (from the French *abbatre*, to pull down, overthrow, demoliſh, batter down, or deſtroy), a term uſed by the writers of the Engliſh common-law both in an active and neutral ſenſe; as, To abate a caſtle, is to beat it down. To abate a writ, is, by ſome exception, to defeat or overthrow it. A ſtranger abateth; that is, entereth upon a houſe or land void by the death of him that laſt poſſeſſed it, before the heir takes poſſeſſion, and ſo keepeth him out: wherefore, as he that putteth out him in poſſeſſion is ſaid to diſſeize, ſo he that ſteppeth in between the former poſſeſſor and his heir is ſaid to abate. In the neuter ſignification thus: The writ of the demandant ſhall abate; that is, ſhall be diſabled, fruſtrated, or overthrown. The appeal abateth by covin; that is, the accuſation is defeated by deceit.

Abate, in the manege, implies the performing any downward motion properly. Thus a horſe is ſaid to abate or take down his curvets, when he puts both his hind legs to the ground at once, and obſerves the ſame exactneſs in all the times.

ABATEMENT, in heraldry, an accidental figure ſuppoſed to have been added to coats-of-arms, in order to denote ſome diſhonourable demeanour or ſtain, whereby the dignity of the coat-armour was rendered of leſs eſteem. See Heraldry, n° 12, l.

Abatement, in law. See *To* Abate.

Abatement, in the cuſtoms, an allowance made upon the duty of goods, when the quantum damaged is determined by the judgment of two merchants upon oath, and aſcertained by a certificate from the ſurveyor and land-waiter.

ABATIS, an ancient term for an officer of the ſtables.

ABATOR, in law, a term applied to a perſon who enters to a houſe or lands, void by the death of the laſt poſſeſſor, before the true heir.

ABATOS, an iſland in the lake Mœris, formerly famous for its flax and papyrus. It was the burial-place of Oſiris, (Lucan.)

ABAVO, in botany, a ſynonime of the adanſonia*.

ABB, a term, among clothiers, applied to the yarn of a weaver's warp. They alſo ſay *Abb-wool* in the ſame ſenſe.

ABBA, in the Syriac and Chaldee languages, literally ſignifies a *father**; and figuratively, a ſuperior, reputed as a father in reſpect of age, dignity, or affection. It is alſo a Jewiſh title of honour given to ſome of the claſs called Tanaites.

* See *Adanſonia*.

* See *Abbot*.

ABBADIE (James) an eminent Proteſtant divine, born at Nay in Bern, in 1654; firſt educated there under the famous John la Placette, and afterward at the univerſity of Sedan. From thence he went into Holland and Germany, and was miniſter in the French church of Berlin. He left that place in 1690; came into Engand; was ſome time miniſter in the French church in the Savoy, London; and was made dean of Killalow in Ireland. He died at St Mary le Bonne near London, in 1727, aged 73. He was ſtrongly attached to the cauſe of king William, as appears in his elaborate defence of the revolution, and his hiſtory of the aſſaſſination-plot. He had great natural abilities, which he improved by true and uſeful learning. He was a moſt zealous defender of the primitive doctrine of the Proteſtants, as appears by his writings; and that ſtrong nervous eloquence, for which he was ſo remarkable, enabled him to enforce the doctrines of his profeſſion from the pulpit with great ſpirit and energy. He publiſhed ſeveral works in French that were much eſteemed; the principal of which are, A Treatiſe on the Truth of the Chriſtian Religion; The art of Knowing one's Self; A Defence of the Britiſh Nation; and, The Hiſtory of the laſt Conſpiracy in England, written by order of king William III.

ABBAS, ſon of Abdalmothleb, and Mahomet's uncle, oppoſed his nephew with all his power, eſteeming him an impoſtor and infidel; but in the ſecond year of the hegira, being overcome and made a priſoner at the battle of Bendir in 623, a great ranſom being demanded for him, he repreſented to Mahomet, that his paying it would reduce him to poverty, which would redound to the diſhonour of the family. But Mahomet having been informed of Abbas's having ſecreted large ſums of money, aſked him after the purſes of gold he had left in his mother's cuſtody at Mecca. Abbas, upon this, conceiving him to be really a prophet, embraced his new religion; became one of his principal captains; and ſaved his life when in imminent danger at the battle of Henain, againſt the Thakeſites, ſoon after the reduction of Mecca. But beſides being a great commander, Abbas was a famous doctor of the Muſſulman law, inſomuch that he read lectures upon every chapter of the Koran, as his nephew pretended to receive them one by one from heaven. He died in 652, and his memory is held in the higheſt veneration among the Muſſulmans to this day.

Abul ABBAS, ſirnamed *Saffah*, was proclaimed khalif; and in him began the Dynaſty of the

ABBASSIDES, who poſſeſſed the khalifate for 524 years; and there were 37 khalifs of this race who ſucceeded one another without interruption.

ABBE, in a monaſtic ſenſe, the ſame with Abbot *.

* See *Abbot.*

ABBE, in a modern ſenſe, is the name of a curious popular character in France, very much mentioned, but very little known, in Britain. The term is not to be rendered in our language, as the exiſtence of the being which it denominates is poſterior to the reformation, and no ſuch character was known among the Romaniſts till about a century and a half ago.

Abbés, according to the ſtricteſt definition, are perſons who have not yet obtained any preciſe or fixed ſettlement in church or ſtate, but moſt heartily wiſh for, and would accept of, either, juſt as it may happen. In the mean while, their privileges are many. They are admiſſible in all companies, and no degradation to the beſt, notwithſtanding they are ſometimes found in the worſt. Their dreſs is rather that of an academic, or of a profeſſed ſcholar, than of an eccleſiaſtic; and, never varying in colour, is no incumbrance on the pocket.

Theſe abbés are very numerous, and no leſs uſeful. They are, in colleges, the inſtructors of youth; in private families, the tutors of young gentlemen; and many procure a decent livelihood by their literary and witty compoſitions of all kinds, from the profoundeſt philoſophy to the moſt airy romances. They are, in ſhort, a body of men who poſſeſs a fund of univerſal talents and learning, and are inceſſantly employed in the cultivation of every various branch of literature and ingenuity. No ſubject whatever eſcapes them; ſerious or gay, ſolid or ludicrous, ſacred or profane, all pay tribute to their reſearches; and as they are converſant in the loweſt as well as the higheſt topics, their fame is equally great in the learned and in the ſcribbling world. —A diſtinguiſhing part of their character, too, though we ſhall but ſlightly touch it, is their devotion to the fair ſex: whoſe favourites, in return, they have the honour of being in the moſt enviable degree; the wit and ſmartneſs for which they are uſually remarkable, being juſt the very things that ſuit the French ladies.—In fine, theſe abbés are ſought after by moſt people, on various accounts; as they are equally men of buſineſs and pleaſure, not leſs expert in the moſt ſerious tranſactions, than fond of enjoying their ſhare of whatever occupies the gay world. Hence they diligently frequent all public ſpectacles, which are thought incomplete without them; as they compoſe the moſt intelligent part of the company, and are the moſt weighty approvers or condemners of what paſſes in almoſt all places.

ABBESS, the ſuperior of an abbey or convent of nuns *. The abbeſs has the ſame rights and authority over her nuns, that the abbots regular have over their monks. The ſex indeed does not allow her to perform the ſpiritual functions annexed to the prieſthood, wherewith the abbot is uſually inveſted; but there are inſtances of ſome abbeſſes who have a right, or rather a privilege, to commiſſion a prieſt to act for them. They have even a kind of epiſcopal juriſdiction, as well as ſome abbots who are exempted from the viſitation of their dioceſans.

* See *Abbey* and *Nun.*

ABBEVILLE, a conſiderable city of France in Picardy, and the capital of Ponthieu; the river Somme runs through the middle of it, and divides it into two parts. It has a collegiate church and twelve pariſh-churches, the moſt conſiderable of which are St George's and St Giles's, beſides a great number of monaſteries and nunneries, a bailiwic, and a preſidial court. It is a fortified town; the walls are flanked with baſtions, and ſurrounded by large ditches; and it was never yet taken. The country about it is low, marſhy, and dirty. It is pretty well peopled, and is famous for its woollen manufactory. It is about fifteen miles eaſt of the Britiſh channel, and ſhips may come from thence by the river Somme to the middle of the town. It is ninety miles almoſt directly north of Paris. E. Long. 2. 6. Lat. 50. 7.

ABBEY, a monaſtery, or religious houſe, governed by a ſuperior under the title of abbot or abbeſs *.

* See *Abbot* and *Abbeſs.*

Abbeys differ from *priories*, in that the former are under the direction of an abbot, and the others of a prior †: but abbot and prior (we mean a prior conventual) are much the ſame thing, differing in little but the name.

† See *Prior.*

Fauchet obſerves, that, in the early days of the French monarchy, dukes and counts were called *abbots*, and duchies and counties *abbeys*. Even ſome of their kings are mentioned in hiſtory under the title of abbots. Philip I. Louis VI. and afterwards the dukes of Orleans, are called abbots of the monaſtery of St Aignan. The dukes of Aquitain were called abbots of the monaſtery of St Hilary, at Poictiers; and the earls of Anjou of S. Aubin, &c.

Monaſteries were at firſt nothing more than religious houſes, whither perſons retired from the buſtle of the world to ſpend their time in ſolitude and devotion. But they ſoon degenerated from their original inſtitution, and procured large privileges, exemptions, and riches. They prevailed greatly in Britain before the reformation; particularly in England: and as they increaſed in riches, ſo the ſtate became poor; for the lands, which theſe regulars poſſeſſed, were *in mortua manu*, i. e. could never revert to the lords who gave them. This inconvenience gave riſe to the ſtatutes againſt gifts in *mortmaine*, which prohibited donations to theſe religious houſes; and Lord Coke tells us, that ſeveral lords, at their creation, had a clauſe in their grant, that the Donor might give or ſell his land to whom he would *(exceptis viris Religioſis & Judæis)* excepting Monks and Jews.

Theſe places were wholly aboliſhed in England at the time of the Reformation; Henry VIII. having firſt appointed viſitors to inſpect into the lives of the monks and nuns, which were found very diſorderly: upon which, the abbots, perceiving their diſſolution unavoidable, were induced to reſign their houſes to the king, who by that means became inveſted with the abbey-lands: theſe were afterwards granted to different perſons, whoſe deſcendents enjoy them at this day: they were then valued at 2,853,000 *l.* per annum, an immenſe ſum in thoſe days.

ABBEY-BOYLE, a town of Ireland, in the county of Roſcommon and province of Connaught, twenty-three miles north of Roſcommon. W. Long. 8. 32. Lat. 56. 54. It is remarkable for an old abbey.

ABBEY-HOLM, a town in Cumberland, ſo called from an abbey built there by David king of Scots. It ſtands on an arm of the ſea, and had a market on Saturdays; it has now a fair on October 29, for horſes and horned cattle: it is ſixteen miles ſouth-weſt of Carliſle. W. Long. 2. 38. Lat. 54. 45.

ABBOT, or Abbat, the ſuperior of a monaſtery of monks erected into an abbey or prelacy *.

The name *Abbot* is originally Hebrew, where it ſignifies father. The Jews call *father*, in their language, *Ab*; whence the Chaldeans and Syrians formed *Abba*; thence the Greeks Αϐϐας, which the Latins retained, *Abbas*; and hence our *Abbot*, the French *Abbé*, &c. —St Mark and St Paul uſe the Syriac *Abba* in their Greek, by reaſon it was then commonly known in the ſynagogues and the primitive aſſemblies of the Chriſtians; adding to it, by way of interpretation, the word *father*, Αϐϐα ο πατηρ, "Abba, father;" *q. d.* Abba, that is to ſay, Father.—But the name Ab, and Abba, which at firſt was a term of tenderneſs and affection in the Hebrew and Chaldee, became at length a title of dignity and honour: The Jewiſh doctors affected it; and one of their moſt ancient books, containing the ſayings or apophthegms of divers of them, is entitled Pirke *Abboth*, or Avoth; *i. e.* Chapters of the Fathers. It was in alluſion to this affectation, that Jeſus Chriſt forbad his diſciples to call any man their father on earth; which word St Jerome turns againſt the ſuperiors of the monaſteries of his time, for aſſuming the title of *Abbots*, or Fathers.

The name *Abbot*, then, appears as old as the inſtitution of monks itſelf.—The governors of the primitive monaſteries aſſumed indifferently the titles *Abbots*, and *Archimandrites* *. They were really diſtinguiſhed from the clergy; though frequently confounded with them, becauſe a degree above laymen.

In thoſe early days, the abbots were ſubject to the biſhops and the ordinary paſtors. Their monaſteries being remote from cities, built in the fartheſt ſolitudes, they had no ſhare in eccleſiaſtical affairs. They went on Sundays to the pariſh-church with the reſt of the people; or, if they were too remote, a prieſt was ſent them to adminiſter the ſacraments; till at length they were allowed to have prieſts of their own body. The abbot or archimandrite himſelf was uſually the prieſt: but his function extended no farther than to the ſpiritual aſſiſtance of his monaſtery; and he remained ſtill in obedience to the biſhop. There being among the abbots ſeveral perſons of learning, they made a vigorous oppoſition to the riſing hereſies of thoſe times; which firſt occaſioned the biſhops to call them out of their deſarts, and fix them about the ſuburbs of cities, and at length in the cities themſelves: from which æra their degeneracy is to be dated. The abbots, now, ſoon wore off their former plainneſs and ſimplicity, and began to be looked on as a ſort of little prelates. They aſpired at being independent of the biſhops; and became ſo inſupportable, that ſome ſevere laws were made againſt them at the council of Chalcedon: this notwithſtanding, in time many of them carried the point of independency; and got the appellation of *lord*, with other badges of the epiſcopate, particularly the mitre.

Hence aroſe new ſpecies of diſtinctions between the abbots. Thoſe were termed *mitred* abbots, who were privileged to wear the mitre, and exerciſe epiſcopal authority within their reſpective precincts, being exempted from the juriſdiction of the biſhop. Others were called *croſiered* abbots, from their bearing the croſier or paſtoral ſtaff. Others were ſtyled *œcumenical* or univerſal abbots, in imitation of the patriarch of Conſtantinople: while others were termed *cardinal* abbots, from their ſuperiority over all other abbots.—Among us, the mitred abbots were lords of parliament; and called abbots-ſovereign, and abbots-general, to diſtinguiſh them from the other abbots. And as there were lords abbots, ſo there were alſo lords priors, who had exempt juriſdiction, and were likewiſe lords of Parliament. Some reckon 26 of theſe lords abbots and priors, that ſat in parliament. Sir Edward Coke ſays, that there were 27 parliamentary abbots, and two priors. In the parliament 20 Rich. II. there were but 25 abbots, and two priors: but in the ſummons to parliament, *anno* 4 Ed. III. more are named.

At preſent, in the Roman-catholic countries, the principal diſtinctions obſerved between abbots, are thoſe of *regular* and *commendatory*. The former take the vow and wear the habit of their order; whereas the latter are ſeculars, though they are obliged by their bulls to take orders when of proper age.

Antiently the ceremony of creating an abbot conſiſted in cloathing him with the habit called *cuculla*, or cowl; putting the paſtoral ſtaff into his hand, and the ſhoes called *pedales* on his feet: but at preſent, it is only a ſimple benediction, improperly called, by ſome, conſecration.

Abbot is alſo a title given to others beſide the ſuperiors of monaſteries: thus biſhops, whoſe ſees were formerly abbeys, are called abbots; as are the ſuperiors of ſome congregations of regular canons, particularly

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* See *Abbey* and *Abbeſs*.

* See *Monk* and *Archimandrite*.

Archbiſhop Abbot.

cularly that of St Geneviéve at Paris: and among the Genoeſe, the chief magiſtrate of their republic formerly bore the title of abbot of the people. It was likewiſe uſual, about the time of Charlemagne, for ſeveral lords to aſſume the title of *count-abbots*, *abba-comites*; and that for no other reaſon, but becauſe the ſuperintendancy of certain abbeys was committed to them.

ABBOT (George), archbiſhop of Canterbury, was born October 29. 1562, at Guildford in Surrey. He went through his ſtudies at Oxford, and in 1597 was choſen principal of Univerſity College. In 1599, he was inſtalled dean of Wincheſter: the year following, he was choſen vice-chancellor of the univerſity of Oxford, and a ſecond time in 1603. In 1604, that tranſlation of the bible now in uſe was begun by the direction of king James; and Dr Abbot was the ſecond of eight divines of Oxford, to whom the care of tranſlating the whole New Teſtament (excepting the epiſtles) was committed. The year following, he was a third time vice-chancellor. In 1608, he went to Scotland with George Hume earl of Dunbar, to aſſiſt in eſtabliſhing an union betwixt the kirk of Scotland and the church of England; and in this affair he behaved[*] with ſo much addreſs and moderation, that it laid the foundation of all his future preferment. For king James ever after paid great deference to his advice and counſel; and upon the death of Dr Overton biſhop of Litchfield and Coventry, he named Dr Abbot for his ſucceſſor, who was accordingly conſecrated biſhop of thoſe two united ſees in December 1609. About a month afterwards he was tranſlated to the ſee of London, and on the ſecond of November thereafter was raiſed to the archiepiſcopal ſee. His great zeal for the Proteſtant religion made him a ſtrenuous promoter of the match between the Elector Palatine and the princeſs Elizabeth; which was accordingly concluded and ſolemnized the 14th of February 1612, the archbiſhop performing the ceremony on a ſtage erected in the royal chapel. In the following year happened the famous caſe of divorce betwixt the lady Francis Howard, daughter of the earl of Suffolk, and Robert earl of Eſſex: an affair which has been by many conſidered as one of the greateſt blemiſhes of king James's reign; but the part acted therein by the archbiſhop added much to the reputation he had already acquired for incorruptible integrity. The matter was by the king referred to a court of delegates. The archbiſhop ſaw plainly, that his Majeſty was very deſirous the lady ſhould be divorced; but he was, in his own judgment, directly againſt the divorce. He laboured all he could to extricate himſelf from this difficulty, by having an end put to the cauſe by ſome other way than by ſentence: but it was to no purpoſe; for thoſe who drove on this affair, had got too great power to be reſtrained from bringing it to the concluſion the king deſired. The archbiſhop prepared a ſpeech, which he intended to have ſpoken againſt the nullity of the marriage, in the court at Lambeth; but he did not make uſe of it, becauſe the king ordered the opinions to be given in few words. He continued, however, inflexible in his opinion againſt the divorce; and drew up his reaſons, which the king thought fit to anſwer himſelf. It need ſcarce be added, that ſentence was given in the lady's favour.—In 1618, the king publiſhed a declaration, which he ordered to be read in all churches, permitting ſports and paſtimes on the Lord's day: this gave great uneaſineſs to the archbiſhop; who, happening to be at Croydon when it came thither, had the courage to forbid its being read.—Being now in a declining ſtate of health, the archbiſhop uſed in the ſummer to go to Hampſhire for the ſake of recreation; and being invited by lord Zouch to hunt in his park at Bramzill, he met there with the greateſt misfortune that ever befell him; for he accidentally killed the game-keeper, by an arrow from a croſs-bow which he ſhot at one of the deer. This accident threw him into a deep melancholy; and he ever afterwards kept a monthly faſt on Tueſday, the day on which this fatal miſchance happened, and he ſettled an annuity of 20*l.* on the widow[*]. There were ſeveral perſons who took an advantage of this misfortune, to leſſen him in the king's favour; but his Majeſty ſaid, "An angel might have miſcarried in this ſort." His enemies alledging that he had incurred an irregularity, and was thereby incapacitated for performing the offices of a primate; the king directed a commiſſion to ten perſons to inquire into this matter. The reſult, however, was not ſatisfactory to his Grace's enemies; it being declared, that, as the murder was involuntary, he had not forfeited his archiepiſcopal character. The archbiſhop thenceforward ſeldom aſſiſted at the council, being chiefly hindered by his infirmities; but in the king's laſt illneſs he was ſent for, and attended with great conſtancy till his Majeſty expired on the 27th of March 1625. He performed the ceremony of the coronation of king Charles I. though very infirm and much troubled with the gout. He was never greatly in this king's favour; and the duke of Buckingham being his declared enemy, watched an opportunity of making him feel the weight of his diſpleaſure. This he at laſt accompliſhed, upon the archbiſhop's refuſing to licenſe a ſermon, preached by Dr Sibthorpe to juſtify a loan which the king had demanded, and pregnant with principles which tended to overthrow the conſtitution. The archbiſhop was immediately after ſuſpended from all his functions as primate; and they were exerciſed by certain biſhops commiſſioned by the king, of whom Laud, the archbp's enemy, and afterwards his ſucceſſor, was one: while the only cauſe aſſigned for this procedure was, That the archbiſhop could not at that time perſonally attend thoſe ſervices which were otherwiſe proper for his cogniſance and direction. He did not, however, remain long in this ſituation; for a parliament being abſolutely neceſſary, his Grace was ſent for, and reſtored to his authority and juriſdiction. But not proving friendly to certain rigorous meaſures adopted by the prevailing church-party, headed by Laud, whoſe power and intereſt at court was now very conſiderable, his preſence became unwelcome there; ſo that upon the birth of the prince of Wales, afterwards Charles II. Laud had the honour to baptize him, as dean of the chapel. The archbiſhop being worn out with cares and infirmities, died at Croydon, the 5th of Auguſt 1633, aged ſeventy-one years; and was buried at Guilford, the place of his nativity, and where he had endowed an hoſpital with lands to the amount of 300*l.* per annum. A ſtately monument was erected over the grave, with the effigy of the archbiſhop in his robes. He ſhewed himſelf, in moſt circumſtances of his life, a man of great moderation to all parties; and was deſirous that the clergy ſhould attract the eſteem of the laity by the ſanctity of their manners, rather than claim it as due to their function. His notions and principles, however, not ſuiting the humour of ſome writers, have drawn upon him many ſevere reflections; particularly, which is to be regretted, from the earl of Clarendon. But Dr Welwood has done more juſtice to his merit and abilities *. He wrote ſeveral tracts upon various ſubjects; and, as already mentioned, tranſlated part of the New Teſtament, with the reſt of the Oxford divines, 1611.

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[*] Heylin's hiſt. of Preſbyterians, p. 83.

[*] Fuller's church-hiſt. cent. xviii. p. 87.

ABBOT (Robert,) elder brother to the former, and born at Guilford in 1560, went through his ſtudies in Baliol college, Oxford. In 1582, he took his degree of maſter of arts, and ſoon became a celebrated preacher; and to this talent he chiefly owed his preferment. Upon his firſt ſermon at Worceſter, he was choſen lecturer in that city, and ſoon after rector of All-ſaints in the ſame place. John Stanhope, eſq; happening to hear him preach at Paul's-croſs, was ſo pleaſed with him, that he immediately preſented him to the rich living of Bingham in Nottinghamſhire. In 1597, he took his degree of doctor in divinity: and, in the beginning of king James's reign, was appointed chaplain in ordinary to his Majeſty; who had ſuch an opinion of him as a writer, that he ordered the doctor's book *De Antichriſto* to be printed with his own commentary upon part of the Apocalypſe. In 1609, he was elected maſter of Baliol college; which truſt he diſcharged with the utmoſt care and aſſiduity, by his frequent lectures to the ſcholars, by his continual preſence at public exerciſes, and by promoting temperance in the ſociety. In November 1610, he was made prebendary of Normanton in the church of Southwell; and, in 1612, his Majeſty appointed him regius profeſſor of divinity at Oxford. The fame of his lectures became very great; and thoſe which he gave upon the ſupreme power of kings againſt Bellarmine and Suarez, ſo much pleaſed his Majeſty, that, when the ſee of Saliſbury became vacant, he named him to that biſhoprick, and he was conſecrated by his own brother at Lambeth, December 3, 1615. When he came to Saliſbury, he found the cathedral running to decay, through the negligence and covetouſneſs of the clergy belonging to it: however, he found means to draw five hundred pounds from the prebendaries, which he applied to the reparation of this church. He then gave himſelf up to the duties of his function with great diligence and aſſiduity, viſiting his whole dioceſe in perſon, and preaching every Sunday whilſt health would permit. But this was not long: for his ſedentary life, and cloſe application to ſtudy, brought upon him the gravel and ſtone; of which he died on the 2d of March 1618, in the fifty-eighth year of his age; having not filled the ſee quite two years and three months, and being one of the five biſhops which Saliſbury had in ſix years. He was buried oppoſite to the biſhop's ſeat in the cathedral. Dr Fuller *, ſpeaking of the two brothers, ſays, "that George was the more plauſible preacher, Robert the greateſt ſcholar; George the abler ſtateſman, Robert the deeper divine; gravity did frown in George, and ſmile in Robert." He publiſhed ſeveral pieces; and alſo left behind him ſundry manuſcripts, which Dr Corbet made a preſent of to the Bodleian library.

ABBOTS BROMLEY, a town in Staffordſhire, with a market on Tueſday. After the diſſolution of the monaſteries, it was given to the Lord Paget; and has ſince been called Paget's Bromley, and is ſo denominated in the county map. But it retains its old name in the king's books, and is a diſcharged vicarage of 30 *l.* clear yearly value. It likewiſe retains the old name with regard to the fairs; which are three, and all for horſes and horned cattle. They are on the Thurſday before Mid-lent Sunday, the 22d of May, and 24th of Auguſt. It is ſix miles eaſt of Stafford, ſeven north of Litchfield, and 128 north-weſt of London. W. Long. 1. 2. Lat. 52. 45.

ABBOTSBURY, a ſmall town in Dorſetſhire, with a market on Thurſday; ſeven miles weſt of Weymouth, ſeven ſouth-weſt of Dorcheſter, and a hundred and thirty-three weſt-by-ſouth of London. The fair is on July the tenth, for ſheep and toys. W. Long. 1. 17. Lat. 50. 40. The abbey near this town was founded by a Norman lady, about the year 1026; and Edward the Confeſſor and William the Conqueror were conſiderable benefactors to it.

ABBREVIATE *of Adjudications*, in Scots law, an abſtract or abridgment of a decreet of adjudication, which is recorded in a regiſter kept for that purpoſe *.

ABBREVIATION. See ABBREVIATURE.

ABBREVIATOR, in a general ſenſe, a perſon who abridges any large book into a narrower compaſs.

ABBREVIATORS, a college of 72 perſons in the chancery of Rome, who draw up the pope's brieves, and reduce petitions, when granted by him, into proper form for being converted into bulls.

ABBREVIATURE, or ABBREVIATION, properly ſignifies the ſubſtitution of a ſyllable or letter for a whole word: thus, M. ſtands for *munipulus*, a handful; and Cong. for *congius*, a gallon.

ABBREVIATURE, in a leſs proper ſenſe, is uſed for any mark or character. See CHARACTER.

ABBUTALS, ſignify the buttings or boundings of land towards any point. Limits were anciently diſtinguiſhed by artificial hillocks, which were called *botentines*; and hence *butting*. In a deſcription of the ſite of land, the ſides on the breadth are more properly *adjacentes*, and thoſe terminating the length are *abbutantes*; which, in old ſurveys, were ſometimes expreſſed by *capitare*, to head, whence abbutals are now called *head-lands*.

ABCEDARY, or ABCEDARIAN, an epithet given to compoſitions, the parts of which are diſpoſed in the order of the letters of the alphabet: thus we ſay, Abcedarian pſalms, lamentations, hymns, *&c.*

ABDALA, the ſon of Abdalmothleb, was the father of the prophet Mahomet.

ABDALMALEK, the ſon of Mirvan, and the 5th khalif of the race of the Ommiades, ſirnamed *Raſch al Hegiarat*, *i. e.* the ſkinner of a ſtone, becauſe of his extreme avarice; as alſo *Abeulzebab*, becauſe his breath was ſaid to be ſo poiſonous as to kill all the flies which reſted on his face. Yet he ſurpaſſed all his predeceſſors in power and dominion; for in his reign the Indies were conquered in the eaſt, and his armies penetrated Spain in the weſt: he likewiſe extended his empire toward the ſouth, by making himſelf maſter of Medina and Mecca. He began his reign in the 65 of the hegira, A. D. 648; reigned 15 years; and four of his ſons enjoyed the khalifate one after another.

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* Memoirs, 8vo. 1700. p. 38.

* *Worthies of England; in Surrey.*

* See *Law*, Part III. nº clxxii. 5.

ABDALMELEK (Ben Zohar), an eminent phyſician, commonly called by the Europeans *Avenzoar* *.

ABDALMOTHLEB, or ABDAL MATELEB, the ſon of Haſhem, the father of Abdalla, and grandfather of Mahomet the prophet of the Muſſulmans, was, it is ſaid, of ſuch wonderful comelineſs and beauty, that all women who ſaw him became enamoured: which may have given occaſion to that prophetic light, which, according to the Arabians, ſhone on the foreheads of him, his anceſtors, and deſcendants; it being certain that they were very handſome and graceful men. He died when Mahomet, of whom he had taken peculiar care, was only 8 or 9 years old; aged, according to ſome, 110, and according to other writers 120.

ABDALONYMUS, or ABDOLONYMUS, (in claſſic hiſtory), of the royal family of Sidon, and deſcended from king Cinyras, was contented to live in obſcurity, and get his ſubſiſtence by cultivating a garden, while Strato was in poſſeſſion of the crown of Sidon. Alexander the Great having depoſed Strato, inquired whether any of the race of Cinyras was living, that he might ſet him on the throne. It was generally thought that the whole race was extinct: but at laſt Abdalonymus was thought of, and mentioned to Alexander; who immediately ordered ſome of his ſoldiers to fetch him. They found the good man at work, happy in his poverty, and entirely a ſtranger to the noiſe of arms, with which all Aſia was at that time diſturbed; and they could ſcarcely perſuade him that they were in earneſt. Alexander was convinced of his high deſcent, by the dignity that appeared in his perſon; but was deſirous of learning from him in what manner he bore his poverty. "I wiſh (ſaid Abdalonymus) I may bear my new "condition as well: Theſe hands have ſupplied my "neceſſities: I have had nothing, and I have wanted "nothing." This anſwer pleaſed Alexander ſo much, that, beſides giving him all that was Strato's, he augmented his dominions, and gave him a large preſent out of the Perſian ſpoils.

ABDALS, in the Eaſtern countries, a kind of ſaints ſuppoſed to be inſpired to a degree of madneſs. The word comes, perhaps, from the Arabic, *Abdallah*, the ſervant of God. The Perſians call them *devaneh khoda*, ſimilar to the Latins way of ſpeaking of their prophets and ſibyls, *q. d. furentes deo*, raging with the god. They are often carried by exceſs of zeal, eſpecially in the Indies, to run about the ſtreets, and kill all they meet of a different religion; of which travellers furniſh many inſtances. The Engliſh call this, *running a muk*, from the name of the inſtrument, a ſort of poignard, which they employ on thoſe deſperate occaſions. If they are killed, as it commonly happens, before they have done much miſchief, they reckon it highly meritorious; and are eſteemed, by the vulgar, martyrs for their faith.

ABDERA, a maritime town of Thrace, not far from the mouth of the river Neſſus, on the eaſt ſide; (Strabo.) The foundation thereof, according to Herodotus, was attempted to be laid by Timeſius the Clazomenian; but he was forced by the Thracians to quit the deſign. The Teians undertook it, and ſucceeded; ſettling there, in order to avoid the inſults of the Perſians. —Several ſingularities are told of Abdera *. The graſs of the country round it was ſo ſtrong, that ſuch horſes as eat of it ran mad. In the reign of Caſſander king of Macedon, this city was ſo peſtered with frogs and rats, that the inhabitants were forced to quit it for a time. —The Abderites, or Abderitani, were very much derided for their want of wit and judgment: yet their city has given birth to ſeveral eminent perſons; as, Protagoras, Democritus, Anaxarchus, Hecatæus the hiſtorian, Nicænetus the poet, and many others, who were mentioned among the illuſtrious men.—In the reign of Lyſimachus, Abdera was afflicted for ſome months with a moſt extraordinary diſeaſe †: this was a burning fever, whoſe criſis was always on the ſeventh day, and then it left them; but it ſo diſtracted their imaginations, that they fancied themſelves players. After this, they were ever repeating verſes from ſome tragedy, and particularly out of the Andromeda of Euripides, as if they had been upon the ſtage; ſo that many of theſe pale, meager actors were pouring forth their tragic exclamations in every ſtreet. This delirium continued till the winter following; which was a very cold one, and therefore fitter to remove it. Lucian, who has deſcribed this diſeaſe, endeavours to account for it this manner: Archelaus, an excellent player, acted the Andromeda of Euripides before the Abderites, in the height of a very hot ſummer. Several had a fever at their coming out of the theatre; and as their imaginations were full of the tragedy, the delirium which the fever raiſed repreſented perpetually Andromeda, Perſeus, Meduſa, *&c.* and the ſeveral dramatic incidents, and called up the ideas of thoſe objects, and the pleaſure of the repreſentation, ſo ſtrongly, that they could not forbear imitating Archelaus's action and declamation: And from theſe the fever ſpread to others by infection.

ABDEST, a Perſian word, properly ſignifying the water placed in a baſon for waſhing the hands; but is uſed to imply the legal purifications practiſed by the Mahometans before they enter on their religious ceremonies.

ABDIAS of Babylon, one of the boldeſt legend-writers, who boaſted he had ſeen our Saviour, was one of the 72 diſciples, had been eye-witneſs of the actions and prayers at the deaths of ſeveral of the apoſtles, and had followed into Perſia St Simon and St Jude, who, he ſaid, made him the firſt biſhop of Babylon. His book entitled *Hiſtoria certaminis apoſtolici*, was publiſhed by Wolfgang Lazius, at Baſil, 1551; and it as ſince borne ſeveral impreſſions in different places.

ABDICATION, the action whereby a magiſtrate, or perſon in office, renounces and gives up the ſame before the term of ſervice is expired.

This word is frequently confounded with *reſignation*; but differs from it, in that abdication is done purely and ſimply, whereas reſignation is in favour of ſome third perſon. It is ſaid to be a renunciation, quitting, and relinquiſhing, ſo as to have nothing further to do with a thing; or the doing of ſuch actions as are inconſiſtent with the holding of it. On king James's leaving the kingdom, and abdicating the government, the lords would have had the word *deſertion* made uſe of; but the commons thought it was not comprehenſive enough, for that the king might then have liberty of returning.

ABDOMEN, in anatomy, is that part of the trunk of the body which lies between the thorax and the bottom of the pelvis. See ANATOMY, n° 349, &c.

ABDOMINALES, or ABDOMINAL FISHES, conſtitute the IVth Order of the *Fourth Claſs* of Animals, in the Linnæan ſyſtem. See Zoology, n° 10, d.

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* See *Avenzoar*.

* Plinii lib. xxv. c. 8. Juſt. lib. xv. c. 2.

† Lucianus, *quomodo Hiſt. ſit conſcribendus*, initio.

ABDON, one of the Levitical cities in the ſouth of the tribe of Aſher. (Joſhua.)

Abdon, the ſon of Hillel, a Pirathonite, ſucceeded Elon, and judged Iſrael eight years.

ABDUCTION, a form of reaſoning among logicians, which conſiſts in drawing concluſions from certain and undeniable propoſitions.

Abduction, in ſurgery, a ſpecies of fracture wherein the broken parts of the bone recede from each other.

ABDUCTOR, or **Abducent**, in anatomy, a name given to ſeveral of the muſcles on account of their ſerving to withdraw, open, or pull back, the parts to which they are fixed.

ABEL, ſecond ſon of Adam and Eve, was a ſhepherd. He offered to God ſome of the firſtlings of his flock, at the ſame time that his brother Cain offered fruits of the earth. God was pleaſed with Abel's oblation, but diſſatisfied with Cain's; which ſo exaſperated the latter, that he roſe up againſt his brother and killed him. Theſe are the only circumſtances Moſes relates of him; though, were we to take notice of the ſeveral particulars which curioſity has given birth to on this occaſion, they would run to a very great length. But this will not be expected.—It is remarkable, that the Greek churches, who celebrate the feaſts of every patriarch and prophet, have not done the ſame honour to Abel; his name is not to be found in any catalogue of ſaints or martyrs till the 10th century, nor even in the new Roman martyrology. However, he is prayed to with ſome other ſaints in ſeveral Roman litanies ſaid for perſons who lie at the point of death.

ABELARD (Peter), one of the moſt famous doctors of the twelfth century, was born at Palais near Nantz, in Britany: he was well learned in divinity, philoſophy, and the languages; but was particularly diſtinguiſhed by his ſkill in logic, and his fondneſs for diſputations, which led him to travel into ſeveral provinces in order to give public proof of his acuteneſs in that ſcience. After having baffled many antagoniſts, he read lectures in divinity with great applauſe at Paris; where he boarded with a canon whoſe name was Fulbert, and who had a very beautiful niece named Heloiſe. The canon ardently wiſhed to ſee this young lady make a figure among the learned, and Abelard was made her preceptor: but inſtead of inſtructing her in the ſciences, he taught her to love. Abelard now performed his public functions very coldly, and wrote nothing but amorous verſes. Heloiſe proving with child, Abelard ſent her to a ſiſter of his in Britany, where ſhe was delivered of a ſon. To ſoften the canon's anger, he offered to marry Heloiſe privately; and he was better pleaſed with the propoſal than the niece; who, from a ſingular exceſs of paſſion, choſe to be his miſtreſs rather than his wife. She married, however; but uſed often to proteſt upon oath that ſhe was ſingle, which provoked the canon to uſe her ill. Upon this, Abelard ſent her to the monaſtery of Argenteuil; where ſhe put on a religious habit, but did not take the veil. Heloiſe's relations conſidering this as a ſecond treachery, hired ruffians, who, forcing into his chamber in the dead of the night, emaſculated him. This infamous treatment made him fly to the gloom of a cloiſter. He aſſumed the monaſtic habit in the abbey of St Dennis; but the diſorders of that houſe ſoon drove him from thence. He was afterwards charged with hereſy; but after ſeveral perſecutions for his religious ſentiments, he ſettled in a ſolitude in the dioceſe of Troies, where he built an oratory, to which he gave the name of the Paraclet. He was afterwards choſen ſuperior of the abbey of Ruis in the dioceſe of Vannes: when the nuns being expelled from the nunnery in which Heloiſe had been placed, he gave her his oratory; where ſhe ſettled with ſome of her ſiſter nuns, and became their prioreſs. Abelard mixed the philoſophy of Ariſtotle with his divinity, and in 1140 was condemned by the council of Rheims and Sens. Pope Innocent II. ordered him to be impriſoned, his books to be burnt, and forbid him ever teaching again. However, he was ſoon after pardoned, at the ſolicitation of Peter the Venerable, who received him into his abbey of Clugni, where he led an exemplary life. He died in the priory of Marcellus at Chalons, April 21, 1142, aged ſixty three. His corpſe was ſent to Heloiſe, who buried it in the Paraclet. He left ſeveral works: the moſt celebrated of which are thoſe tender letters that paſſed between him and Heloiſe, with the account of their misfortunes prefixed; which have been tranſlated into Engliſh, and one of them immortalized by the harmony of Mr Pope's numbers.

ABEL-TREE, or **Abele-tree**, an obſolete name for a ſpecies of the poplar. See Populus.

Abel-beth-maacha, called alſo *Abel-maim*, a town in the tribe of Naphthali, in the north of Canaan, towards Syria, where was a diſtrict called Maacha *.

ABELIANS, **Abeloites**, or **Abelonians**, in church-hiſtory, a ſect of heretics mentioned by St Auſtin ‡, which aroſe in the dioceſe of Hippo in Africa, and is ſuppoſed to have begun in the reign of Arcadius, and ended in that of Theodoſius. Indeed it was not calculated for being of any long continuance. Thoſe of this ſect regulated marriage after the example of Abel; who, they pretended, was married, but died without ever having known his wife. They therefore allowed each man to marry one woman, but enjoined them to live in continence: and, to keep up the ſect, when a man and woman entered into this ſociety, they adopted a boy and a girl, who were to inherit their goods, and to marry upon the ſame terms of not begetting children, but of adopting two of different ſexes.

ABELLA, anciently a town of Campania, near the river Clanius. The inhabitants were called Abellani, and ſaid to have been a colony of Chalcidians. The nux Avellana, called alſo Præneſtina, or the hazelnut, takes its name from this town, according to Macrobius. Now *Avella*.

ABELLINUM, anciently a town of the Hirpini, a people of Apulia; diſtant about a mile from the rivulet Sabbato, between Beneventum and Salernum. Pliny calls the inhabitants Abellinates, with the epithet Protopi, to diſtinguiſh them from the Abellinates Marſi. Now *Avellino*. E. Long. 15. 20. Lat. 21.

ABEL-MEHOLA, the country of the prophet Eliſha, ſituate in Manaſſeh, on this ſide Jordan, between the valley of Jezreel and the village Bethmaela in the plains of Jordan, where the Midianites were defeated by Gideon. Judges, vii. 22.

ABEL-MIZRAIM, called alſo the Threſhing-floor of *Atad;* ſignifying the lamentation of the Egyptians; in alluſion to the mourning for Jacob,

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* 1 Kin. xv. 2 Chro. xvi.

‡ Auguſtin. *de Hær.* c. 87.

Gen. i. 3, 10, 11. Suppoſed to be near Hebron. (Wells.)

ABELMOSCH, or ABELMUSCH, in botany, the trivial name of a ſpecies of the hibiſcus. See HIBISCUS.

ABEL-SATTIM, or SITTIM, a town in the plains of Moab, to the N. E. of the Dead Sea, not far from Jordan, where the Iſraelites committed fornication with the daughters of Moab: So called, probably, from the great number of ſittim-trees there.

ABEN EZRA (Abraham) a celebrated rabbi, born at Toledo in Spain, called by the Jews, The wiſe, great, and admirable Doctor, was a very able interpreter of the Holy Scriptures; and was well ſkilled in grammar, poetry, philoſophy, aſtronomy, and medicine. He was alſo a perfect maſter of the Arabic. His principal work is, Commentaries on the Old Teſtament, which is much eſteemed: theſe are printed in Bomberg's and Buxtorf's Hebrew Bibles. His ſtyle is clear, elegant, conciſe, and much like that of the Holy Scriptures: he almoſt always adheres to the literal ſenſe, and every where gives proofs of his genius and good ſenſe: he, however, advances ſome erroneous ſentiments. The ſcarceſt of all his books is entitled, Jeſud Mora; which is a theological work, intended as an exhortation to the ſtudy of the Talmud. He died in 1174, aged 75.

ABEN MELLER, a learned rabbin, who wrote a commentary on the Old Teſtament in Hebrew, intitled The Perfection of Beauty. This rabbin generally follows the grammatical ſenſe and the opinions of Kimchi. The beſt edition is that of Holland.

ABENAS, a town of France, in Languedoc and in the lower Vivarais, ſeated on the river Ardeſch, at the foot of the Cevennes, 15 miles north-weſt of Viviers. E. Long. 4. 43. Lat. 44. 40.

ABENSPERG, a ſmall town of Germany, in the circle and duchy of Bavaria, and in the government of Munich. It is ſeated on the river Abentz, near the Danube, 13 miles ſouth-weſt of Ratiſbon, and 20 eaſt of Ingolſtadt. E. Long. 11. 38. Lat. 48. 45.

ABERAVON, a borough-town of Glamorganſhire in Wales, governed by a portreeve. It had a market, which is now diſcontinued: the vicarage is diſcharged, and is worth 45 l. clear yearly value. It is ſeated at the mouth of the river Avon, 19 miles ſouth-weſt of Cowbride, 75 eaſt of St David's, and 194 weſt of London. W. Long. 3. 21. Lat. 51. 40.

ABERBROTHICK, or ARBROATH, one of the royal boroughs of Scotland, ſituated in the county of Angus, about forty miles N. N. E. of Edinburgh; its W. Long. being 2. 29. and N. Lat. 56. 36. It is ſeated on the diſcharge of the little river Brothic into the ſea, as the name imports, *Aber* in the Britiſh implying ſuch a ſituation. It is a ſmall but flouriſhing place, well built, and ſtill increaſing. The town has been in an improving ſtate for the thirty laſt years, and the number of inhabitants greatly augmented; which is owing to the introduction of manufactures. The number, at this time, is ſaid to be about three thouſand five hundred: theſe principally conſiſt of weavers of coarſe brown linens, and ſome ſail-cloth; others are employed in making white and coloured threads: the remainder are either engaged in the ſhipping of the place, or in the neceſſary and common mechanic trades. The brown linens, or Oſnaburghs, were manufactured here before any encouragement was given by Government, or the linen company erected at Edinburgh. It appears from the books of the ſtamp-office in this town, that ſeven or eight hundred thouſand yards are annually made in the place, and a ſmall diſtrict round. Beſides this export and that of thread, much barley and ſome wheat is ſent abroad. The foreign imports are flax, flax-ſeed, and timber, from the Baltic. The coaſting trade conſiſts of coals from Borrowſtounneſs, and lime from Lord Elgin's kilns in Fife.—At this place, in default of a natural harbour, a tolerable artificial one of piers has been formed, where, at ſpring-tides, which riſe here fifteen feet, ſhips of two hundred tons can come, and of eighty at neap-tides; but they muſt lie dry at low water. This port is of great antiquity: there is an agreement yet extant between the abbot and the burghers of Aberbrothic, in the year 1194, concerning the making of the harbour. Both parties were bound to contribute their proportions; but the largeſt fell to the ſhare of the former, for which he was to receive an annual tax payable out of every rood of land lying within the borough.—The glory of this place was the abbey, whoſe very ruins give ſome idea of its former magnificence. It was founded by William the Lion in 1178, and dedicated to our celebrated primate Thomas à Becket. The founder was buried here; but there are no remains of his tomb, or of any other, excepting that of a monk, of the name of Alexander Nicol. The monks were of the Tyronenſian order; and were firſt brought from Kelſo, whoſe abbot declared thoſe of this place on the firſt inſtitution to be free from his juriſdiction. The laſt abbot was the famous Cardinal Beaton, at the ſame time archbiſhop of St Andrews, and, before his death, as great and abſolute here as Wolſey was in England. King John, the Engliſh monarch, granted this monaſtery moſt uncommon privileges; for by charter, under his great ſeal, he exempted it *a teloniis et conſuetudine* in every part of England, except London.

ABERCONWAY, or CONWAY, Caernarvonſhire, North-wales; ſo called from its ſituatiou at the mouth of the river Conway. It is a large well-built town; but its caſtle is now in ruins. It is governed by a mayor and two bailiffs, and has a market on Fridays. It is 229 meaſured miles from London. W. Lon. 3. 47. Lat. 53. 20.

ABERDEEN, the name of two cities in Scotland, called the *Old* and *New Towns*, ſituated on the German Ocean, in W. Long. 1. 40. and N. lat. 57. 19.

Old Town. The Old Town lies about a mile to the north of the new, at the mouth of the river Don, over which is a fine bridge, of a ſingle arch, which reſts at both ſides on two rocks. The old town was formerly the ſeat of the biſhop, and had a large cathedral commonly called *St Macher's*. This two very antique ſpires, and one aiſle, which is uſed as a church, are now the only remains of it. The biſhoprick was founded in the time of David I. who tranſlated it from Mortlich in Banffſhire to this place. The cathedral had anciently two rows of ſtone pillars acroſs the church, and three turrets; the ſteeple, which was the largeſt of theſe turrets, reſted upon an arch, ſupported by four pillars. In this cathedral there was a fine library; but, about the year 1560, it was almoſt totally deſtroyed. But the capital building is the King's-college, on the ſouth ſide of the town, which is a large and ſtately fabric. It is built round a ſquare, with cloiſters on the ſouth ſide. The chapel is very ruinous within; but there ſtill remains ſome wood-work of exquiſite workmanſhip. This was preſerved by the ſpirit of the principal at the time of the reformation, who armed his people and checked the blind zeal of the barons of the Mearns, who after ſtripping the cathedral of its roof, and robbing it of the bells, were going to violate this ſeat of learning. They ſhipped their ſacrilegious booty, with an intention of expoſing it to ſale in Holland: but the veſſel had ſcarcely gone out of port, but it periſhed in a ſtorm with all its ill-gained lading. The ſteeple is vaulted with a double croſs arch; above which is an imperial crown, ſupported by eight ſtone-pillars, and cloſed with a globe and two guilded croſſes. In the year 1631 this ſteeple was thrown down by a ſtorm, but was ſoon after rebuilt in a more ſtately form. This college was founded in 1494, by William Elphinſton biſhop of this place, Lord Chancellor of Scotland in the reign of James III. and Lord Privy Seal in that of James IV. But James IV. claimed the patronage of it, and it has ſince been called the *King's College*. This college, and the Mariſhal-college in the New Town, form one univerſity, called the *Univerſity of King Charles*. The library is large, but not remarkable for many curioſities. Hector Boethius was the firſt principal of the college; and ſent for from Paris for that purpoſe, on an annual ſalary of forty marks Scots, at thirteen pence each. The ſquare tower on the ſide of the college was built, by contributions from general Monk and the officers under him then quartered at Aberdeen, for the reception of ſtudents; of which there are about a hundred belonging to the college, who lie in it.

New Town. The New Town is the capital of the ſhire of Aberdeen. For largeneſs, trade, and beauty, it greatly exceeds any town in the north of Scotland. It is built on a hill or riſing ground, and lies on a ſmallbay formed by the Dee, deep enough for a ſhip of 200 tons. It is about two miles in circumference, and contains 13000 ſouls, and about 3000 in the ſuburbs; but the whole number of inhabitants between the bridges Dee and Don, which includes both the Aberdeens, and the interjacent houſes or hamlets, is eſtimated at 20,000. The buildings (which are of granite from the neighbouring quarries) are generally four ſtories high; and have, for the moſt part, gardens behind them, which gives it a beautiful appearance. On the high ſtreet is a large church, which formerly belonged to the Franciſcans. This church was begun by Bp William Elphinſton; and finiſhed by Gavinus Dunbar, Biſhop of Aberdeen, about the 1500. Bp Dunbar is ſaid likewiſe to have built the bridge over the Dee, which conſiſts of ſeven arches. In the middle of Caſtle-ſtreet is an octagon building, with neat bas-relievos of the kings of Scotland from James I. to James VII. The town-houſe makes a good figure, and has a handſome ſpire in the center. The grammar-ſchool is a low but neat building. Gordon's hoſpital is handſome; in front is a good ſtatue of the founder: it maintains fortyboys, who are apprenticed at proper ages. The infirmary is a large plain building, and ſends out between eight and nine hundred cured patients annually. But the chief public building in the new town is the Mariſhall-college, founded by George Keith earl of Mariſhall, in the year 1593; but ſince greatly augmented with additional buildings. There are about 140 ſtudents belonging to it. In both the Mariſhall and King's-college the languages, mathematics, natural philoſophy, divinity, *&c.* are taught by very able profeſſors. The convents in Aberdeen were: One of Mathurines, or of the order of the Trinity, founded by William the Lion, who died in 1214; another of Dominicans, by Alexander II.; a third of Obſervantines, a building of great length in the middle of the city, founded by the citizens and Mr Richard Vaus, &c.; and a fourth of Carmelites, or White Friars, founded by Philip de Arbuthnot in 1350.

Trade. Aberdeen once enjoyed a good ſhare of the tobacco trade; but was at length forced to reſign it to Glaſgow, which was ſo much more conveniently ſituated for it. At preſent, its imports are from the Baltic, and a few merchants trade to the Weſt Indies and North America. Its exports are ſtockings, thread, ſalmon, and oatmeal. The firſt is a moſt important article, as appears by the following ſtate of it. For this manufacture, 20,800 pounds worth of wool is annually imported, and 1600 pounds worth of oil. Of this wool is annually made 69,333 dozen pairs of ſtockings; worth, at an average, 1 *l.* 10 *s. per* dozen. Theſe are made by the country-people, in almoſt all parts of this great county, who get 4 *s. per* dozen for ſpinning, and 14 *s. per* dozen for knitting; ſo that there is annually paid them 62,329 *l.* 14 *s.* There is, beſides, about 2000 *l.* value of ſtockings manufactured from the wool of the county. The thread manufacture is another conſiderable article, though trifling in compariſon of the woollen. The ſalmon-fiſheries on the Dee and the Don are a good branch of trade. About 46 boats, and 130 men, are employed on the firſt; and, in ſome years, 167,000 lb. of fiſh have been ſent pickled to London, and about 930 barrels of ſalted fiſh exported to France, Italy, *&c.* The fiſhery on the Don is far leſs conſiderable.—Aberdeen, with Aberbrothick, Brechin, Montroſe, and Inverbervie, returns one member to Parliament.

ABERDOUR, a ſmall town in Fifeſhire, Scotland, on the frith of Forth, about ten miles N. W. of Edinburgh. In old times it belonged to the Viponts; in 1126 was transferred to the Mortimers by marriage, and afterwards to the Douglaſes. William, Lord of Liddeſdale, ſurnamed the *Flower of chivalry*, in the reign of David II. by charter conveyed it to James Douglas, anceſtor of the preſent noble owner the Earl of Morton. The monks of Inchcolm had a grant for a burial-place here from Allan de Mortimer, in the reign of Alexander III. The nuns, uſually ſtyled the poor *Clares*, had a convent at this place.

ABERFORD, a market-town in the weſt riding of Yorkſhire, ſtands in a bottom; and is about a mile long, and indifferently well built. It is near a Roman highway, which is raiſed very high, and not far from the river Cock; between which and the town there is the foundation of an old caſtle ſtill viſible. The market-day is Wedneſday, and it is 181 miles north-by-weſt from London. W. Long. 2. 45. Lat. 55. 52.

ABERGAVENNY, a large, populous, and flouriſhing town in Monmouthſhire, ſeated at the confluence of the rivers Uſk and Gavenny. It has a fine bridge over the Uſk, conſiſting of fifteen arches; and being a great thoroughfare from the weſt part of Wales to Bath, Briſtol, Glouceſter, and other places, is well furniſhed with accommodations for travellers. It is ſurrounded with a wall, and had once a caſtle. It is governed by a bailiff, a recorder, and twenty-ſeven burgeſſes; has two markets, one on Wedneſdays, and the other on Fridays; and carries on a conſiderable trade in flannels, which are brought hither for ſale from the other parts of the county. Its fairs are on May 14, for lean horned cattle and ſheep; on the firſt Tueſday after Trinity-Sunday, for linen and woollen cloth; and on the 25th of September, for flannels, hogs, and horſes. It is 142 miles diſtant from London. W. Long. 2. 45. Lat. 51. 50.

ABERNETHY (John), an eminent diſſenting miniſter, was the ſon of Mr John Abernethy a diſſenting miniſter in Colraine, and was born on the 19th of October 1680. When about nine years of age, he was ſeparated from his parents, his father being obliged to attend ſome public affairs in London; and his mother, to ſhelter herſelf from the mad fury of the Iriſh rebels, retiring to Derry, a relation who had him under his care, having no opportunity of conveying him to her, took him with him to Scotland; by which means he eſcaped the hardſhips he muſt have ſuffered at the ſiege of Derry, where Mrs Abernethy loſt all her other children. He afterwards ſtudied at the univerſity of Glaſgow, till he took the degree of maſter of arts; and, in 1708, he was choſen miniſter of a diſſenting congregation at Antrim, where he continued above twenty years. About the time of the Bangorian controverſy (for which, ſee HOADLY), a diſſenſion aroſe among his brethren in the miniſtry at Belfaſt, on the ſubject of ſubſcription to the Weſtminiſter confeſſion; in which he became a leader on the negative ſide, and incurred the cenſure of a general ſynod. Being in conſequence deſerted by the greateſt part of his congregation, he accepted an invitation to ſettle in Dublin, where his preaching was much admired. He was diſtinguiſhed by his candid, free, and generous ſentiments; and died of the gout in Dec. 1740, in the ſixtieth year of his age. He publiſhed a volume of ſermons on the Divine Attributes; after his death a ſecond volume was publiſhed by his friends; and theſe were ſucceeded by two other volumes on different ſubjects: all of which have been greatly admired.

ABERNETHY, a town in Strathern, a diſtrict of Perthſhire, in Scotland. It is ſeated on the river Tay, a little above the mouth of the Erne. It is ſaid to have been the ſeat of the Pictiſh kings; and was afterwards the ſee of an archbiſhop, ſince transferred to St Andrews. It is now greatly decayed.

ABERRATION, in aſtronomy, a ſmall apparent motion of the fixed ſtars diſcovered by the late Dr Bradley. The diſcovery was made by accident in the year 1725, when Mr Molyneux and Dr Bradley began to obſerve the bright ſtar in the head of *Draco*, marked γ by Bayer, as it paſſed near the zenith, with an inſtrument made by Mr Graham, in order to diſcover the parallax of the earth's annual orbit; and, after repeated obſervations, they found this ſtar, about the beginning of March 1726, to be $20''$ more ſoutherly than at the time of the firſt obſervation. It now indeed ſeemed to have arrived at its utmoſt limit ſouthward; becauſe, in ſeveral trials made about this time, no ſenſible difference was obſerved in its ſituation. By the middle of April, it appeared to be returning back again toward the north; and, about the beginning of June, it paſſed at the ſame diſtance from the zenith as it had done in December, when it was firſt obſerved: in September following it appeared $39''$ more northerly than it was in March, juſt the contrary way to what it ought to appear by the annual parallax of the ſtars. This unexpected phænomenon perplexed the obſervers very much; and Mr Molyneux died before the true cauſe of it was diſcovered. After this, Dr Bradley, with another inſtrument more exact and accurately adapted to this purpoſe, obſerved the ſame appearances not only in that but many other ſtars: and, by the great regularity that appeared in a ſeries of obſervations made in all parts of the year, the doctor was fully ſatisfied with regard to the general laws of the phænomena; and therefore endeavoured to find out the cauſe of them. He was already convinced, that the apparent motion of the ſtars was not owing to a nutation of the earth's axis. The next thing that offered itſelf, was an alteration in the direction of the plumb line, with which the inſtrument was conſtantly rectified; but this, upon trial, proved inſufficient. Then he had recourſe to what refraction might do; but here alſo nothing ſatisfactory occurred. At laſt this acute aſtronomer found, that the phænomena in queſtion proceeded from the progreſſive motion of light, and the earth's annual motion in its orbit: for he perceived, that if light was propagated in time, the apparent place of a fixed object would not be the ſame when the eye is at reſt, as when it is moving in any other direction, than that of the line paſſing through the eye and object; and that, when the eye is moving in different directions, the apparent place of the object would be different *.

ABERRATION, in optics, is uſed to denote that error or deviation of the rays of light, when inflected by a lens or ſpeculum, whereby they are hindered from meeting or uniting in the ſame point. There are two ſpecies of the abberrations of rays, diſtinguiſhed by their different cauſes; one ariſing from the figure of the glaſs or ſpeculum, the other from the unequal refrangibility of the rays of light. This laſt ſpecies is ſometimes called the Newtonian, from the name of its inventor *.

ABERYSTWITH, a market-town of Cardiganſhire, in Wales, ſeated on the Ridal, near its confluence with the Iſtwith, where it falls into the ſea. It was formerly a walled town; and fortified with a caſtle, which is now in ruins; and the town itſelf is gone to decay, for there is ſcarce a hundred houſes remaining. However, it is governed by a mayor and recorder; and ſends one member to parliament. It is noted for its fiſhing trade, and has a good market on Mondays for corn and wool. Its diſtance from London is 199 miles weſt-ſouth-weſt. W. Long. 4. 15. Lat. 52. 30.

ABESTA, the name of one of the ſacred books of the Perſian magi, which they aſcribe to their great founder Zoroaſter. The abeſta is a commentary on two others of their religious books called *Zend* and *Pazend*; the three together including the whole ſyſtem of the Ignicold, or worſhippers of fire.

ABETTOR, a law-term, implying one who encourages another to the performance of ſome criminal action, or who is art and part in the performance itſelf.

* Vide Phil. Tranſ. nº 406.

* See *Optics*, nº 19—22.

ſelf. Treaſon is the only crime in which abettors are excluded by law, every individual concerned being conſidered as a principal. It is the ſame with *Art-and-part* in the Scots law.

ABEX, a country in High Ethiopia, in Africa, bordering on the Red Sea, by which it is bounded on the eaſt. It has Nubia or Sennar on the north; Sennar and Abyſſinia on the weſt; and Abyſſinia on the ſouth. Its principal towns are Suaquem and Arkeko. It is ſubject to the Turks, and has the name of the Beglerbeg of Habeleth. It is about five hundred miles in length and one hundred in breadth, and is a wretched country; for the heat here is almoſt inſupportable, and the air is ſo unhealthy, that an European cannot ſtay long there without the utmoſt hazard of his life. It is very mountainous, inſomuch that there are many more wild beaſts than men. There are foreſts, in which grow a great number of ebony trees.

ABEYANCE, in law, the expectancy of an eſtate. Thus if lands be leaſed to one perſon for life, with reverſion to another for years, the remainder for years is an abeyance till the death of the leſſee.

ABGAR, or ABGARUS, a name given to ſeveral of the kings of Edeſſa in Syria. The moſt celebrated of them is one who, it is ſaid, was cotemporary with Jeſus Chriſt; and who having a diſtemper in his feet, and hearing of Jeſus's miraculous cures, requeſted him, by letter, to come and cure him. Euſebius *, who believed that this letter was genuine, and alſo an anſwer our Saviour is ſaid to have returned to it, has tranſlated them both from the Syriac, and aſſerts that they were taken out of the archives of the city of Edeſſa. The firſt is as follows: "Abgarus, prince of Edeſſa, to " Jeſus the holy Saviour, who hath appeared in the fleſh " in the confines of Jeruſalem, greeting. I have heard " of thee, and of the cures thou haſt wrought without " medicines or herbs. For it is reported thou makeſt " the blind to ſee, the lame to walk, lepers to be clean, " devils and unclean ſpirits to be expelled, ſuch as " have been long diſeaſed to be healed, and the dead " to be raiſed; all which when I heard concerning " thee, I concluded with myſelf, That either thou " waſt a God come down from heaven, or the Son of " God ſent to do theſe things. I have therefore written to thee, beſeeching thee to vouchſafe to come " unto me, and cure my diſeaſe. For I have alſo heard " that the Jews uſe thee ill, and lay ſnares to deſtroy " thee. I have here a little city, pleaſantly ſituated, " and ſufficient for us both. ABGARUS." To this letter, Jeſus, it is ſaid, returned an anſwer by Ananias, Abgarus's courier, which was as follows: "Bleſſed " art thou, O Abgarus! who haſt believed in me " whom thou haſt not ſeen; for the ſcriptures ſay or " me, They who have ſeen me have not believed in " me, that they who have not ſeen, may, by believing, " have life. But whereas thou writeſt to have me " come to thee, it is of neceſſity that I fulfil all things " here for which I am ſent; and having finiſhed them, " to return to him that ſent me: but when I am returned to him, I will then ſend one of my diſciples " to thee, who ſhall cure thy malady, and give life to " thee and thine. JESUS." After Jeſus's aſcenſion, Judas, who is alſo named Thomas, ſent Thaddeus one of the ſeventy to Abgarus; who preached the goſpel to him and his people, cured him of his diſorder, and wrought many other miracles: which was done, ſays Euſebius, A. D. 43.—Though the above letters are acknowledged to be ſpurious by the candid writers † of the church of Rome; ſeveral Proteſtant authors, as Dr Parker ‡, Dr Cave ||, and Dr Grabe §, have maintained that they are genuine, and ought not to be rejected.

ABGILLUS (John), ſurnamed Preſter John, was ſon to a king of the Friſcii; and, from the auſterity of his life, obtained the name of *Preſter* or Prieſt. He attended Charlemagne in his expedition to the Holy Land; but inſtead of returning with that monarch to Europe, it is pretended that he gained mighty conqueſts, and founded the empire of the Abyſſines, called, from his name, the empire of Preſter John. He is ſaid to have written the hiſtory of Charlemagne's journey into the Holy Land, and of his own into the Indies; but they are more probably trifling romances, written in the ages of ignorance.

ABIANS, anciently a people of Thrace, or (according to ſome authors) of Scythia. They had no fixed habitations; they led a wandering life. Their houſes were waggons, which carried all their poſſeſſions. They lived on the fleſh of their herds and flocks, on milk, and cheeſe, chiefly on that of mare's milk. They were unacquainted with commerce. They only exchanged commodities with their neighbours. They poſſeſſed lands; but they did not cultivate them. They aſſigned their agriculture to any who would undertake it, reſerving only to themſelves a tribute; which they exacted, not with a view to live in affluence, but merely to enjoy the neceſſaries of life. They never took arms but to oblige thoſe to make good a promiſe to them by whom it had been broken. They paid tribute to none of the neighbouring ſtates. They deemed themſelves exempt from ſuch an impoſition; for they relied on their ſtrength and courage, and conſequently thought themſelves able to repel any invaſion. The Abians, we are told, were a people of great integrity. This honourable eulogium is given them by Homer. (Strabo.)

ABIATHAR, high-prieſt of the Jews, ſon to Abimelech, who had borne the ſame office and received David into his houſe. This ſo enraged Saul, who hated David, that he put Abimelech to death, and 81 prieſts; Abiathar alone eſcaped the maſſacre. He afterward was high-prieſt; and often gave king David teſtimonies of his fidelity, particularly during Abſalom's conſpiracy, at which time Abiathar followed David, and bore away the ark. But after this, conſpiring with Adonijah, in order to raiſe him to the throne of king David his father; this ſo exaſperated Solomon againſt him, that he diveſted him of the prieſthood, and baniſhed him, A. M. 3021, before Chriſt 1014.

ABIB, ſignifying an ear of corn, a name given by the Jews to the firſt month of their eccleſiaſtical year, afterwards called *Niſan*. It commenced at the vernal equinox; and according to the courſe of the moon, by which their months were regulated, anſwered to the latter part of our March and beginning of April.

ABIDING *by writings*, in Scots law: When a perſon founds upon a writing alledged to be falſe, he may be obliged to declare judicially, whether he will ſtand or abide by it as a true deed. As to the conſequence of abiding by, or paſſing from, a falſe deed, ſee LAW, Part III. N° clxxxvi. 32.

ABIES, the Fir-tree, a genus of evergreens; the

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* *Eccl. Hiſt.* lib. i. c. 13.

† Simon's *Crit. Hiſt. of the N. Teſt.* part i. c. 3. Dupin's *Hiſt. of the Canon.* vol. ii. c. 6. See alſo, *Jones's New Method of ſettling the canonical authority of the N.T.* vol. ii. p. 7, &c.

‡ *Demonſtr. of the law of nature & the Xian relig.* Preface, and Pt. ii. p. 135.

|| Hiſt. Liter. *in Chriſt.* vol. i. p. 2, 3.

§ *Spicileg. Patr.* tom. i. p. 4, 306. et in Notis, p. 319, 321, 326.

characters of which are, There are male and female flowers on the ſame tree; the male flowers have empalements of four leaves without petals, many ſtamina, and naked ſummits. The female flowers are collected in a ſcaly cone, each ſcale covering two flowers having neither petals or ſtamina, with one pointal, and are each ſucceeded by a winged nut. The diſtinguiſhing character of this genus, is the leaves ariſing ſingly from their baſe; whereas the Pines have two or more ariſing from the ſame point.

The Fir has always been ſeparated from the Pine-trees by all writers on botany before Dr Linnæus; and were generally diſtinguiſhed therefrom, by their leaves being produced ſingly on the branches; the leaves of the Pines being produced by pairs, threes, or fives, out of ſheaths which ſurround their baſe. And as this diſtinction is now well known among the nurſery-gardeners, it is much better to keep them ſeparate, than to join them, with the cedar of Libanus and larch-tree, to the Pine, as the doctor has done, making them of one genus; eſpecially as the culture of them is very different. See Pinus.

Species deſcribed.

The following ſpecies are now in the Britiſh gardens. 1. Picea, or the ſilver or yew-leaved fir, grows naturally in many parts of Germany, but the fineſt trees of this ſort are growing upon mount Olympus. The Straſburgh turpentine is drawn from this tree. The wood is white and ſoft, and therefore not greatly eſteemed. 2. Alba, or the ſpruce or Norway fir, ſometimes called the pitch-tree, grows naturally on the low lands of Sweden, Norway, and Denmark, or the mountains of Scotland; as alſo in many other parts of Europe. The wood is very light, white, rots in the air, and crackles in the fire. It is uſed for making muſical inſtruments, packing-boxes, *&c.* The Laplanders make ropes of the roots, and employ them for faſtening together the thin planks of their portable canoes. The inhabitants of Canada prepare a pleaſant and wholeſome liquor from the leaves. 3. Balſamea, or the balm-of-Gilead fir, ſo nearly reſembles the picea, as ſcarcely to be diſtinguiſhed from it after it is grown to a large ſize. 4. Canadenſis, or the ſmall-coned American ſpruce fir, grows naturally in many parts of North America, from whence the cones have been brought to England. The leaves are ſhorter than thoſe of the ſpruce fir, but like them in ſhape; the cones are looſe, and about an inch in length. 5. The Newfoundland ſpruce, is a native of Newfoundland and ſeveral other parts of North America; where the inhabitants make three ſorts of it, by the titles of Black, White, and Red Spruce. 6. Americana, or the American hemlock fir, is alſo a native of the ſame country; and in the northern parts grows to be a very large tree: but in Britain the branches ſpread wide every way, ſo that there is no appearance of the trees ever arriving to any conſiderable height. The leaves are ſhort, and ſhaped very like thoſe of the yew-tree: they are ranged on two ſides of the branches only; ſo they appear flat, like thoſe of the ſilver fir; but are of a pale green on both ſides. The cones are ſmall, looſe, and roundiſh. From moſt of theſe firs, the inhabitants of North America collect a clear fragrant turpentine, which they uſe for curing green wounds; and the phyſicians there make great uſe of it internally.

Culture.

All the ſorts of fir are propagated by ſeeds. The time for ſowing them is about the middle of March, when the ſeaſon is mild; otherwiſe it had better be deferred till the end of that month, or the beginning of April. The ſeeds which are preſerved in their cones, will keep good much longer than thoſe which are taken out: but the cones of the ſilver and balm-of-Gilead firs generally fall to pieces in the autumn, ſoon after the ſeeds are ripe; ſo that if they are not carefully watched, and gathered at that time, the ſeeds will be loſt. The cones of all the ſorts of fir open with more eaſe than thoſe of the pines, and require but little trouble to get out their ſeeds. If they are ſpread on a cloth before a fire for a few hours, their ſcales will open and emit the ſeeds. They may be ſown in pots or boxes filled with light freſh earth, and covered over about half an inch thick with the ſame earth: theſe ſhould be placed to an eaſt aſpect, where they may have the ſun till eleven in the morning. Or if the ſeeds are ſown in a bed of earth, it ſhould be ſhaded with mats in the middle of the day: for when they are too much expoſed to the ſun, the ſurface of the ground will dry ſo faſt (eſpecially in dry ſeaſons) as to hinder the ſeeds from vegetating; and when the plants begin to appear, if they are not ſcreened from the ſun, many of them will be ſoon deſtroyed. The ſeeds muſt be carefully guarded againſt mice and birds, who are very fond of them, but particularly when the plants begin to appear; for as they thruſt up the cover of the ſeeds on their top, the birds, in pecking off theſe covers, deſtroy the young plants: therefore the ſureſt method is to cover them with nets until the plants have thrown off their huſks and expanded their ſeed-leaves, ſoon after which they will be out of danger. After the plants have remained in the ſeed-bed one year, they may be tranſplanted into beds in rows at five or ſix inches diſtance, and the plants in the rows four inches aſunder. They muſt be carefully weeded; and, if the ſeaſon proves very dry, it will be of ſervice gently to ſprinkle them over with water once or twice a-week during the hot time of the year. When they have grown two years in theſe beds, they may then be tranſplanted into the nurſery, placing them in rows at three feet diſtance, and in the rows a foot aſunder. The beſt ſeaſon for removing them is in April, juſt before they begin to ſhoot. The ſmaller theſe trees are planted out where they are to remain, the greater will be their progreſs, and they will grow to a much larger ſize than thoſe that are removed at a much greater age.—The wood of all the ſorts of fir yet known, being much inferior to that of the Pine *, it is not common to make plantations of them for their timber, but to cultivate them in pleaſure-grounds for ornament. With this view, they ſhould be placed ſo far aſunder as to admit the free air between them; otherwiſe the lower branches will decay, and render the trees unſightly. The great beauty of theſe trees is their pyramidal form, and their being furniſhed with lateral branches from about ſeven feet above the ſurface of the ground to the top. Theſe branches ſhould be well garniſhed with leaves: to obtain which, the trees ſhould not be planted nearer than 18 or 20 feet; for when they are cloſer planted, the under branches ſoon drop their leaves, and totally decay. The unſkilful diſpoſition of theſe trees has brought them into diſrepute with many perſons; whereas, if properly placed, they may be made

* See *Pinus.*

made very ornamental to fine ſeats.—In pruning off the under branches to the deſigned height, there muſt be care taken not to cut off too many at the ſame time; one tier being enough to be diſplaced in a year. The beſt time for this operation is in the beginning of September.—The American ſpruce-firs, planted in light moiſt ground, grow to a large ſize, and make a beautiful appearance; and if they are allowed room for their lower branches to ſpread and extend, they will be garniſhed with them almoſt to the ground, forming themſelves in a pyramidal figure.--For the medical uſes of certain ſpecies of the Abies, ſee Materia Medica, nº 61.

ABIGEAT, an old law-term, denoting the crime of ſtealing cattle by droves or herds. This crime was more ſeverely puniſhed than *furtum*, the delinquent being often condemned to the mines, baniſhment, and ſometimes capitally.

ABIHU, brother to Nadab, and ſon to Aaron. The two former had the happineſs to aſcend mount Sinai with their father, and there to behold the glory of God: but afterward putting ſtrange fire into their cenſers, inſtead of the ſacred fire commanded by God, fire ruſhing upon them killed them. Though all the people bewailed this terrible cataſtrophe, Moſes forbad Aaron and his two ſons Eleazar and Ithamar to join in the lamentation.

ABILITY, a term in law, denoting a power of doing certain actions in the acquiſition or transferring of property.

ABIMELECH, king of Gerar, a country of the Philiſtines, cotemporary with Abraham. This patriarch and his family being there, his wife Sarah, though 90 years of age, was not ſafe in it; for Abimelech carried her off, and was ſo enamoured of her, that he reſolved to marry her. Abraham did not declare himſelf Sarah's huſband; but gave out ſhe was his ſiſter. But the king being warned in a dream, that ſhe was married to a prophet, and that he ſhould die if he did not reſtore her to Abraham, the king obeyed: at the ſame time reproving Abraham for his diſingenuity; who thereupon, among other excuſes, ſaid ſhe was really his ſiſter, being born of the ſame father, tho' of a different mother. Abimelech afterwards gave conſiderable preſents to Abraham; and a covenant, that of Beerſheba, was entered into between them.—After the death of Abraham, there being a famine in the neighbouring countries, Iſaac his ſon alſo withdrew into Gerar, which was then likewiſe governed by a king called

Abimelech, probably the ſucceſſor of the former. Here Rebekah's beauty forced her huſband to employ Abraham's artifice. Abimelech diſcovering that they were nearer related, chid Iſaac for calling his wife his ſiſter; and, at the ſame time, forbid all his ſubjects, upon pain of death, to do the leaſt injury to Iſaac or Rebekah.—Iſaac's proſperity loſt him the king's friendſhip, and he was deſired to go from among them. He obeyed; but Abimelech afterward entered into a covenant with him.

Abimelech, the natural ſon of Gideon, by Druma his concubine. His violent acts and death are recorded in Judges, chap. ix.

ABINGDON, a market-town in Berkſhire, ſeated on a branch of the Thames, received its name from an abbey anciently built there. The ſtreets, which are well paved, centre in a ſpacious area, in which the market is held; and in the centre of this area is the market-houſe, which is ſupported on lofty pillars, with a large hall of free-ſtone above, in which the ſummer-aſſizes for the county are held, and other public buſineſs done, the Lent aſſizes being held at Reading. It has two churches; one dedicated to St Nicholas, and the other to St Helena: the latter is adorned with a ſpire, and both are ſaid to have been erected by the abbots of Abingdon. Here are alſo two hoſpitals, one for ſix, and the other for thirteen poor men, and as many poor women; a free ſchool; and a charity-ſchool. The town was incorporated by queen Mary; and is governed by a mayor, two bailiffs, and nine aldermen: it ſends two members to parliament, who are choſen by the inhabitants at large not receiving alms. Its great manufacture is malt, large quantities of which are ſent by water to London. The market-days are on Monday and Friday; and it hath four fairs for horſes and other cattle, on the firſt Monday in Lent, on June 20, on September 19, and on December 11. It is ſix miles and a half ſouth of Oxford, forty-ſeven eaſt of Glouceſter, and fifty-five weſt of London. Long. 1. 20. Lat. 51.

AB-INTESTATE, in the civil law, is applied to a perſon who inherits the right of one who died inteſtate or without making a will. See Intestate.

ABIRAM, a ſeditious Levite, who, in concert with Korah and Dathan, rebelled againſt Moſes and Aaron, in order to ſhare with them in the government of the people; when Moſes ordering them to come with their cenſers before the altar of the Lord, the earth ſuddenly opened under their feet, and ſwallowed up them and their tents; and at the ſame inſtant fire came from heaven, and conſumed two hundred and fifty of their followers. Numb. xvi.

ABISHAI, ſon of Zeruiah, and brother to Joab, was one of the celebrated warriors who flouriſhed in the reign of David: he killed with his own hand three hundred men, with no other weapon but his lance; and ſlew a Philiſtine giant, the iron of whoſe ſpear weighed three hundred ſhekels. 1 Sam. xxvi. 2 Sam. xxiii.

ABJURATION, in our ancient cuſtoms, implied an oath, taken by a perſon guilty of felony, and who had fled to a place of ſanctuary, whereby he ſolemnly engaged to leave the kingdom for ever.

Abjuration, is now uſed to ſignify the renouncing, diſclaiming, and denying upon oath, the Pretender to have any kind of right to the crown of theſe kingdoms.

Abjuration *of hereſy*, the ſolemn recantation of any doctrine as falſe and wicked.

ABLACTATION, or weaning a child from the breaſt. If the mother or nurſe has enough of milk, a child will need little or no other food before the ſecond or third month of its age; when it will be proper to give it, once or twice a-day, a little water-pap; and as it grows older, it may be fed oftener, and have its panada ſometimes mixed with milk. This will accuſtom the child by degrees to take food, and will render the weaning both leſs difficult and leſs dangerous. Weaning, unleſs when ailments, weakneſs, or ſuch like circumſtances, forbid, ought generally to take place about the ſixth or ſeventh month, at fartheſt by the ninth or tenth. The child ought then to be fed four or five times a-day; but ſhould never be accuſtomed to eat in the night. The food ſhould be ſimple and light; not ſpoiled with ſugar, wine, and ſuch like additions, for they produce the diſeaſes that children are moſt troubled with. Unfermented flour makes a viſcid food that turns ſour before it digeſts, and well fermented bread ſoon turns ſour; but if the panada made of this latter be given new, the inconvenience of ſouring is prevented. To prevent acidity in the child's ſtomach by a daily uſe of vegetable food, give now and then a little freſh broth, made from either veal, mutton, or beef. Rice is not ſo apt to turn ſour as wheat bread is; it therefore would be a more convenient food for children, and deſerves to be attended to. Toaſted bread boiled in water till it is almoſt dry, then mixed with freſh milk not boiled, is an agreeable change. As the teeth advance, the diet may increaſe in its ſolidity. As to the quantity, let the appetite be the meaſure of it; obſerving to ſatisfy hunger, but no more; which may be thus managed, Feed the child no longer than he eats with a degree of eagerneſs: but children may at all times be allowed good light bread to chew as much as they pleaſe. Butter ought by all means to be denied them; as it both relaxes the ſtomach, and produces groſs humours. In place of this, let them be uſed as early as poſſible with honey; which is cooling, cleanſing, tends to ſweeten the humours, prevents or deſtroys worms, and renders children leſs ſubject to ſcabbed head and other cutaneous diſorders. In feeding, let the child be held in a ſitting poſture, and that until the ſtomach has nearly digeſted its contents; the too common practice of violently dancing and ſhaking the child ſhould be avoided. Divert it during the day as much as poſſible, which will make it ſleep ſoundly all the night. Never awaken a child when it is aſleep, for thus ſickneſs and peeviſhneſs are often produced.

Ablactation, among the ancient gardeners, the ſame with what is called *grafting by approach* *.

* See *Grafting.*

ABLAI, a country of Great Tartary, the inhabitants of which, called Buchars or Buchares, are ſubject to Ruſſia, but that only for protection. It lies eaſtward of the river Irtis, and extends five hundred leagues along the ſouthern frontiers of Siberia.

ABLACQUEATION, an old term in gardening, ſignifies the operations of removing the earth and baring the roots of trees in winter, to expoſe them more freely to the air, rain, ſnows, &c.

ABLATIVE, is the 6th caſe in Latin grammar, and peculiar to that language. It is oppoſed to the dative, which expreſſes the action of *giving*, the ablative expreſſing that of *taking away*.

ABLECTI, in Roman antiquity, a ſelect body of ſoldiers choſen from among thoſe called *Extraordinarii* *.

* Which ſee.

ABLEGMINA, in Roman antiquity, thoſe choice parts of the entrails of victims, which were offered in ſacrifice to the gods. They were ſprinkled with flour, and burnt upon the altar; the prieſts pouring ſome wine on them.

ABLUENTS, in medicine, the ſame with diluters.

ABLUTION, in a general ſenſe, ſignifies the waſhing or purifying ſomething with water.

Ablution, in a religious ſenſe, a ceremony in uſe among the ancients, and ſtill practiſed in ſeveral parts of the world: it conſiſted in waſhing the body, which was always done before ſacrificing, or even entering their houſes.—Ablutions appear to be as old as any ceremonies, and external worſhip itſelf. Moſes enjoined them; the heathens adopted them; and Mahomet and his followers have continued them: thus they have got footing among moſt nations, and make a conſiderable part of moſt eſtabliſhed religions. The Egyptian prieſts had their diurnal and nocturnal ablutions; the Grecians their ſprinklings; the Romans their luſtrations and lavations; the Jews their waſhing of hands and feet, beſide their baptiſms. The ancient Chriſtians had their ablutions before communion; which the Romiſh church ſtill retain before their maſs, ſometimes after: the Syrians, Cophts, *&c.* have their ſolemn waſhings on Good-Friday: the Turks their greater and leſſer ablutions; their Ghaſt and Wodou, their Aman, Taharat, *&c.*

ABNER, the ſon of Ner, father-in-law to Saul, and general of all his forces, who ſerved him on all occaſions with fidelity and courage. After the death of that prince, Abner ſet Iſhboſheth, Saul's ſon, on the throne. A war breaking out between the tribe of Judah who had elected David king, and Iſrael, Abner marched againſt that prince with the flower of his troops, but was defeated. Abner afterward, being diſguiſed, went over to David, and diſpoſed the chiefs of the army and the elders of Iſrael to declare for him; and was received by David with ſuch teſtimonies of affection, as gave umbrage to Joab, who killed him traiterouſly.

ABNOBA, now Abenow, a long range of mountains in Germany, taking different names according to the different countries they run through. As about the river Maine, called the *Oden* or *Ottenwald;* between Heſſe and Franconia, the *Speſſart;* and about the duchy of Wirtemberg, where the Danube takes its riſe, called the *Baar*.

ABO, a maritime town in Sweden: it is the capital of the province of Finland, and is ſeated in the gulph of that name, at the mouth of the river Aurajoki. It is a good port; and is the ſee of a biſhop, ſuffragan of Upſal. It has alſo an univerſity, founded by queen Chriſtina in 1640. It lies 120 miles north-eaſt from Stockholm. E. Long. 21. 28. Lat. 60. 50.

ABOARD, the inſide of a ſhip. Hence any perſon who enters a ſhip is ſaid to *go aboard:* but when an enemy enters in the time of battle, he is ſaid to *board;* a phraſe which always implies hoſtility.—To *fall aboard of*, is to ſtrike or *encounter* another ſhip when one or both are in motion, or to be driven upon a ſhip by the force of the wind or current.—*Aboard-main-tack*, the order to draw the main-tack, *i.e.* the lower corner of the main-ſail, down to the cheſs-tree. See Chess-tree.

ABOLITION, implies the act of annulling, deſtroying, making void, or reducing to nothing. In law, it ſignifies the repealing any law or ſtatute.

ABOLLA, a warm kind of garment, lined or doubled, worn by the Greeks and Romans, chiefly out of the city, in following the camp.—Critics and antiquaries are greatly divided as to the form, uſe, kinds, *&c.* of this garment. Papias makes it a ſpecies of the toga, or gown; but Nonius, and the generality, a ſpecies of the pallium, or cloak. The *abolla* ſeems rather to have ſtood oppoſed to the *toga*, which was a garment of peace, as the *abolla* was of war; at leaſt Varro and Martial place them in this oppoſite light. There ſeem to have been different kinds of abollas, fitted to different occaſions. Even kings appear to have uſed the abolla: Caligula was affronted at king Ptolemy for appearing

Abomaſus ‖ Aborigines.

pearing at the ſhews in a purple abolla, and by the eclat thereof turning the eyes of the ſpectators from the emperor upon himſelf.

ABOMASUS, Abomasum, or Abomasius, names of the fourth ſtomach of ruminating animals*.

ABOMINATION, a term uſed in ſcripture with regard to the Hebrews, who, being ſhepherds, are ſaid to have been an abomination to the Egyptians, becauſe they ſacrificed the ſacred animals of that people, as oxen, goats, ſheep, &c. which the Egyptians eſteemed as abominations, or things unlawful. The term is alſo applied in the ſacred writings to idolatry and idols, becauſe the worſhip of idols is in itſelf an abominable thing, and at the ſame time ceremonies obſerved by idolaters were always attended with licentiouſneſs and other odious and abominable actions. The *abomination of deſolation*, foretold by the prophet Daniel, is ſuppoſed to imply the ſtatue of Jupiter Olympius, which Antiochus Epiphanes cauſed to be placed in the temple of Jeruſalem. And the *abomination of deſolation*, mentioned by the Evangeliſts, ſignifies the enſigns of the Romans, during the laſt ſiege of Jeruſalem by Titus, on whom the figures of their gods and emperors were embroidered, and placed upon the temple after it was taken.

ABON, Abona, or Abonis, (Antonine;) a town and river of Albion. The town, according to Camden, is Abingdon; and the river Abhon or Avon. But by Antonine's Itinerary, the diſtance is nine miles from the Venta Silurum, or Caer-Went: others, therefore, take the town to be Porſhut, at the mouth of the river Avon, over againſt Briſtol. Abhon or Avon, in the Celtic language, denotes a river.

ABOR, Chabor, or Habor, a diſtrict in Aſſyria, on the river Gozan, bounding on Media, 2 Kings xvii.

ABORIGINES, (Dionyſius of Halicarnaſſus, Livy, Virgil;) originally a proper name, given to a certain people in Italy, who inhabited the ancient Latium, or country now called *Campagna di Roma*. In this ſenſe the Aborigines are diſtinguiſhed from the Janigenæ, who, according to the falſe Beroſus, inhabited the country before them; from the Siculi, whom they expelled; from the Grecians, from whom they deſcended; from the Latins, whoſe name they aſſumed after their union with Æneas and the Trojans; laſtly, from the Auſonii, Volſci, Oenotrii, &c. neighbouring nations in other parts of the country.—Whence this people came by the appellation, is much diſputed. St Jerom ſays, they were ſo called as being, *abſque origine*, the primitive planters of the country after the flood: Dion. of Halicarnaſſus accounts for the name, as denoting them the founders of the race of inhabitants of that country: others think them ſo called, as being originally Arcadians, who claimed to be earth-born, and not deſcended from any people. Aurelius Victor ſuggeſts another opinion, *viz.* that they were called *Aborigines*, q. d. *Aberrigines*, from *ab*, from, and *errare*, to wander; as having been before a wandering people. Pauſanias rather thinks they were thus called απο ορεσι, from *mountains;* which opinion ſeems confirmed by Virgil, who, ſpeaking of Saturn, the legiſlator of this people, ſays,

> *Is genus indocile ac diſperſum montibus altis*
> *Compoſuit, legeſque dedit.*——

Aborigines, Abortion.

The Aborigines were either the original inhabitants of the country, ſettled there by Janus, as ſome imagine; or by Saturn, or Cham, as others; not long after the diſperſion, or even, as ſome think, before it: or they were a colony ſent from ſome other nation; who expelling the ancient inhabitants the Siculi, ſettled in their place.—About this mother-nation there is great diſpute. Some maintain it to be the Arcadians, parties of whom were brought into Italy at different times; the firſt under the conduct of Oenotrius, ſon of Lycaon, 450 years before the Trojan war; a ſecond from Theſſaly; a third under Evander, 60 years before the Trojan war: beſides another under Hercules; and another of Lacedæmonians, who fled from the ſevere deſcpline of Lycurgus: all theſe uniting, are ſaid to have formed the nation or kingdom of the Aborigines. Others will have them of barbarian rather than Grecian origin, and to have come from Scythia; others from Gaul. Laſtly, others will have them to be Canaanites, expelled by Joſhua.

ABORTION, in midwifery, the birth of a fœtus before it has acquired a ſufficient degree of perfection to enable it to perform reſpiration and the other vital functions*.

The practice of procuring abortions was prohibited by the ancient Greek legiſlators Solon and Lycurgus. Whether or not it was permitted among the Romans, has been much diſputed. It is certain the practice, which was by them called *viſceribus vim inferre*, was frequent enough: but whether there was any penalty on it, before the emperors Severus and Antonine, is the queſtion. Noodt maintains the negative; and further, that thoſe princes only made it criminal in one particular caſe, *viz.* of a married woman's practiſing it out of reſentment againſt her huſband, in order to defraud him of the comfort of children: this was ordered to be puniſhed by a temporary exile. The foundation on which the practice is ſaid to have been allowed, was, that the fœtus, while *in utero*, was reputed as a part of the mother, ranked as one of her own viſcera, over which ſhe had the ſame power as over the reſt: beſides, that it was not reputed as a man, *homo;* nor to be alive, otherwiſe than as a vegetable: conſequently, that the crime amounted to little more than that of plucking unripe fruit from the tree. Seneca repreſents it as a peculiar glory of Helvia, that ſhe had never, like other women, whoſe chief ſtudy is their beauty and ſhape, deſtroyed the fœtus in her womb. The primitive fathers, Athenagoras, Tertullian, Minutius Felix, Auguſtin, &c. declaimed loudly againſt the practice as virtual murder. Several councils have condemned it. Yet we are told that the modern Romiſh eccleſiaſtical laws allow of diſpenſations for it. Egane mentions the rates at which a diſpenſation for it may be had.—In ſome countries, the procuring of abortions is ſtill ſaid not only to be allowed, but even enjoined by law; as among the Formoſans, if Mr Pſalmanazar had been to be believed, who relates, that the women there, tho' married, are not allowed to breed before 35 years of age. When with child before that time, they are obliged to make themſelves abortive by force: to this end the prieſteſs (for in that country, according to him, the prieſtly office belongs to women) tramples on the patient's belly, till ſhe bring forth. But the extraordinary fabrications of this author are now well known*.

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* See *Comparative Anatomy*, nº 88, 89, 90.

* For the treatment, &c. of Abortions, ſee *Midwifery*, nº 12.

* See *Pſalmanazar*.

The practice of artificial abortion is chiefly in the hands of women and nurſes, rarely in that of phyſicians; who, in ſome countries, are not admitted to the profeſſion without abjuring it. Hippocrates, in the oath he would have enjoined on all phyſicians, includes their not giving the *peſſus abortivus*: though elſewhere he gives the formal proceſs whereby he himſelf procured in a young woman a miſcarriage. In the Supplement to Chambers's Dictionary, a detail is given of the various methods by which abortions may be procured. But we were unwilling to beſtow room upon information which it ſeemed equally uſeleſs and improper to propagate. It may, however, be obſerved, that often all the powers of art prove ineffectual, and no leſs often do the attempts prove the means of puniſhment by the fatal conſequences which they produce.

Abortion, among gardeners, ſignifies ſuch fruits as are produced too early, and never arrive at maturity.

ABORTIVE, is, in general, applied to whatever comes before its legitimate time, or to a deſign which miſcarries.

ABOU-NAVAS, an Arabian poet of the firſt claſs, was born at Balſora; and flouriſhed at the court of Aaron al Raſchid, at the end of the 7th century.

ABOUT, the ſituation of a ſhip immediately after ſhe has *tacked*, or changed her courſe by going about and ſtanding on the other tack*.—*About-ſhip!* the order to the ſhip's crew to prepare for tacking.

ABOUTIGE, a town in Upper Egypt, in Africa, near the Nile, where they make the beſt opium in all the Levant. It was formerly a large, but now is a mean place. N. lat. 26. 50.

ABRA, a ſilver coin ſtruck in Poland, and worth about one ſhilling Sterling. It is current in ſeveral parts of Germany, Conſtantinople, Aſtracan, Smyrna, and Grand Cairo.

ABRABANEL, Abarbanel, or Avravanel, (Iſaac) a celebrated rabbi, deſcended from king David, and born at Liſbon A. D. 1437. He became counſellor to Alphonſo V. king of Portugal, and afterwards to Ferdinand the Catholic; but in 1492 was obliged to leave Spain with the other Jews. In ſhort, after reſiding at Naples, Corfou, and ſeveral other cities, he died at Venice in 1508, aged 71. Abrabanel paſſed for one of the moſt learned of the rabbis; and the Jews gave him the names of the Sage, the Prince, and the Great Politician. We have a Commentary of his on all the Old Teſtament, which is pretty ſcarce: he there principally adheres to the literal ſenſe; and his ſtyle is clear, but a little diffuſe. His other works are, A Treatiſe on the Creation of the World; in which he refutes Ariſtotle, who imagined that the world was eternal: A Treatiſe on the explication of the prophecies relating to the Meſſiah, againſt the Chriſtians: A book concerning articles of Faith; and ſome others leſs ſought after. Though Abrabanel diſcovers his averſion to Chriſtianity, yet in all his writings he treats the Chriſtians with politeneſs and good-manners.

ABRACADABRA, a magical word, recommended by Serenus Samonicus as an antidote againſt agues and ſeveral other diſeaſes. It was to be written upon a piece of paper as many times as the word contains letters, omitting the laſt letter of the former every time, as in the margin†, and repeated in the ſame order; and then ſuſpended about the neck by a linen thread. *Abracadabra* was the name of a god worſhipped by the Syrians; ſo wearing his name was a ſort of invocation of his aid: a practice which, though not more uſeful, yet was leſs irrational, than is the equally heatheniſh practice among thoſe who call themſelves Chriſtians, of wearing various things, in expectation of their operating by a Sympathy, whoſe parents were Ignorance and Superſtition.

†
abracadabra
abracadabr
abracadab
abracada
abracad
abraca
abrac
abra
abr
ab
a

ABRAHAM, the father and ſtock whence the faithful ſprung, was the ſon of Terah. He was deſcended from Noah by Shem, from whom he was nine degrees removed. Some fix his birth in the 130th year of Terah's age, but others place it in his father's 70th year. It is highly probable he was born in the city of Ur, in Chaldea, which he and his father left when they went to Canaan, where they remained till the death of Terah; after which, Abraham reſumed his firſt deſign of going to Paleſtine. The Scriptures mention the ſeveral places he ſtopped at in Canaan; his journey into Egypt, where his wife was carried off from him; his going into Gerar, where Sarah was again taken from him, but reſtored as before; the victory he obtained over the four kings who had plundered Sodom; his compliance with his wife, who inſiſted that he ſhould make uſe of their maid Hagar in order to raiſe up children; the covenant God made with him, ſealed with the ceremony of circumciſion; his obedience to the command of God, who ordered him to offer up his only ſon as a ſacrifice, and how this bloody act was prevented; his marriage with Keturah; his death at the age of 175 years; and his interment at the cave of Macpelah, near the body of Sarah his firſt wife. It would be of little uſe to dwell long upon theſe particulars, ſince they are ſo well known. But tradition has ſupplied numberleſs others, the mention of one or two of which may not be unacceptable.

Many extraordinary particulars have been told relating to his converſion from idolatry. It is a pretty general opinion, that he ſucked in the poiſon with his milk; that his father made ſtatues, and taught that they were to be worſhipped as gods*. Some Jewiſh authors relate†, that Abraham followed the ſame trade with Terah for a conſiderable time. Maimonides‡ ſays, that he was bred up in the religion of the Sabæans, who acknowledged no deity but the ſtars; that his reflections on the nature of the planets, his admiration of their motions, beauty, and order, made him conclude there muſt be a being ſuperior to the machine of the univerſe, a being who created and governed it: however, according to an old tradition, he did not renounce paganiſm till the 50th year of his age. It is related||, that his father, being gone a journey, left him to ſell the ſtatues in his abſence; and that a man, who pretended to be a purchaſer, aſked him how old he was. Abraham anſwered, "Fifty."—"Wretch that thou art, (ſaid the other,) for adoring, at ſuch an age, a being which is but a day old!" Theſe words greatly confounded Abraham. Some time afterwards, a woman brought him ſome flour, that he might give it as an offering to the idols; but Abraham, inſtead of doing ſo, took up a hatchet and broke them all to pieces, excepting the largeſt, into the hand of which he put the weapon. Terah, at his return, aſked whence came all this havock? Abraham made anſwer, that the ſtatues had had a great conteſt which ſhould eat firſt of the oblation; "Upon which, (ſaid he),

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* See *Tacking*.

* Suidas, in Σαρουχ. See Joſ. xxiv. 2.

† Apud Genebrand. in Chron.

‡ More Nevoch. c. 29.

|| Heidegger. Hiſt. Patriarch. tom. iii. p. 36.

he), the god you ſee there, being the ſtouteſt, hewed the others to pieces with that hatchet." Terah told him this was bantering; for thoſe idols had not the ſenſe to act in this manner. Abraham retorted theſe words upon his father againſt the worſhipping of ſuch gods. Terah, ſtung with this raillery, delivered up his ſon to the cogniſance of Nimrod, the ſovereign of the country: who exhorted Abraham to worſhip the fire; and, upon his refuſal, commanded him to be thrown into the midſt of the flames: "Now let your God (ſaid he) come and deliver you:" But (adds the tradition), Abraham came ſafe and ſound out of the flames.—This tradition is not of modern date, ſince it is told by St Jerom *; who ſeems to credit it in general, but diſbelieves that part of it which makes Terah ſo cruel as to be the informer againſt his own ſon. Perhaps the antiquity of the word *Ur* § might have given riſe to the fiction altogether. Such as lay ſtreſs on the following words which God ſays to Abraham, (Gen. xv. 7.), *I am the Lord that brought thee out of Ur of the Chaldees*, imagine that he ſaved him from a great perſecution, ſince he employed the very ſame words in the beginning of the decalogue to denote the deliverance from Egypt.

Abraham is ſaid to have been well ſkilled in many ſciences, and to have wrote ſeveral books. Joſephus * tells us that he taught the Egyptians arithmetic and geometry; and, according to Eupolemus and Artapan, he inſtructed the Phœnicians, as well as the Egyptians, in aſtronomy. A work which treats of the creation has been long aſcribed to him; it is mentioned in the Talmud †, and the Rabbis Chanina and Hoſchaia uſed to read it on the eve before the ſabbath. In the firſt ages of Chriſtianity, according to St Epiphanius ‡, a heretical ſect, called Sethinians, diſperſed a piece which had the title of *Abraham's Revelation*. Origen mentions alſo a treatiſe ſuppoſed to be wrote by this patriarch. All the ſeveral works which Abraham compoſed in the plains of Mamre, are ſaid to be contained in the library of the monaſtery of the Holy croſs on Mount Amaria, in Ethiopia ||. The book on the creation was printed at Paris 1552, and tranſlated into Latin by Poſtel: Rittangel, a converted Jew, and profeſſor at Konigſberg, gave alſo a Latin tranſlation of it, with remarks, in 1642.

Abraham ben meir, or Aben ezra. See Aben ezra.

Abraham Usque, a Portugueſe Jew, who tranſlated the Bible out of Hebrew into Spaniſh. It was printed at Ferrara in 1553, and re-printed in Holland in 1630. This Bible, eſpecially the firſt edition, which is moſt valuable, is marked with ſtars at certain words, which are deſigned to ſhew that theſe words are difficult to be underſtood in the Hebrew, and that they may be uſed in a different ſenſe.

Abraham (Nicholas,) a learned Jeſuit born in the dioceſe of Toul, in Lorrain, in 1589. He obtained the rank of divinity profeſſor in the univerſity of Pont-a-Mouſon, which he enjoyed 17 years, and died September 7, 1655. He wrote Notes on Virgil and on Nonnius; A Commentary on ſome of Cicero's Orations, in 2 vols folio; An excellent collection of theological pieces, in folio, entitled *Pharus Veteris Teſtamenti*; and ſome other works.

ABRAHAMITES, an order of monks exterminated for idolatry by Theophilus in the ninth century. Alſo the name of another ſect of heretics who had adopted the errors of Paulus. See Paulicians.

ABRANTES, a town of Portugal, in Eſtremadura, ſeated on the river Tajo, belongs to a marquis of the ſame name. It ſtands high, is ſurrounded with gardens and olive-trees, and contains thirty-five thouſand inhabitants. It has four convents, an alms-houſe, and an hoſpital. W. Long. 7. 18. Lat. 39. 13.

ABRASAX, or Abraxas, the ſupreme god of the Baſilidian heretics. It is a myſtical word, compoſed of the Greek numerals α, β, ρ, α, ξ, α, σ, which together make up the number CCCLXV. For Baſilides taught, that there were 365 heavens between the earth and the empyræan; each of which heavens had its angel or intelligence, which created it; each of which angels likewiſe was created by the angel next above it; thus aſcending by a ſcale to the ſupreme Being, or firſt Creator. The Baſilidians uſed the word *Abraxas* by way of charm or amulet.

ABRASION, in medicine, the corroding of any part by acrid humours or medicines.

ABRAX, an antique ſtone with the word *abraxas* engraven on it. They are of various ſizes, and moſt of them as old as the third century.

ABREAST, (a ſea-term) ſide by ſide, or oppoſite to; a ſituation in which two or more ſhips lie, with their ſides parallel to each other, and their heads equally advanced. This term more particularly regards the line of battle at ſea, where, on the different occaſions of attack, retreat, or purſuit, the ſeveral ſquadrons or diviſions of a fleet are obliged to vary their diſpoſitions, and yet maintain a proper regularity by ſailing in right or curved lines. When the line is formed *abreaſt*, the whole ſquadron advances uniformly, the ſhips being equally diſtant from and parallel to each other, ſo that the length of each ſhip forms a right angle with the extent of the ſquadron or line abreaſt. The commander in chief is always ſtationed in the center, and the ſecond and third in command in the centers of their reſpective ſquadrons. ---*Abreaſt*, within the ſhip, implies on a line with the beam, or by the ſide of any object aboard; as, the frigate ſprung a leak *abreaſt* of the main hatch-way, *i. e.* on the ſame line with the main hatch-way, croſſing the ſhip's length at right angles, in oppoſition to *afore* or *abaft* the hatch-way *.---We diſcovered a fleet *abreaſt* of Beachy-head; *i. e.* off, or directly oppoſite to it.

ABRETTENE, (Strabo;) Abrettine, (Stephanus;) a diſtrict of Myſia, in Aſia. Hence the epithet *Abrettenus* given Jupiter, (Strabo); whoſe prieſt was Cleon, formerly at the head of a gang of robbers, and who received many and great favours at the hand of Antony, but afterwards went over to Auguſtus. The people were called *Abretteni*; inhabiting the country between Ancyra of Phrygia, and the river Rhyndacus.

ABRIDGEMENT, in literature, a term ſignifying the reduction of a book into a ſmaller compaſs.

The art of conveying much ſentiment in few words, is the happieſt talent an author can be poſſeſſed of. This talent is peculiarly neceſſary in the preſent ſtate of literature; for many writers have acquired the dexterity of ſpreading a few tritical thoughts over ſeveral hundred pages. When an author hits upon a thought that pleaſes him, he is apt to dwell upon it, to view it in different lights, to force it in improperly, or upon the

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* Tradit. Hebraic. in Geneſin.

§ It is he proper ame of a ity, and it lſo ſignifi*d fire.* The Lat. verſion, Eſdras ix. as it thus: *Qui elegiſti um de igne Chaldeorum.*

* Antiq. ib. i. cap. 7, .

† Heidegger. Hiſt. Patriarch. tom. ii. . 143.

‡ Adverſ. Hær. p 286.

|| Kirchem's reatiſe of libraries, . 142.

* See *Abaft.*

the ſlighteſt relations, Though this may be pleaſant to the writers, it tires and vexes the reader. There is another great ſource of diffuſion in compoſition. It is a capital object with an author, whatever be the ſubject, to give vent to all his beſt thoughts. When he finds a proper place for any of them, he is peculiarly happy. But, rather than ſacrifice a thought he is fond of, he forces it in by way of digreſſion, or ſuperfluous illuſtration. If none of theſe expedients anſwer his purpoſe, he has recourſe to the margin, a very convenient apartment for all manner of pedantry and impertinence. There is not an author, however correct, but is more or leſs faulty in this reſpect. An abridger, however, is not ſubject to theſe temptations. The thoughts are not his own; he views them in a cooler and leſs affectionate manner; he diſcovers an impropriety in ſome, a vanity in others, and a want of utility in many. His buſineſs, therefore, is to retrench ſuperfluities, digreſſions, quotations, pedantry, *&c.* and to lay before the public only what is really uſeful. This is by no means an eaſy employment: To abridge ſome books, requires talents equal, if not ſuperior, to thoſe of the author. The facts, manner, ſpirit, and reaſoning, muſt be preſerved; nothing eſſential, either in argument or illuſtration, ought to be omitted. The difficulty of the taſk is the principal reaſon why we have ſo few good abridgements: Wynne's abridgement of Locke's Eſſay on the Human underſtanding, is, perhaps, the only unexceptionable one in our language.

Theſe obſervations relate ſolely to ſuch abridgements as are deſigned for the public. But,

When a perſon wants to ſet down the ſubſtance of any book, a ſhorter and leſs laborious method may be followed. It would be foreign to our plan to give examples of abridgements for the public: But as it may be uſeful, eſpecially to young people, to know how to abridge books for their own uſe, after giving a few directions, we ſhall exhibit an example or two, to ſhew with what eaſe it may be done.

Read the book carefully; endeavour to learn the principal view of the author; attend to the arguments employed: When you have done ſo, you will generally find, that what the author uſes as new or additional arguments, are in reality only collateral ones, or extenſions of the principal argument. Take a piece of paper or a common-place book, put down what the author wants to prove, ſubjoin the argument or arguments, and you have the ſubſtance of the book in a few lines. For example,

In the Eſſay on Miracles, Mr Hume's deſign is to prove, That miracles which have not been the immediate objects of our ſenſes, cannot reaſonably be believed upon the teſtimony of others.

Now, his argument (for there happens to be but one) is,

"That experience, which in ſome things is variable, in others uniform, is our *only* guide in reaſoning concerning matters of fact. A variable experience gives riſe to probability only; an uniform experience amounts to a proof. Our belief of any fact from the teſtimony of eye-witneſſes, is derived from no other principle than our experience in the veracity of human teſtimony. If the fact atteſted be miraculous, here ariſes a conteſt of two oppoſite experiences, or proof againſt proof. Now, a miracle is a violation of the laws of nature; and as a firm and unalterable experience has eſtabliſhed theſe laws, the proof againſt a miracle, from the very nature of the fact, is as complete as any argument from experience can poſſibly be imagined; and if ſo, it is an undeniable conſequence, that it cannot be ſurmounted by any proof whatever derived from human teſtimony."

In Dr Campbell's Diſſertation on Miracles, the author's principal aim is to ſhew the fallacy of Mr Hume's argument; which he has done moſt ſucceſsfully by another ſingle argument, as follows:

"The evidence ariſing from human teſtimony *is not ſolely* derived from experience: on the contrary, teſtimony hath a natural influence on belief antecedent to experience. The early and unlimited aſſent given to teſtimony by children gradually contracts as they advance in life: it is, therefore, more conſonant to truth, to ſay, that our *diffidence* in teſtimony is the reſult of experience, than that our *faith* in it has this foundation. Beſides, the uniformity of experience, in favour of any fact, is not a proof againſt its being reverſed in a particular inſtance. The evidence ariſing from the ſingle teſtimony of a man of known veracity will go farther to eſtabliſh a belief in its being actually reverſed: If his teſtimony be confirmed by a few others of the ſame character, we cannot with-hold our aſſent to the truth of it. Now, tho' the operations of nature are governed by uniform laws, and though we have not the teſtimony of our ſenſes in favour of any *violation* of them; ſtill, if in particular inſtances we have the teſtimony of *thouſands* of our fellow-creatures, and thoſe too men of ſtrict integrity, ſwayed by no motives of ambition or intereſt, and governed by the principles of common ſenſe, That they were actually eye-witneſſes of theſe violations, the conſtitution of our nature obliges us to believe them."

Theſe two examples contain the ſubſtance of about 400 pages.——Making private abridgements of this kind has many advantages; it engages us to read with accuracy and attention; it fixes the ſubject in our minds; and, if we ſhould happen to forget, inſtead of reading the books again, by glancing a few lines we are not only in poſſeſſion of the chief arguments, but recall in a good meaſure the author's method and manner.

Abridging is peculiarly uſeful in taking the ſubſtance of what is delivered by Profeſſors, *&c.* It is impoſſible, even with the aſſiſtance of ſhort-hand, to take down, *verbatim*, what is ſaid by a public ſpeaker. Beſides, although it were practicable, ſuch a talent would be of little uſe. Every public ſpeaker has circumlocutions, redundancies, lumber, which deſerve not to be copied. All that is really uſeful may be comprehended in a ſhort compaſs. If the plan of the diſcourſe, and arguments employed in ſupport of the different branches, be taken down, you have the whole. Theſe you may afterwards extend in the form of a diſcourſe dreſſed in your own language. This would not only be a more rational employment, but would likewiſe be an excellent method of improving young men in compoſition, an object too little attended to in all our univerſities.

Abridgement, in law, ſignifies the making a declaration or plaint ſhorter by leaving out ſomething.

ABRODIETICAL; delicate or nice in diet.

ABROGATION, ſignifies annulling, making void, or repealing a law.

ABROLKOS, the name of certain ſhelves, or banks of ſand, about 20 leagues from the coaſt of Brazil.

ABROTANUM, in botany, a ſynonime of ſeveral plants. See ARTEMISIA, FILAGO, SANTOLINA; and MATERIA MEDICA, n° 62, 63.

ABROTONUM, a town and harbour on the Mediterranean, in the diſtrict of Syrtis Parva, in Africa, (Strabo, Pliny:) one of the three cities that went to form Tripoly.

ABRUS, in botany, the trivial name of the glycine*.

ABRUZZO, a province in Naples. The river Peſcara divides it into two parts; one of which is called Ulterior, whereof Aquila is the capital; and the other Citerior, whoſe capital is Solomona. Beſides the Appenines, there are two conſiderable mountains, the one called Monte Cavallo, and the other Monte Maiello. The top of this laſt is always covered with ſnow. Abruzzo is a cold but fruitful country; and abounds with corn, rice, ſeveral good fruits, and ſaffron.

ABSALOM, the ſon of David by Maacah, was brother to Thamar David's daughter, who was raviſhed by Amnon their eldeſt brother by another mother. He waited two years for an opportunity of revenging the injury done to his ſiſter, and at laſt procured the aſſaſſination of Amnon at a feaſt which he had prepared for the king's ſons. He took refuge with Talmai king of Geſhur; and was no ſooner reſtored to favour, but he engaged the Iſraelites to revolt from his father. Abſalom was defeated in the wood of Ephraim: as he was flying, his hair caught hold of an oak, where he hung till Joab came and thruſt him through with three darts: David had expreſsly ordered his life to be ſpared, and extremely lamented him.

ABSCEDENTIA, in ſurgery, a term applied to decayed parts of the body, which, in a morbid ſtate, are ſeparated from the ſound, or loſe that union which was preſerved in a natural ſtate.

ABSCESS, in ſurgery; from *abſcedo*, to depart. A cavity containing pus; or, a gathering of matter in a part: So called, becauſe the parts which were joined are now ſeparated; one part recedes from another, to make way for the collected matter. See SURGERY, n° 8.

ABSCISSION, a figure in rhetoric, whereby the ſpeaker ſtops ſhort in the middle of his diſcourſe, leaving the audience to make the inference.

ABSCISSION, in ſurgery, the ſame with amputation.

ABSCONSA, a dark lanthern uſed by the monks at the ceremony of burying their dead.

ABSENCE, in Scots law: When a perſon cited before a court does not appear, and judgment is pronounced, that judgment is ſaid to be *in abſence*. No perſon can be tried criminally in abſence *.

ABSINTHIATED *Medicines*, ſuch as are impregnated with abſinthium or wormwood.

ABSINTHIUM, in botany, the trivial name of the common wormwood or artemiſia. It is alſo a ſynonime of the tanacetum incanum, the ſenecio incanum, the anthemis montana, the achillæa egyptiaca, and of the parthenium hyſterophorus. See ARTEMISIA, *&c.* and MATERIA MEDICA, n° 64, 65, 66.

ABSIS, in aſtronomy, the ſame with APSIS.

ABSOLUTE, in a general ſenſe, denotes a thing's being independent of, or unconnected with, any other; it is alſo uſed to expreſs freedom from all limitation.

ABSOLUTE *Gravity*, in phyſics, is the whole force by which a body is urged downwards.

ABSOLUTE *Government*, is that wherein the prince, unlimited by the laws, is left ſolely to his own will *.

ABSOLUTE *Equation*, in aſtronomy, is the aggregate of the optic and eccentric equations. The apparent inequality of a planet's motion ariſing from its not being equally diſtant from the earth at all times, is called its optic equation, and would ſubſiſt even if the planet's real motion were uniform. The eccentric inequality is cauſed by the planet's motion being uniform. To illuſtrate which, conceive the ſun to move, or to appear to move, in the circumference of a circle, in whoſe centre the earth is placed. It is manifeſt, that if the ſun moves uniformly in this circle, it muſt appear to move uniformly to a ſpectator on the earth, and in this caſe there will be no optic nor eccentric equation: but ſuppoſe the earth to be placed out of the centre of the circle, and then, though the ſun's motion ſhould be really uniform, it would not appear to be ſo, being ſeen from the earth: and in this caſe there would be an optic equation, without an eccentric one. Imagine farther, the ſun's orbit to be not circular, but elliptic, and the earth in its focus; it will be as evident that the ſun cannot appear to have an uniform motion in ſuch ellipſe: ſo that his motion will then be ſubject to two equations, the optic and the eccentric. See EQUATION.

ABSOLUTE *Motion* } See { MOTION.
ABSOLUTE *Space* } See { SPACE.
ABSOLUTE *Time* } See { TIME.

ABSOLUTE, in metaphyſics, denotes a being that poſſeſſes independent exiſtence.

ABSOLUTION, in general, is the pardoning or forgiving a guilty perſon.

ABSOLUTION, in civil law, is a ſentence whereby the party accuſed is declared innocent of the crime laid to his charge.

ABSOLUTION, in the canon law, is a juridical act, whereby the prieſt declares the ſins of ſuch as are penitent remitted.

ABSOLUTION is chiefly uſed among Proteſtants for a ſentence whereby a perſon who ſtands excommunicated is releaſed or freed from that puniſhment.

ABSORBENT *Medicines*, teſtaceous powders, as chalk, crab-eyes, *&c.* which are taken inwardly for drying up or abſorbing any acrid or redundant humours in the ſtomach or inteſtines. They are likewiſe applied outwardly to ulcers or ſores with the ſame intention *.

ABSORBENT *Veſſels*, a name given promiſcuouſly to the lacteal veſſels, lymphatics, and inhalent arteries †. Naturaliſts ſpeak of the like abſorbents in plants, the fibrous or hairy roots of which are as a kind of vaſa abſorbentia, which attract and imbibe the nutritious juices from the earth. See PLANTS, n° 21, 50.

ABSORBING, the ſwallowing up, ſucking up, or imbibing, any thing: thus black bodies are ſaid to abſorb the rays of light; luxuriant branches, to abſorb or waſte the nutricious juices which ſhould feed the fruit of trees, *&c.*

ABSORPTION, the effects of abſorbing. In the animal œconomy, it is the act whereby the abſorbent veſſels imbibe the juices ‡, *&c.*

ABSORUS, APSORUS, ABSYRTIS, ABSYRTIDES, APSYRTIDES

See Gly- e.

See *Law*, Part III. clxxxv. 4.

* See *Government*.

* See *Materia Medica*, n° 14, &c. & *Medicine*, n° 373, &c.

† See *Medicine*, Part I. n° 11, &c. & *Anatomy*, n° 369, &c.

‡ See *Anatomy*, n° 369, 370.

Apsyrtides, Apsyrtis, and Absyrtium, (Strabo, Mela, Ptolemy;) iſlands in the Adriatic, in the gulf of Carnero; ſo called from Abſyrtus, Medea's brother, there ſlain. They are either one iſland, or two, ſeparated by a narrow channel, and joined by a bridge; and are now called *Cherſo* and *Oſero*.

ABSTEMIOUS, Abstemii, in church-hiſtory, a name given to ſuch perſons as could not partake of the cup of the euchariſt, on account of their natural averſion to wine. Calviniſts allow theſe to communicate in the ſpecies of bread only, touching the cup with their lip; which, on the other hand, is by the Lutherans deemed a profanation.

ABSTEMIUS (Laurentius) a native of Macerata, profeſſor of belles lettres in Urbino, and librarian of duke Guido Ubaldo, under the pontificate of Alexander VI. He wrote, 1. Notes on moſt difficult paſſages of ancient authors. 2. Hecatomythium, *i. e.* A collection of an 100 fables, *&c.* which have been often printed with thoſe of Æſop, Phædrus, Gabrias, Avienus, *&c.*

ABSTERGENT *Medicines*, thoſe employed for reſolving obſtructions, concretions, *&c.* ſuch as ſoap, *&c.*

ABSTINENCE, in a general ſenſe, the act or habit of refraining from ſomething which we have a propenſion to or find pleaſure in.—Among the Jews, various kinds of abſtinence were ordained by their law. Among the primitive Chriſtians, ſome denied themſelves the uſe of ſuch meats as were prohibited by that law, others looked upon this abſtinence with contempt; as to which, St Paul gives his opinion, Rom. xiv. 1---3. The council of Jeruſalem, which was held by the Apoſtles, enjoined the Chriſtian converts to abſtain from meats ſtrangled, from blood, from fornication, and from idolatry. Abſtinence, as preſcribed by the goſpel, is intended to mortify and reſtrain the paſſions, to humble our vicious natures, and by that means raiſe our minds to a due ſenſe of devotion. But there is another ſort of abſtinence, which may be called *ritual*, and conſiſts in abſtaining from particular meats at certain times and ſeaſons. It was the ſpiritual monarchy of the weſtern world, which firſt introduced this ritual abſtinence; the rules of which were called *rogations*; but groſsly abuſed from the true nature and deſign of faſting.—In England, abſtinence from fleſh has been enjoined by ſtatute even ſince the reformation, particularly on Fridays, and Saturdays, on vigils, and on all commonly called *fiſh-days*. The like injunctions were renewed under Q. Elizabeth: but at the ſame time it was declared, that this was done not out of motives of religion, as if there were any difference in meats; but in favour of the conſumption of fiſh, and to multiply the number of fiſhermen and mariners, as well as ſpare the ſtock of ſheep. The great faſt, ſays St Auguſtin, is to abſtain from ſin.

Abstinence is more particularly uſed for a ſpare diet, or a ſlender parſimonious uſe of food, below the ordinary ſtandard of nature. The phyſicians relate wonders of the effects of abſtinence in the cure of many diſorders, and protracting the term of life. The noble Venetian, Cornaro, after all imaginable means had proved vain, ſo that his life was deſpaired of at forty, recovered, and lived to near an hundred, by mere dint of abſtinence; as he himſelf gives the account. It is indeed ſurpriſing to what a great age the primitive Chriſtians of the Eaſt, who retired from the perſecutions into the deſarts of Arabia and Egypt, lived, healthful and cheerful, on a very little food. Caſſian aſſures us, that the common rate for 24 hours was 12 ounces of bread, and mere water: with this St Anthony lived 105 years; James the hermit, 104; Arſenius, tutor of the Emperor Arcadius, 120; S. Epiphanius, 115; Simeon the Stylite, 112; and Romauld, 120. Indeed, we can match theſe inſtances of longevity at home. Buchanan writes, that one Laurence preſerved himſelf to 140 by force of temperance and labour; and Spotſwood mentions one Kentigern, afterwards called S. Mongah or Mungo, who lived to 185 by the ſame means. Other inſtances ſee under the article Longævity.—Abſtinence, however, is to be recommended only as it means a proper regimen; for in general it muſt have bad conſequences when obſerved without a due regard to conſtitution, age, ſtrength, *&c.* According to Dr Cheyne, moſt of the chronical diſeaſes, the infirmities of old age, and the ſhort lives of Engliſhmen, are owing to repletion; and may be either cured, prevented, or remedied by abſtinence: but then the kinds of abſtinence which ought to obtain, either in ſickneſs or health, are to be deduced from the laws of diet and regimen*.

Among the brute creation, we ſee extraordinary inſtances of long abſtinence. The ſerpent-kind, in particular, bear abſtinence to a wonderful degree. We have ſeen rattle-ſnakes that had ſubſiſted many months without any food, yet ſtill retained their vigour and fierceneſs. Dr Shaw ſpeaks of a couple of ceraſtes, (a ſort of Egyptian ſerpents), which had been kept five years in a bottle cloſe corked, without any ſort of food, unleſs a ſmall quantity of ſand wherein they coiled themſelves up in the bottom of the veſſel may be reckoned as ſuch: yet when he ſaw them, they had newly caſt their ſkins, and were as briſk and lively as if juſt taken. But it is even natural for divers ſpecies to paſs four, five, or ſix months every year, without either eating or drinking. Accordingly, the tortoiſe, bear, dormouſe, ſerpent, *&c.* are obſerved regularly to retire, at thoſe ſeaſons, to their reſpective cells, and hide themſelves, ſome in the caverns of rocks or ruins; others dig holes under ground; others get into woods, and lay themſelves up in the clefts of trees; others bury themſelves under water, *&c.* And theſe animals are found as fat and fleſhy after ſome months abſtinence as before.---Sir G. Ent * weighed his tortoiſe ſeveral years ſucceſſively, at its going to earth in October, and coming out again in March; and found, that, of four pounds four ounces, it only uſed to loſe about one ounce.—Indeed, we have inſtances of men paſſing ſeveral months as ſtrictly abſtinent as other creatures. In particular, the records of the Tower mention a Scotchman impriſoned for felony, and ſtrictly watched in that fortreſs for ſix weeks: in all which time he took not the leaſt ſuſtenance; for which he had his pardon. Numberleſs inſtances of extraordinary abſtinence, particularly from morbid cauſes, are to be found in the different periodical Memoirs, Tranſactions, Ephemerides, &c.—It is to be added, that, in moſt inſtances of extraordinary human abſtinence related by naturaliſts, there were ſaid to have been apparent marks of a texture of blood and humours, much like that of the animals above mentioned. Though it is no improbable opinion, that the air itſelf may furniſh ſomething for nutrition. It is certain, there are ſubſtances of all kinds, animal, vegetable, &c. floating in the atmoſphere, which muſt be continually taken in by reſpiration. And that an animal body may be nouriſhed thereby, is evident in the inſtance of vipers; which if taken when firſt brought forth, and kept from every thing but air, will yet grow very conſiderably in a few days. So the eggs of lizards are obſerved to increaſe in bulk, after they are produced, though there be nothing to furniſh the increment but air alone; in like manner as the eggs or ſpawn of fiſhes grow and are nouriſhed with the water. And hence, ſay ſome, it is that cooks, turnſpit-dogs, &c. though they eat but little, yet are uſually fat.

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* See Al ment, Die, Regimen; & Medicine, Part VI. nº 328, &c.

*Phil. Tran nº 194.

ABSTINENTS, or ABSTINENTES, a ſect of heretics that appeared in France and Spain about the end of the third century. They are ſuppoſed to have borrowed part of their opinions from the Gnoſtics and Manicheans, becauſe they oppoſed marriage, condemned the uſe of meats, and placed the Holy Ghoſt in the claſs of created beings.

ABSTRACT *Idea*, in metaphyſics, is a partial idea of a complex object, limited to one or more of the component parts or properties, laying aſide or abſtracting from the reſt. Thus, in viewing an object with the eye, or recollecting it in the mind, we can eaſily abſtract from ſome of its parts or properties, and attach ourſelves to others: we can attend to the redneſs of a cherry, without regard to its figure, taſte, or conſiſtence. See ABSTRACTION.

ABSTRACT *Terms*, words that are uſed to expreſs abſtract ideas. Thus beauty, uglineſs, whiteneſs, roundneſs, life, death, are abſtract terms.

ABSTRACT *Numbers*, are aſſemblages of units, conſidered in themſelves, without denoting any particular and determined particulars. Thus 6 is an abſtract number, when not applied to any thing; but, if we ſay 6 feet, 6 becomes a concrete number. See the article NUMBER.

ABSTRACT *Mathematics*, otherwiſe called Pure Mathematics, is that which treats of magnitude or quantity, abſolutely and generally conſidered, without reſtriction to any ſpecies of particular magnitude; ſuch are Arithmetic and Geometry. In this ſenſe, abſtract mathematics is oppoſed to mixed mathematics, wherein ſimple and abſtract properties, and the relations of quantities primitively conſidered in pure mathematics, are applied to ſenſible objects, and by that means become intermixed with phyſical conſiderations; ſuch are Hydroſtatics, Optics, Navigation, &c.

ABSTRACTION, the operation of the mind when occupied by abſtract ideas. A large oak fixes our attention, and abſtracts us from the ſhrubs that ſurround it. In the ſame manner, a beautiful woman in a crowd, abſtracts our thoughts, and engroſſes our attention ſolely to herſelf. Theſe are examples of real abſtraction: when theſe, or any others of a ſimilar kind, are recalled to the mind after the objects themſelves are removed from our ſight, they form what is called *abſtract ideas*, or the mind is ſaid to be employed in abſtract ideas. But the power of abſtraction is not confined to objects that are ſeparable in reality as well as mentally: the ſize, the figure, the colour of a tree are inſeparably connected, and cannot exiſt independent of each other; and yet we can mentally confine our obſervations to any one of theſe properties, neglecting or abſtracting from the reſt.

ABSTRUSE, ſomething deep, hidden, concealed, or far removed from common apprehenſions, and therefore not eaſily underſtood; in oppoſition to what is obvious and palpable. Thus metaphyſics is an abſtruſe ſcience; and the doctrine of fluxions, and the method de maximis and minimis, are abſtruſe points of knowledge.

ABSURD, an epithet applied to any thing that oppoſes the human apprehenſion, and contradicts a manifeſt truth. Thus, it would be abſurd to ſay that ſix and ſix make only 10, or to deny that twice ſix make 12. When the term *abſurd* is applied to actions, it has the ſame import as *ridiculous*.

ABSURDITY, an impropriety, or ſomething that oppoſes an evident truth or principle. The contradiction is the greateſt of all abſurdities.

ABSYNTHIUM. See ABSINTHIUM.

ABSYRTUS, in the heathen mythology, the ſon of Æta and Hypſea, and the brother of Medea. The latter running away with Jaſon, after her having aſſiſted him in carrying off the golden fleece, was purſued by her father; when, to ſtop his progreſs, ſhe tore Abſyrtus in pieces, and ſcattered his limbs in his way.

ABTHANES, a title of honour uſed by the ancient inhabitants of Scotland, who called their nobles *thanes*, which in the old Saxon ſignifies *king's miniſters*; and of theſe the higher rank were ſtyled *abthanes*, and thoſe of the lower *underthanes*.

ABUCARAS (Theodorus), metropolitan of Caria in the ninth century, was remarkable for his zeal in defending what he believed to be the truth, and was the author of above forty controverſial treatiſes againſt the Saracens, Jews, and reputed heretics. This metropolitan at firſt embraced the doctrines of Photius; for which, begging pardon of the council of Conſtantinople in 869, he was reſtored to the communion of the church, and obtained a ſeat in the council. His works are inſerted in the Supplement of the *Bibliotheque des Peres*, the Paris edition.

ABUKESO, in commerce, the ſame with ASLAN *.

*Which ſee.

ABULFARAGIUS (Gregory), ſon to Aaron a phyſician, born in 1226, in the city of Malatia, near the ſource of the Euphrates in Armenia. He followed the profeſſion of his father; and practiſed with great ſucceſs, numbers of people coming from the moſt remote parts to aſk his advice. However, he would hardly have been known at this time, had his knowledge been confined to phyſic: but he applied himſelf to the ſtudy of the Greek, Syriac, and Arabic languages, as well as philoſophy and divinity; and he wrote a hiſtory which does honour to his memory. It is written in Arabic, and divided into dynaſties. It conſiſts of ten parts, being an epitome of univerſal hiſtory from the creation of the world to his own time. Dr Pocock publiſhed it with a Latin tranſlation in 1663; and added, by way of ſupplement, a ſhort continuation relating to the hiſtory of the eaſtern princes.

ABUNA, the title given to the archbiſhop or metropolitan of Abyſſinia. See ABYSSINIAN.

ABUNDANT *Number*, in arithmetic, is a number, the ſum of whoſe aliquot parts is greater than the number itſelf. Thus the aliquot parts of 12, being 1, 2, 3, 4, and 6, they make, when added together, 16.

An abundant number is oppoſed to a *deficient* number, or that which is greater than all its aliquot parts taken together; as 14, whoſe aliquot parts are 1, 2, and 7, which make no more than 10: and to a *perfect* number, or one to which its aliquot parts are equal, as 6, whoſe aliquot parts are 1, 2, and 3.

ABUNDANTIA, a heathen divinity, repreſented in ancient monuments under the figure of a woman with a pleaſing aſpect, crowned with garlands of flowers, pouring all ſorts of fruit out of a horn which ſhe holds in her right hand, and ſcattering grain with her left, taken promiſcuouſly from a ſheaf of corn. On a medal of Trajan, ſhe is repreſented with two cornucopiæ.

ABUS, (Tacitus); a river of Britain, formed by the confluence of the Ure, the Derwent, Trent, &c. falling into the German ſea, between Yorkſhire and Lincolnſhire, and forming the mouth of the Humber.

ABUSE, in a general ſenſe, implies the perverting ſomething from its genuine or original intention. Thus an abuſe of words is the uſing them without any clear and diſtinct ideas.

ABUTILON, in botany, the trival name of ſeveral ſpecies of the ſida. See SIDA. Abutilon is alſo a ſynonime of the melochia tomentoſa and melochia depreſſa, two American plants of the monadelphia pentandria claſs. It is likewiſe a ſynonime of the lavatora, malva, and hibiſcus.

ABYDOS, anciently a town built by the Mileſians in Aſia, on the Helleſpont, where it is ſcarce a mile over, oppoſite to Seſtos on the European ſide, (Dionyſius Periegetes.) Now both called the *Dardanelles*. Abydos lay midway between Lampſacus and Ilium, famous for Xerxes's bridge, (Herodotus, Virgil); and for the loves of Leander and Hero, (Muſæus, Ovid); celebrated alſo for its oyſters, (Ennius, Virgil.) The inhabitants were a ſoft, effeminate people, given much to detraction; hence the proverb, *Ne temere Abydum*, when we would caution againſt danger, (Stephanus.)

ABYDOS, (Strabo, Pliny); anciently an inland town of Egypt, between Ptolemais and Dioſpolis Parva, towards Syene; famous for the palace of Memnon, and the temple of Oſiris. A colony of Mileſians; (Stephanus.)

ABYLA, (Ptolemy, Mela); one of Hercules's pillars, on the African ſide, called by the Spaniards *Sierra de las Monas*, over againſt Calpe in Spain, the other pillar; ſuppoſed to have been formerly joined, but ſeparated by Hercules, and thus to have given entrance to the ſea now called the *Mediterraean*: the limits of the labours of Hercules, (Pliny.)

ABYSS, in a general ſenſe, denotes ſomething profound, and, as it were, bottomleſs. The word is originally Greek, αϐυσσος; compounded of the privative α, and βυσσος, bottom; *q. d.* without a bottom.

ABYSS, in a more particular ſenſe, denotes a deep maſs or fund of waters. In this ſenſe, the word is particularly uſed, in the Septuagint, for the water which God created at the beginning with the earth, which encompaſſed it round, and which our tranſlators render by *deep*. Thus it is that darkneſs is ſaid to have been on the face of the abyſs.

ABYSS is alſo uſed for an immenſe cavern in the earth, where God collected all thoſe waters on the third day; which, in our verſion, is rendered the *ſeas*, and elſewhere the *great deep*. Dr Woodward, in his Natural Hiſtory of the Earth, aſſerts, That there is a mighty collection of waters incloſed in the bowels of the earth, conſtituting a huge orb in the interior or central parts of it; and over the ſurface of this water he ſuppoſes the terreſtrial ſtrata to be expanded. This, according to him, is what Moſes calls *the great deep*, and what moſt authors render *the great Abyſs*. The water of this vaſt Abyſs, he aſſerts, does communicate with that of the ocean, by means of certain hiatus's or chaſms paſſing betwixt it and the bottom of the ocean: and this and the Abyſs he ſuppoſes to have one common centre, around which the water of both is placed; but ſo, that the ordinary ſurface of the Abyſs is not level with that of the ocean, nor at ſo great a diſtance from the centre as the other, it being for the moſt part reſtrained and depreſſed by the ſtrata of earth lying upon it: but where-ever thoſe ſtrata are broken, or ſo lax and porous that water can pervade them, there the water of the Abyſs aſcends; fills up all the clefts and fiſſures into which it can get admittance; and ſaturates all the interſtices and pores of the earth, ſtone, or other matter, all around the globe, quite up to the level of the ocean.—The exiſtence of an abyſs, or receptacle of ſubterraneous waters, is controverted by Camerarius *; and defended by Dr Woodward, chiefly by two arguments: the firſt drawn from the vaſt quantity of water which covered the earth in the time of the deluge; the ſecond, from the conſideration of earthquakes, which he endeavours to ſhew are occaſioned by the violence of the waters in this abyſs. A great part of the terreſtrial globe has been frequently ſhaken at the ſame moment; which argues, according to him, that the waters, which were the occaſion thereof, were coextended with that part of the globe. There are even inſtances of univerſal earthquakes; which (ſays he) ſhew, that the whole abyſs muſt have been agitated: for ſo general an effect muſt have been produced by as general a cauſe, and that cauſe can be nothing but the ſubterraneous Abyſs †.—To this abyſs alſo has been attributed the origin of ſprings and rivers; the level maintained in the ſurfaces of different ſeas; and their not overflowing their banks. To the effluvia emitted from it, ſome even attribute all the diverſities of weather and changes in our atmoſphere ‡. Ray ||, and other authors, ancient as well as modern, ſuppoſe a communication between the Caſpian ſea and the ocean by means of a ſubterranean abyſs: and to this they attribute it, that the Caſpian does not overflow, notwithſtanding the great number of large rivers it receives, of which Kempfer reckons above 50 in the compaſs of 60 miles; tho', as to this, others ſuppoſe that the daily evaporation may ſuffice to keep the level.—After all, however, that has been advanced by naturaliſts concerning this Abyſs, its exiſtence remains as yet uneſtabliſhed by any ſolid proofs.

ABYSS is alſo uſed to denote hell. In which ſenſe the word is ſynonymous with what is otherwiſe called *Barathrum*, *Erebus*, and *Tartarus*; in the Engliſh bible, the *bottomleſs pit*. The unclean ſpirits expelled by Chriſt, begged, *ne imperaret ut in abyſſum irent*, according to the vulgate; εις αβυσσον, according to the Greek. Luke viii. 31. Rev. ix. 1.

ABYSS is more particularly uſed, in antiquity, to denote the temple of Proſerpine. It was thus called on account

* Diſſert. Taur. Acta Erud. ſupp. tom. vi. p. 24.

† Hiſt. of the earth. Journal de Scavans, tom. lviii. p. 393. Memoirs of Literature, tom. viii. p. 101, &c.

‡ Holloway, Introd. to Woodwards hiſt. of the Earth. Acta Erud. 1727. p. 313.

|| Phyſico-Theol. Diſc. ii c. 1. p. 76.

account of the immenſe fund of gold and riches depoſited there; ſome ſay, hid under ground.

Abyss is alſo uſed, in heraldry, to denote the centre of an eſcutcheon. In which ſenſe, a thing is ſaid to be bore in abyſs, *en abyſme*, when placed in the middle of the ſhield, clear from any other bearing: He bears azure, a flower de lis, in abyſs.

ABYSSINIA, by ſome called *Higher Ethiopia*, and by the Arabians *Al Habaſh*, is bounded on the north by Nubia; on the eaſt, by the Arabic gulph or Red Sea, and the kingdom of Adel; on the ſouth, by the kingdoms of Ajan, Alaba, and Gingiro; and on the weſt, by the kingdom of Goram and part of Gingiro; and is divided into a great number of provinces. The principal river is the Nile, which has its ſource in this country; and the moſt conſiderable lake, that of Dambea, which diſcharges itſelf into the Nile, is about 700 miles in length, and 90 in breadth. The air is pretty temperate in the mountains, and therefore their towns and ſtrong-holds are generally placed on them; but in the valleys it is hot and ſuffocating. The ſoil and face of the country is various. In ſome places there are nothing but rocks and profound caverns: in others, eſpecially where there are rivers, the land is exceeding fruitful; and the banks of theſe ſtreams are bordered with flowers of various kinds, many of which are unknown in Europe. The torrents in the rainy ſeaſon waſh a great deal of gold from the mountains. This ſeaſon begins in May, when the ſun is vertical, or directly over their heads; and ends in September. To theſe torrents is attributed the overflowing of the Nile, the cauſe of which ſo much puzzled the ancients. It was commonly attributed to the melting of the ſnow upon the hills in theſe parts: but experience has ſince undeceived the world; for there is no ſnow, even on the higheſt hills in this country.—The country produces a great variety of animals, both tame and wild, ſuch as lions, tigers, rhinoceroſes, leopards, elephants, monkeys, ſtags, deer; horſes, camels, dromedaries, goats, cows, ſheep; likewiſe oſtriches, with a vaſt variety of other birds. In the rivers are crocodiles and the hippopotamus. Travellers mention alſo a peculiar kind of bees, ſmall, black, and without a ſting, which hive in the earth, and make honey and wax that are extremely white. The country is greatly infeſted with locuſts, which devour every thing that is green wherever they come.—Beſides the large towns, there are a great number of villages, which in ſome places are ſo thick ſown, that they look like one continued town: the houſes are very mean, being but one ſtory high; and built of ſtraw, earth, and lime. In moſt of the towns the houſes are ſeparated by hedges, which are always green, and mixed with flowers and fruit-trees at a certain diſtance from each other, which affords an agreeable proſpect.—The government is monarchical. The ſovereign has the title of Negus, and is an abſolute prince. When he is in camp, the tents are ſo regularly diſpoſed as to have the appearance of a city; and there is a captain over every diviſion, to prevent diſorders and to execute juſtice.—The Abyſſines in general are of an olive complexion, tall, graceful, and well featured. Thoſe who are neither mechanics or tradeſmen (which few of them are), nor tillers of the ground, are inured to bear arms, which are a head-piece, a buckler, a coat of mail, bows and arrows, darts, pikes capped with iron at both ends, a ſling, and a ſword: they have very few fire-arms, and thoſe were introduced by the Portugueſe. The habit of perſons of quality is a ſilken veſt, or fine cotton, with a kind of ſcarf. The citizens have the ſame habit, only coarſer. The common people have nothing but a pair of cotton drawers, and a ſcarf which covers the reſt of their body. The women are of a healthy conſtitution, active, and moderately handſome, having neither flat noſes nor thick lips like the negroes; and nature is ſo friendly, that they ſtand in little need of midwives, which is indeed the caſe of moſt countries in the torrid zone. They appear in public as in Europe, without being forbid the converſation of the men as among the Mahometans. Princeſſes of the royal blood are not permitted to marry foreigners; and when they take the air, they go in great ſtate, with 400 or 500 women attendants. Their language is the Ethiopic, which bears a great affinity with the Arabic; but particular provinces have a different dialect. As to their religion, ſee the next article.

Manufactures are almoſt wholly wanting in this country; and the few trades which they have amongſt them are always conveyed from the father to the children. They ſeem indeed by their churches, and other ruinated places, to have had a knowledge of architecture. But the workmen were ſent for from other countries, and were forced to do all themſelves; ſo that when theſe fabrics were reared, eſpecially the imperial palace built by Peter Pais, a Portugueſe architect, the people flocked from all parts of Ethiopia to view it, and admired it as a new wonder of the world.—Gold, ſilver, copper, and iron, are the principal ores with which their mines abound in this extenſive part of Africa; but not above one third part is made uſe of by way of merchandize, or converted into money; of which they have little or no uſe in Abyſſinia. They cut their gold indeed into ſmall pieces for the pay of their troops, and for expences of the court, which is but a modern cuſtom among them; the king's gold, before the end of the 17th century, being laid up in his treaſury in ingots, with intent to be never carried out, nor ever uſed in any thing but veſſels and trinkets for the ſervice of the palace. In the lieu of ſmall money, they make uſe of rock-ſalt as white as ſnow and as hard as ſtone. This is taken out of the mountain of Lafta, and put into the king's warehouſes; where it is reduced into tablets of a foot long, and three inches broad, ten of which are worth about a French crown. When they are circulated in trade, they are reduced into ſtill ſmaller pieces, as occaſion requires. This ſalt is alſo applied to the ſame purpoſe as common ſea-ſalt. With this mineral ſalt they purchaſe pepper, ſpices, and ſilk ſtuffs, which are brought to them by the Indians, in their ports in the Red Sea. Cardamums, ginger, aloes, myrrh, caſſia, civet, ebony-wood, ivory, wax, honey, cotton and linnens of various ſorts and colours, are merchandizes which may be had from Abyſſinia; to which may be added ſugar, hemp, flax, and excellent wines, if theſe people had the art of preparing them. It is affirmed there are in this country the fineſt emeralds that are any where to be found; and, though they are found but in one place, they are there in great quantities, and ſome ſo large and ſo perfect as to be of almoſt ineſtimable value. The greateſt part of the merchandizes above mentioned, are more for foreign than inland trade. Their domeſtic commerce conſiſts chiefly in ſalt, honey, buck-wheat, grey peaſe, citrons, oranges, lemons, and other proviſions, with fruits and herbage neceſſary for the ſupport of life. Thoſe places that the Abyſſinian merchants frequent the moſt, who dare venture to carry their commodities by ſea themſelves, are Arabia Felix, and the Indies, particularly Goa, Cambaye, Bengal, and Sumatra. With regard to their ports on the Red Sea, to which foreign merchants commonly reſort, the moſt conſiderable are thoſe of Mette, Azum, Zajalla, Maga, Dazo, Patea, and Brava. The trade of the Abyſſinians by land is inconſiderable. There are, however, bands of them who arrive yearly at Egypt, particularly at Cairo, laden with gold duſt, which they bring to barter for the merchandizes of that country, or of Europe, for which they have occaſion. Theſe caſilas or caravans, if we may be allowed thus to call a body of 40 or 50 poor wretches who unite together for their mutual aſſiſtance in their journey, are commonly three or four months on their route, traverſing foreſts and mountains almoſt impaſſable, in order to exchange their gold for neceſſaries for their families, and return immediately with the greateſt part of the merchandize on their backs. Frequently the Jews or Egyptians give them large credit; which may ſeem ſurpriſing, as they are beyond recourſe if they ſhould fail of payment. But experience has ſhewn, that they have never abuſed the confidence repoſed in them; and even in the event of death, their fellow-travellers take care of the effects of the deceaſed for the benefit of their families, but in the firſt place for the diſcharge of thoſe debts contracted at Cairo.—It remains only to be obſerved, that one of the principal branches of trade of the Abyſſines is that of ſlaves; who are greatly eſteemed in the Indies and Arabia for the beſt, and moſt faithful, of all that the other kingdoms of Africa furniſh. The Indian and Arabian merchants frequently ſubſtitute them as their factors; and, on account of their good ſervices and integrity, not only often give them their liberty, but liberally reward them.

ABYSSINIAN, in eccleſiaſtical hiſtory, is uſed as the name of a ſect, or hereſy, in the Chriſtian church, eſtabliſhed in the empire of Abyſſinia. The Abyſſinians are a branch of the Copts or Jacobites; with whom they agree in admitting but one nature in Jeſus Chriſt, and rejecting the council of Chalcedon: whence they are alſo called Eutychians, and ſtand oppoſed to the Melchites. They are only diſtinguiſhed from the Copts, and other ſects of Jacobites, by ſome peculiar national uſages.—The Abyſſinian ſect or church is governed by a biſhop or metropolitan ſtyled *Abuna*, ſent them by the Coptic patriarch of Alexandria reſiding at Cairo, who is the only perſon that ordains prieſts. The next dignity is that of Komos, or Hegumenas, who is a kind of arch-preſbyter. They have canons alſo, and monks: the former of whom marry; the latter, at their admiſſion, vow celibacy, but with a reſervation: theſe, it is ſaid, make a promiſe aloud, before their ſuperior, to keep chaſtity; but add, in a low voice, *as you keep it*. The emperor has a kind of ſupremacy in eccleſiaſtical matters. He alone takes cogniſance of all eccleſiaſtical cauſes, except ſome ſmaller ones reſerved to the judges; and confers all benefices, except that of Abuna.—The Abyſſinians have at different times expreſſed an inclination to be reconciled to the ſee of Rome; but rather out of intereſt of ſtate, than any other motive. The emperor David, or the queen regent on his behalf, wrote a letter on this head to pope Clement VII. full of ſubmiſſion, and demanding a patriarch from Rome to be inſtructed by: which being complied with, he publicly abjured the doctrine of Eutychius and Dioſcorus in 1626, and allowed the ſupremacy of the pope. Under the emperor Seltan Seghed all was undone again; the Romiſh miſſionaries ſettled there had their churches taken from them, and their new converts baniſhed or put to death. The congregation *de propaganda* have made ſeveral attempts to revive the miſſion, but to little purpoſe.—The doctrines and ritual of this ſectary form a ſtrange compound of Judaiſm, Chriſtianity, and ſuperſtition. They practiſe circumciſion; and are ſaid to extend the practice to the females as well as males: they obſerve both Saturday and Sunday ſabbaths: they eat no meats prohibited by the law of Moſes: women are obliged to the legal purifications: and brothers marry their brothers wives, *&c.* On the other hand, they celebrate the epiphany with peculiar feſtivity, in memory of Chriſt's baptiſm; when they plunge and ſport in ponds and rivers, which has occaſioned ſome to affirm that they were baptized anew every year. Among the ſaints-days is one conſecrated to Pilate and his wife; by reaſon Pilate waſhed his hands before he pronounced ſentence on Chriſt, and his wife deſired him to have nothing to do with the blood of that juſt perſon. They have four lents: the great one commences ten days earlier than ours, and is obſerved with much ſeverity, many abſtaining therein even from fiſh, becauſe St Paul ſays there is one kind of fleſh of men, and another of fiſhes. They allow of divorce, which is eaſily granted among them, and by the civil judge; nor do their civil laws prohibit polygamy itſelf. They have at leaſt as many miracles and legends of ſaints, as the Romiſh church: which proved no ſmall embarraſſment to the Jeſuit miſſionaries, to whom they produced ſo many miracles, wrought by their ſaints, in proof of their religion, and thoſe ſo well circumſtantiated and atteſted, that the Jeſuits were obliged to deny miracles to be any proof of a true religion; and in proof hereof to allege the ſame arguments againſt the Abyſſinians, which Proteſtants in Europe allege againſt the Papiſts. They pray for the dead, and invoke ſaints and angels; have ſo great a veneration for the virgin, that they charged the Jeſuits with not rendering her honour enough. Images in painting they venerate; but abhor all thoſe in relievo, except the croſs. They hold that the ſoul of man is not created; becauſe, ſay they, God finiſhed all his work on the ſixth day. They admit the apocryphal books, and the canons of the apoſtles, as well as the apoſtolical conſtitutions, for genuine. Their liturgy is given by Alvarez, and in Engliſh by Pagit.

ACA, ACE, or ACON, a town of Phœnicia, on the Mediterranean; afterwards called *Ptolemais*; now *Acre*.

ACACALOTL, the Braſilian name of a bird called by ſome *corvus aquaticus*, or the water-raven: properly, the pelicanus carbo, or corvorant. See PELICANUS.

ACACIA, EGYPTIAN THORN, or BINDING BEAN-TREE, in botany, a ſpecies of Mimoſa *, according to Linnæus; tho' other botaniſts make it a diſtinct genus.

Falſe ACACIA. See ROBINIA.

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* See Mimoſa.

Three-thorned ACACIA, or *Honey-Locuſt*. See GLEDITSIA.

ACACIA, in the Materia Medica. See there, n° 67.

ACACIA, among antiquaries, ſomething reſembling a roll or bag, ſeen on medals, as in the hands of ſeveral conſuls and emperors. Some take it to repreſent a handkerchief rolled up, wherewith they made ſignals at the games; others, a roll of petitions or memorials; and ſome, a purple bag full of earth, to remind them of their mortality.

ACACIANS, in eccleſiaſtical hiſtory, the name of ſeveral ſects of heretics; ſome of which maintained, that the Son was only a ſimilar, not the ſame, ſubſtance with the Father; and others, that he was not only a diſtinct, but a diſſimilar, ſubſtance. Two of theſe ſects had their denomination from Acacius biſhop of Cæſarea, who lived in the fourth century, and changed his opinions, ſo as, at different times, to be head of both. Another was named from Acacius patriarch of Conſtantinople, who lived in the cloſe of the fifth century.

ACACIUS, ſirnamed LUSCUS, becauſe he was blind of one eye, was biſhop of Cæſarea in Paleſtine, and ſucceeded the famous Euſebius: he had a great ſhare in the baniſhment of pope Liberius, and bringing Felix to the ſee of Rome. He gave name to a ſect *, and died about the year 365. He wrote the life of Euſebius, and ſeveral other works.

* See the preceding article.

ACACIUS (St), biſhop of Amida, in Meſopotamia, in 420, was diſtinguiſhed by his piety and charity. He ſold the plate belonging to his church, to purchaſe ſeven thouſand Perſian ſlaves who were ready to die with want and miſery; and giving each of them ſome money, ſent them home. Veranius, their king, was ſo affected with this noble inſtance of benevolence, that he deſired to ſee the biſhop; and this interview procured a peace between that prince and Theodoſius I.

There have been ſeveral other eminent perſons of the ſame name; particularly, A martyr under the emperor Decius: A patriarch of Antioch, who ſucceeded Baſil in 458, and died in 459: A biſhop of Miletum in the fifth century: A famous rhetorician in the reign of the emperor Julian: and, A patriarch of Conſtantinople in the fifth century; who was ambitious to draw the whole power and authority of Rome by degrees to Conſtantinople, for which he was delivered over irretrievably to the devil by pope Felix III.

ACADEMICIAN, or ACADEMIST, a member of an academy. See ACADEMY in the modern ſenſe.

ACADEMICS, or ACADEMISTS, a denomination given to the cultivators of a ſpecies of philoſophy originally derived from Socrates, and afterwards illuſtrated and enforced by Plato, who taught in a grove near Athens, conſecrated to the memory of Academus an Athenian hero; from which circumſtance this philoſophy received the name of *academical*. Before the days of Plato, philoſophy had, in a great meaſure, fallen into contempt. The contradictory ſyſtems and hypotheſes which had ſucceſſively been urged upon the world were become ſo numerous, that, from a view of this inconſtancy and uncertainty of human opinions, many were led to conclude, that truth lay beyond the reach of our comprehenſion. Abſolute and univerſal ſcepticiſm was the natural conſequence of this concluſion. In order to remedy this abuſe of philoſophy and of the human faculties, Plato laid hold of the principles of the academical philoſophy; and, in his Phædo, reaſons in the following manner. "If we are unable to diſcover truth,(ſays he), it muſt be owing to two circumſtances: either there is no truth in the nature of things; or the mind, from a defect in its powers, is not able to apprehend it. Upon the latter ſuppoſition, all the uncertainty and fluctuation in the opinions and judgments of mankind admit of an eaſy ſolution: Let us therefore be modeſt, and aſcribe our errors to the real weakneſs of our own minds, and not to the nature of things themſelves. Truth is often difficult of acceſs: in order to come at it, we muſt proceed with caution and diffidence, carefully examining every ſtep; and, after all our labour, we will frequently find our greateſt efforts diſappointed, and be obliged to confeſs our ignorance and weakneſs."

Labour and caution in our reſearches, in oppoſition to raſh and haſty deciſions, were the diſtinguiſhing characteriſtics of the diſciples of the ancient academy. A philoſopher poſſeſſed of theſe principles, will be ſlow in his progreſs; but will ſeldom fall into errors, or have occaſion to alter his opinion after it is once formed. Vanity and precipitance are the great ſources of ſcepticiſm: hurried on by theſe, inſtead of attending to the cool and deliberate principles recommended by the academy, ſeveral of our modern philoſophers have plunged themſelves into an abſurd and ridiculous kind of ſcepticiſm. They pretend to diſcredit things that are plain, ſimple, and eaſily comprehended; but give peremptory and deciſive judgments upon ſubjects that evidently exceed the limits of our capacity. Of theſe, Berkley and Hume are the moſt conſiderable. Berkley denied the exiſtence of every thing, excepting his own ideas. Mr Hume has gone a ſtep further, and queſtioned even the exiſtence of ideas; but at the ſame time has not heſitated to give determined opinions with regard to eternity, providence, and a future ſtate, miraculous interpoſitions of the Deity, &c. ſubjects far above the reach of our faculties. In his eſſay on the academical or ſceptical philoſophy, he has confounded two very oppoſite ſpecies of philoſophy. After the days of Plato, indeed, the principles of the firſt academy were groſsly corrupted by Arceſilas, Carneades, &c. This might lead Mr Hume into the notion that the *academical* and *ſceptical* philoſophy were ſynonimous terms. But no principles can be of a more oppoſite nature than thoſe which were inculcated by the old academy of Socrates and Plato, and the ſceptical notions which were propagated by Arceſilas, Carneades, and the other diſciples of the ſucceeding academics.

ACADEMY, in antiquity, a garden or villa, ſituated within a mile of Athens, where Plato and his followers held their philoſophical conferences. It took its name from one Academus, or Ecademus, a citizen of Athens, who was the original owner of it, and made it a kind of gymnaſium: he lived in the time of Theſeus. Cimon embelliſhed it with fountains, trees, and walks; but Sylla, during the ſiege of Athens, employed theſe very trees in making battering engines againſt the city. Cicero too had his villa, or place of retirement, near Puzzuoli, which he alſo named an academy, where he compoſed his *Academical queſtions*, and his book *De natura deorum*.

ACADEMY, among the moderns, is moſt commonly uſed

* See Mimoſa.

uſed to ſignify a ſociety of learned men, eſtabliſhed for the improvement of any art or ſcience.

The firſt Academy we read of, was eſtabliſhed by Charlemagne, at the inſtigation of Alcuin. It was compoſed of the chief wits of the court, the emperor himſelf being a member. In their academical conferences, every perſon was to give an account of what ancient authors he had read; and each even aſſumed the name of ſome ancient author who pleaſed him moſt, or ſome celebrated perſon of antiquity. Alcuin, from whoſe letters we learn theſe particulars, took that of Flaccus, the ſirname of Horace: a young lord, named Augilbert, took that of Homer: Adelard, biſhop of Corbie, was called Auguſtin: Riculfe, biſhop of Mentz, was Dametas; and the king himſelf, David *. This ſhews the miſtake of ſome modern writers, who relate, that it was in conformity with the genius of the learned men of thoſe times, who were great admirers of Roman names, that Alcuin took the name of Flaccus Albinus.

* See *School*.

Moſt nations have now their Academies; but Italy has by far the greateſt number.—The French have many flouriſhing academies, moſt of which were eſtabliſhed by Lewis XIV.—We have but few in Britain; and thoſe of chiefeſt note go by a different name *. There are, however, in London, the *Academy* of Painting, and that of Muſic; eſtabliſhed by letters-patent, and governed by their reſpective directors.

* See *Society*, the general term with us for eſtabliſhments of this kind.

In giving an account of the principal Academies, it ſeems moſt proper to arrange them according to their ſubjects.

I. MEDICAL *Academies*; as that of the Naturæ Curioſi in Germany; that founded at Palermo in 1645; another at Venice in 1701, which meets weekly in a hall near the grand hoſpital; another at Geneva in 1715, in the houſe of M. Le Clerc. The colleges of phyſicians at London and Edinburgh are alſo, by ſome, ranked in the number of *Academies* *.

* See *College*.

The Academy of *Naturæ Curioſi*, called alſo the Leopoldine Academy, was founded in 1652 by Jo. Laur. Bauſchius, a phyſician; who, in imitation of the Engliſh, publiſhed an invitation to all phyſicians to communicate their extraordinary caſes; and, meeting with ſucceſs, was elected preſident. Their works were at firſt publiſhed ſeparately; but in 1670 a new ſcheme was laid for publiſhing a volume of obſervations every year. The firſt volume appeared in 1684, under the title of Ephemerides, and the work has been continued with ſome interruptions and variations of the title, &c. In 1687, the emperor Leopold took the ſociety under his protection, granting the members ſeveral privileges, particularly that their preſidents ſhould be counts palatine of the holy Roman empire. This academy has no fixed reſidence or regular aſſemblies: inſtead of theſe, there is a kind of bureau, or office, firſt eſtabliſhed at Breſlau, and afterwards removed to Nuremberg, where letters, obſervations, &c. from correſpondents or members are taken in. The academy conſiſts of a preſident, two adjuncts or ſecretaries, and colleagues or members without reſtriction. The colleagues, at their admiſſion, oblige themſelves to two things: firſt, to chuſe ſome ſubject out of the animal, vegetable, or mineral kingdom, to handle, provided it had not been treated of by any colleague before; the ſecond, to apply themſelves to furniſh materials for the Annual Ephemerides. Each member to bear a ſymbol of the academy; *viz.* a gold ring, whereon, inſtead of a ſtone, is a book open, and, on the face thereof, an eye; on the other ſide the motto of the academy, *Nunquam otioſus*.

II. CHIRURGICAL *Academies*; as that inſtituted ſome years ago, by public authority, at Paris: the members of which were not only to publiſh their own and correſpondents obſervations and improvements; but to give an account of all that is publiſhed on ſurgery, and to compoſe a complete hiſtory of the art, by their extracts from all the authors ancient and modern who have wrote on it. A queſtion in ſurgery is annually propoſed by the academy, and a gold medal of two hundred livres value given to him who furniſhes the moſt ſatiſfactory anſwer.

III. ECCLESIASTICAL *Academies*; as that at Bologna in Italy, inſtituted in 1687, employed in the examination of the doctrine, diſcipline, and hiſtory, of each age of the church.

IV. COSMOGRAPHICAL *Academies*; as that at Venice, called the *Argonauts*. This was inſtituted at the ſolicitation of F. Coronelli, for the improvement of geographical knowledge. Its deſign was to publiſh exact maps, both celeſtial and terreſtrial, as well particular as general, together with geographical, hiſtorical, and aſtronomical deſcriptions. Each member, in order to defray the expence of ſuch a publication, was to ſubſcribe a proportional ſum, for which they were to receive one or more copies of each piece publiſhed. For this end, three ſocieties are ſettled; one under F. Moro, provincial of the Minorites in Hungary; another under the abbot Laurence au Rue Payenne au Marais; the third under F. Baldigiani, Jeſuit, profeſſor of mathematics in the Roman college. The device of this academy is the terraqueous globe, with the motto *Plus ultra*; and at its expence all the globes, maps, and geographical writings, of F. Coronelli have been publiſhed.

V. *Academies of* SCIENCES.—Theſe comprehend ſuch as are erected for improving natural and mathematical knowledge. They are otherwiſe called *Philoſophical* and *Phyſical* Academies.

The firſt of theſe was inſtituted at Naples, about the year 1560, in the houſe of Baptiſta Porta. It was called the Academy *Secretorum Naturæ*; and was ſucceeded by the Academy of *Lyncei*, founded at Rome by Prince Frederic Ceſi, towards the end of that century. Several of the members of this academy rendered it famous by their diſcoveries; among theſe was the celebrated Galileo. Several other academies were inſtituted about that time, which contributed greatly to the advancement of the ſciences; but none of them comparable to that of the *Lyncei*.

Some years after the death of Toricelli, the *Academy del Cimento* made its appearance, under the protection of Prince Leopold, afterwards Cardinal de Medicis. Redi was one of its chief members; and the ſtudies purſued by the reſt may be collected from thoſe curious experiments publiſhed in 1667, by their ſecretary Count Laurence Magulotti, under the tittle of *Saggi di Naturali Eſperienze*; a copy of which was preſented to the Royal Society, tranſlated into Engliſh by Mr Waller, and publiſhed at London in 4^{to}.

The *Academy degl' Inquieti*, afterwards incorporated into that of Della Traccia in the ſame city, followed the example of that of Del Cimento. Some excellent diſcourſes

courſes on phyſical and mathematical ſubjects, by Geminiano Montenari, one of the chief members, were publiſhed in 1667, under the title of *Penſieri Fiſico Matematici*.

The *Academy of Roſſano*, in the kingdom of Naples, was originally an academy of Belles Lettres, founded in 1540, and transformed into an Academy of Sciences in 1695 at the ſolicitation of the learned abbot Don Giacinto Gimma; who being made preſident, under the title of Promoter General thereof, gave them a new ſet of regulations. He divided the academiſts into the following claſſes: Grammarians, Rhetoricians, Poets, Hiſtorians, Philoſophers, Phyſicians, Mathematicians, Lawyers, and Divines, with a claſs apart for Cardinals and perſons of quality. To be admitted a member, a man muſt have ſome degrees in the faculty. The members are not allowed to take the title of *Academiſts* in the beginning of their books, without a written permiſſion from their preſident, which is not granted till the work has been examined by the cenſors of the Academy; and the permiſſion is the greateſt honour the Academy can confer, as they thereby adopt the work, and are anſwerable for it againſt all criticiſms that may be made upon it. To this law the preſident or promoter himſelf is ſubject; and no academiſt is allowed to publiſh any thing againſt the writings of another, without leave from the ſociety.

Several other Academies of *Sciences* have been founded in Italy; but, for want of being ſupported by princes did not continue long. The loſs of them, however, was abundantly repaired by the inſtitution of others ſtill ſubſiſting; ſuch as, the *Academy of Filarmonici* at Verona; of *Ricovatri* at Padua, where a learned diſcourſe on the origin of ſprings was delivered by Sig. Valliſnieri, firſt profeſſor of phyſic in the univerſity of that city, and which was afterwards printed. To the Academy of the *Muti de Reggio*, at Modena, the ſame Sig. Valliſnieri preſented an excellent diſcourſe on the ſcale of created beings, ſince inſerted in his hiſtory of the generation of man and animals printed at Venice in the year 1721.

F. Merſenne is ſaid to have given the firſt idea of a philoſophical Academy in France, towards the beginning of the 17th century, by the conferences of naturaliſts and mathematicians occaſionally held at his lodgings; at which Gaſſendi, Des Cartes, Hobbes, Roberval, Paſcal, Blondel, and others aſſiſted. F. Merſenne propoſed to each certain problems to examine, or certain experiments to be made. Theſe private aſſemblies were ſucceeded by more public ones, formed by Mr Montmort, and Mr Thevenot the celebrated traveller. The French example animated ſeveral Engliſhmen of diſtinction and learning to erect a kind of philoſophical academy at Oxford, towards the cloſe of Oliver Cromwell's adminiſtration; which, after the Reſtoration, was erected into a Royal Society *. The Engliſh example, in its turn, animated the French. Lewis XIV. in 1666, aſſiſted by the counſels of Mr Colbert, founded an Academy of Sciences at Paris, with a ſufficient revenue to defray the charge of experiments, and ſalaries to the members.

* See *Society*.

Royal Academy of Sciences. After the peace of the Pyrenees, Lewis XIV. being deſirous of eſtabliſhing the arts, ſciences, and literature, upon a ſolid foundation, directed M. Colbert to form a ſociety of men of known abilities and experience in the different branches, who ſhould meet together under the king's protection, and communicate their reſpective diſcoveries. Accordingly Mr Colbert, having conferred with thoſe who were at that time moſt celebrated for their learning, reſolved to form a ſociety of ſuch perſons as were converſant in natural philoſophy and mathematics, to join to them other perſons ſkilled in hiſtory and other branches of erudition, along with thoſe who were entirely engaged in what are called the *Belles Lettres*, grammar, eloquence, and poetry. The geometricians and natural philoſophers were ordered to meet on Tueſdays and Saturdays, in a great hall of the king's library, where the books of mathematics and natural philoſophy were contained; the learned in hiſtory to aſſemble on Mondays and Thurſdays, in the hall where the books of hiſtory were contained; and the claſs of Belles Lettres to aſſemble on Wedneſdays and Fridays. All the different claſſes were likewiſe ordered to meet together upon the firſt Thurſday of every month; and, by their reſpective ſecretaries, make a report of the proceedings of the foregoing month.

In a ſhort time, however, the claſſes of Hiſtory, Belles Lettres, &c. were united to the *French* Academy, which was originally inſtituted for the improvment and refining the French language, ſo that the royal Academy contained only two claſſes, *viz.* that of natural philoſophy and mathematics.

In year 1696, the king, by a proclamation dated the 26th of January, gave this Academy a new form, and put it upon a more reſpectable footing.—It was now to be compoſed of four kinds of members, *viz. honorary, penſionary aſſociates*, and *eleves*. Theſe laſt were a kind of pupils, or ſcholars, each of whom was attached to one of the penſionaries. The firſt claſs to contain ten perſons, and each of the reſt twenty. The honorary academiſts to be all inhabitants of France; the penſionaries all to reſide at Paris; eight of the aſſociates allowed to be foreigners; and the eleves all to live at Paris. The officers to be, a preſident named by the king, out of the claſs of honorary academiſts; and a ſecretary and treaſurer to be perpetual. Of the penſionaries, three to be geometricians, three aſtronomers, three mechanics, three anatomiſts, three chemiſts, three botaniſts, and the remaining two to be ſecretary and treaſurer. Of the twelve aſſociates, two to apply themſelves to geometry, two to botany, and two to chemiſtry. The eleves to apply themſelves to the ſame kind of ſcience with the penſionaries they were attached to; and not to ſpeak, except when called by the preſident. No regular or religious to be admitted, except into the claſs of honorary academiſts; nor any perſon to be admitted either for aſſociate or penſionary, unleſs known by ſome conſiderable printed work, ſome machine, or other diſcovery. The aſſemblies were held on Wedneſdays and Saturdays, unleſs either of them happened to be a holiday, and then the aſſembly was held on the preceding day.—To encourage the members to purſue their labours, the king engaged not only to pay the ordinary penſions, but even to give extraordinary gratifications, according to the merit of their reſpective performances; furniſhing withal the expence of the experiments and other inquiries neceſſary to be made. If any member gave in a bill of charges of experiments he had made, or deſired the printing of any book, and brought in the charges of graving, the money was immediately paid by the king, upon the preſident's allowing and ſigning the bill. So, if an anatomiſt required live tortoiſes, for inſtance, for making experiments about the heart, &c. as many as he pleaſed were brought him at the king's charge. Their motto was, *Invenit et perfecit.*

In the year 1716, the duke of Orleans, then regent, made an alteration in their conſtitution; augmenting the number of honoraries, and of aſſociates capable of being foreigners, to 12; admitting regulars among ſuch aſſociates; and ſuppreſſing the claſs of eleves, as it appeared to be attended with ſome inconveniencies, particularly that of making too great an inequality among the Academiſts, and being productive of ſome miſunderſtandings and animoſities among the members. At the ſame time he created other two claſſes; one conſiſting of 12 adjuncts, who, as well as the aſſociates, were allowed a deliberative voice in matters relative to ſcience; and the other ſix free aſſociates, who were not attached to any particular ſcience, nor obliged to purſue any particular work.

Since its re-eſtabliſhment in 1699, this Academy has been very exact in publiſhing, every year, a volume containing either the works of its own members, or ſuch memoirs as have been compoſed and read to the Academy during the courſe of that year. To each volume is prefixed the hiſtory of the Academy, or an extract of the memoirs, and, in general, of whatever has been read or ſaid in the Academy; at the end of the hiſtory, are the eulogiums on ſuch Academiſts as have died that year.—M. Rouille de Meſlay, counſellor to the parliament of Paris, founded two prizes, one of 2500, and the other of 2000 livres, which are alternately diſtributed by the parliament every year; the ſubject for the firſt muſt relate to phyſical aſtronomy, and thoſe for the latter to navigation and commerce.

Notwithſtanding the advantages which the members of this Academy enjoy over others, in having their expences defrayed, and even being paid for their time and attendance, they have fallen under ſome imputations, particularly that of plagiariſm, or borrowing their neighbours inventions; but with what juſtice we do not ſay.

The *Royal Society at Berlin* was founded in 1700, by Frederic II. king of Pruſſia, on the model of that of England; excepting that, beſides natural knowledge, it likewiſe comprehends the Belles Lettres. In 1710, it was ordained that the preſident ſhall be one of the counſellors of ſtate, and nominated by the king. The members were divided into four claſſes; the firſt for proſecuting phyſics, medicine, and chemiſtry; the ſecond for mathematics, aſtronomy, and mechanics; the third for the German language and the hiſtory of the country; the fourth for oriental learning, particularly as it may concern the propagation of the goſpel among infidels. Each claſs to elect a director for themſelves, who ſhall hold his poſt for life. The members of any of the claſſes have free admiſſion into the aſſemblies of any of the reſt.

The great promoter of this inſtitution was the celebrated Mr Leibnitz, who accordingly was made the firſt director. The firſt volume of their tranſactions was publiſhed in 1710, under the title of *Miſcellanea Berolinenſia;* and though they received but few marks of the royal favour for ſome time, they continued to publiſh new volumes in 1723, 1727, 1734, and 1740. At laſt, however, Frederic III. the preſent king of Pruſſia, gave new vigour to this Academy, by inviting to Berlin ſuch foreigners as were moſt diſtinguiſhed for their merit in literature, and encouraged his ſubjects to proſecute the ſtudy and cultivation of the ſciences by giving ample rewards; and thinking that the Academy, which till that time had had ſome miniſter or opulent nobleman for its preſident, would find an advantage in having a man of letters at its head, he conferred that honour on M. Maupertuis. At the ſame time, he gave a new regulation to the academy, and took upon himſelf the title of its protector.

The academiſts hold two public aſſemblies annually; one in January, on the preſent king's birth-day; and the other in May, on the day of his acceſſion to the throne. At the latter of theſe is given, as a prize, a gold medal of 50 ducats value: the ſubject for this prize is ſucceſſively, natural philoſophy, mathematics, metaphyſics, and erudition.

The *Imperial Academy at Peterſburgh* was projected by Czar Peter the Great, who had taken the neceſſary meaſures for its eſtabliſhment, when he was prevented by death from putting them into execution. His ſucceſſor, the Czarina Catherine, laboured on the ſame plan; and in a ſhort time formed one of the moſt celebrated academies in Europe, compoſed of the moſt conſiderable foreigners, ſome of them ſettled at Peterſburgh. The memoirs of this academy, which are publiſhed in Latin, are highly valuable, particularly for the mathematical part. The Academy, however, was in a very languiſhing condition, when the empreſs Czarina Eliſabeth aſcended the throne; but that princeſs, happily, naming count Raſomowſki preſident, he gave it a new body of ſtatutes, and quickly reſtored it to its ancient ſplendor.

The building and apparatus of this academy are extraordinary, there being a fine library, obſervatory, &c. It partakes much of what we call an *Univerſity;* having regular profeſſors in the ſeveral faculties, who read lectures as in our ſchools.—The ordinary aſſemblies are held twice a-week, and public or ſolemn ones thrice a-year. In the public aſſemblies an account is given of what has been done in the private ones. The Academy has this modeſt motto, *Paulatim.*

The *Academy of Sciences,* called the *Inſtitute of Bologna,* was founded by count Marſigli in 1712, for the cultivating of phyſics, mathematics, medicine, chemiſtry, and natural hiſtory. Its hiſtory is written by M. de Limiers, from memoirs furniſhed by the founder himſelf.

VI. *Academies of* LAW; as that famous one at Beryta, and that of the Sitientes at Bologna.

VII. *Academies of* HISTORY; as the *Royal Academy of Portugueſe Hiſtory* at Liſbon. This Academy was inſtituted by King John V. in 1720. It conſiſts of a director, four cenſors, a ſecretary, and 50 members; to each of which is aſſigned ſome part of the eccleſiaſtical or civil hiſtory of the nation, which he is to treat either in Latin or Portugueſe. In the church-hiſtory of each dioceſe, the prelates, ſynods, councils, churches, monaſteries, academies, perſons illuſtrious for ſanctity or learning, places famous for miracles or relics, muſt be diſtinctly related in twelve chapters. The civil hiſtory compriſes the tranſactions of the kingdom from the government of the Romans down to the preſent time. The members who reſide in the country are obliged to make collections and extracts out of all the regiſters, &c. where they live. Their meetings to be once in fifteen days.

A medal was ſtruck by this Academy, in honour of their prince: the front of which was his effigy, with the inſcription *Johannes* V. *Luſitanorum Rex;* and, on the reverſe, the ſame prince is repreſented ſtanding, and raiſing Hiſtory almoſt proſtrate before him, with the legend *Hiſtoria Reſurges.* Underneath are the following words in abbreviature: REGia ACADemia HISToriæ LUSITanæ, INSTITuta VI. Idus Decembris MDCCXX.

VIII. *Academies of* ANTIQUITIES; as that at Cortona in Italy, and at Upſal in Sweden. The firſt is deſigned for the ſtudy of Hetrurian antiquities; the other for illuſtrating the northern languages, and the antiquities of Sweden, in which notable diſcoveries have been made by it. The head of the Hetrurian Academy is called *Lucomon,* by which the ancient governors of the country were diſtinguiſhed. One of their laws is to give audience to poets only one day in the year; another is to fix their ſeſſions, and impoſe a tax of a diſſertation on each member in his turn.

The *Academy of Medals and Inſcriptions* at Paris was ſet on foot by M. Colbert, under the patronage of Lewis XIV. in 1663, for the ſtudy and explanation of ancient monuments, and perpetuating great and memorable events, eſpecially thoſe of the French monarchy, by coins, relievos, inſcriptions, &c. The number of members at firſt was confined to four or five, choſen out of thoſe of the French Academy; who met in the library of Mr Colbert, from whom they received his majeſty's orders. The days of their meetings were not determined; but generally they met on Wedneſdays, eſpecially in the winter ſeaſon: but, in 1691, the king having given the inſpection of this academy to M. de Pontchartrain comptroller general, &c. he fixed their meetings on Tueſdays and Saturdays.

By a new regulation, dated the 16th of July 1701, the Academy was compoſed of ten *honorary* members; ten *aſſociates,* each of whom had two declarative voices; ten *penſionaries;* and ten *eleves,* or pupils. They then met every Tueſday and Wedneſday, in one of the halls of the Louvre; and had two public meetings yearly, one the day after Martinmas and the other the 16th after Eaſter. The claſs of *eleves* has been ſuppreſſed, and united to the aſſociates. The king nominates their preſident and vice-preſident yearly; but their ſecretary and treaſurer are perpetual. The reſt are choſen by the members themſelves, agreeably to the conſtitutions on that behalf given them.

One of the firſt undertakings of this Academy, was to compoſe, by means of medals, a connected hiſtory of the principal events of Lewis XIV.'s reign: but in this deſign they met with great difficulties, and of conſequence it was interrupted for many years; but at length it was completed down to the advancement of the duke of Anjou to the crown of Spain.

In this celebrated work, the eſtabliſhment of the Academy itſelf was not forgot. The medal on this ſubject repreſents Mercury ſitting, and writing with an antique ſtylus on a table of braſs; he leans with his left hand upon an urn full of medals, and at his feet are ſeveral others placed upon a card: the legend, *Rerum geſtarum fides;* and on the exergue, *Academia regia inſcriptionum et numiſmatum, inſtituta* M.DC.LXIII. ſignifying that the Royal Academy of Medals and Inſcriptions, founded in 1663, ought to give to future ages a faithful teſtimony of all great actions. Beſides this work, we have ſeveral volumes of their memoirs; and their hiſtory, written and continued by their ſecretaries.

IX. *Academies of* BELLES LETTERS, are thoſe wherein eloquence and poetry are chiefly cultivated. Theſe are very numerous in Italy, and not uncommon in France.

The *Academy of Umidi* at Florence has contributed greatly to the progreſs of the ſciences by the excellent Italian tranſlations given, by ſome of its members, of the ancient Greek and Latin hiſtorians. Their chief attention is to the Italian poetry, at the ſame time that they have applied themſelves to the poliſhing of their language, which produced the *Academy La Cruſca.*

The *Academy of Humoriſts, Umoriſti,* had its origin at Rome from the marriage of Lorenzo Marcini, a Roman gentleman; at which ſeveral perſons of rank were gueſts; and, it being carnival time, to give the ladies ſome diverſion, they took themſelves to the reciting of verſes, ſonnets, ſpeeches, firſt *ex tempore,* and afterwards premeditately; which gave them the denomination of *Belli Humori.* After ſome experience, coming more and more into the taſte of theſe exerciſes, they reſolved to form an Academy of Belles Lettres; and changed the title of *Belli Humori* for that of *Humoriſti:* chuſing for their device a cloud, which, after being formed of exhalations from the ſalt waters of the ocean, returns in a gentle ſweet ſhower; with this motto from Lucretius, *Redit agmine dulci.*

In 1690, the *Academy of Arcadi* was eſtabliſhed at Rome, for reviving the ſtudy of Poetry and of the Belles Lettres. Beſides moſt of the politer wits of both ſexes in Italy, this academy comprehends many princes, cardinals, and other eccleſiaſtics; and, to avoid diſputes about pre-eminence, all appear maſked after the manner of Arcadian ſhepherds. Within ten years from its firſt eſtabliſhment, the number of *Academiſts* amounted to ſix hundred. They hold aſſemblies ſeven times a-year in a mead or grove, or in the gardens of ſome nobleman of diſtinction. Six of theſe meetings are employed in the recitation of poems and verſes of the Arcadi reſiding at Rome; who read their own compoſitions; except ladies and cardinals, who are allowed to employ others. The ſeventh meeting is ſet apart for the compoſitions of foreign or abſent members.

This academy is governed by a Cuſtos, who repreſents the whole ſociety, and is choſen every four years, with a power of electing 12 others yearly for his aſſiſtance. Under theſe are two ſub-cuſtodes, one vicar or pro-cuſtos, and four deputies or ſuperintendants, annually choſen. The laws of the ſociety are immutable, and bear a near reſemblance to the ancient model.

There are five manners of electing members. The firſt is by *acclamation.* This is uſed when ſovereign princes, cardinals, and ambaſſadors of kings, deſire to be admitted; and the votes are then given *viva voce.* The ſecond is called *annumeration.* This was introduced in favour of ladies and academical colonies, where the votes are taken privately. The third, *repreſentation,* was eſtabliſhed in favour of colonies and univerſities, where the young gentry are bred; who have each a privilege of recommending one or two members privately to be ballotted for. The fourth, *ſurrogation,* whereby new members are ſubſtituted in the room of thoſe dead or expelled. The laſt, *deſtination;* whereby, when there is no vacancy of members, perſons of poetical merit have the title of Arcadi conferred upon them, till ſuch time as a vacancy ſhall happen. All the members of this body, at their admiſſion, aſſume new paſtoral names, in imitation of the ſhepherds of Arcadia. The academy has ſeveral colonies of Arcadi in different cities of Italy, who are all regulated after the ſame manner.

X. ACADEMIES *of Languages;* called, by ſome, *Grammatical Academies;* as,

The *Academy della Cruſca* at Florence, famous for its vocabulary of the Italian tongue, was formed in 1582, but ſcarce heard of before the year 1584, when it became noted for a diſpute between Taſſo and ſeveral of its members. Many authors confound this with the Florentine academy. The diſcourſes which Toricelli, the celebrated diſciple of Galileo, delivered in the aſſemblies, concerning levity, the wind, the power of percuſſion, mathematics, and military architecture, are a proof that theſe academiſts applied themſelves to things as well as words.

The *Academy of Fructiferi* had its riſe in 1617, at an aſſembly of ſeveral princes and nobility of the country, who met with a deſign to refine and perfect the German tongue. It flouriſhed long under the direction of princes of the empire, who were always choſen preſidents. In 1668, the number of members aroſe to upwards of 900. It was prior in time to the French academy, which only appeared in 1629, and was not eſtabliſhed into an academy before the year 1635. Its hiſtory is written in the German tongue, by George Neumarck.

The *French Academy,* which had its riſe from a meeting of men of letters in the houſe of M. Conrart, in 1629. In 1635, it was erected into an academy, by Cardinal Richlieu, for refining and aſcertaining the French language and ſtyle.--The number of its members are limited to 40; out of whom a director, chancellor, and ſecretary, are to be choſen: the two former hold their poſt for two months, the latter is perpetual. The members of this academy enjoy ſeveral privileges and immunities, among which is that of not being obliged to anſwer before any court but that of the king's houſhold. They meet three times a-week in the Louvre; at breaking up, forty ſilver medals are diſtributed among them, having on one ſide the king of France's head, and on the reverſe, *Protecteur de l' Academie,* with laurel, and this motto, *A l'Immortalite.* By this diſtribution, the attendance of the *Academiſts* is ſecured, thoſe who are preſent receiving the ſurplus otherwiſe intended for the abſent. To elect or expel a member, at leaſt eighteen are required; nor can any be choſen unleſs he petition for it: by this expedient, the affront of refuſals from perſons elected is avoided. Religious are not admitted; nor can any nobleman, or perſon of diſtinction, be admitted on another footing than as a man of letters. None are to be expelled, except for baſe and diſhoneſt practices; and there are but two inſtances of ſuch expulſions, the firſt of M. Granier for refuſing to return a depoſit the other of the Abbe Furetiere for plagiariſm.——The deſign of this academy was to give not only rules, but examples, of good writing. They began with making ſpeeches on ſubjects taken at pleaſure, about twenty of which were printed. They met with great oppoſition from the parliament at their firſt inſtitution; it being two years before the patents granted by the king would be regiſtered. They have been ſeverely ſatyrized, and their ſtyle has been ridiculed as enervating inſtead of refining the French language. They are alſo charged with having ſurfeited the world by flattery, and having exhauſted all the topics of panegyric in praiſe of their founder; it being a duty incumbent on every member, at his admiſſion, to make a ſpeech in praiſe of the king, the cardinal, the chancellor Seguier, and the perſon in whoſe place he is elected. The moſt remarkable work of this academy is a dictionary of the French tongue; which, after 50 years ſpent in ſettling the words and phraſes to be uſed in writing, was at laſt publiſhed in 1694.

The *Royal Spaniſh Academy* at Madrid held its firſt meeting in July 1713, in the palace of its founder, the duke d' Eſcalona. It conſiſted at firſt of eight Academiſts, including the duke; to which number 14 others were afterwards added, the founder being choſen preſident or director. In 1714, the king granted them his confirmation and protection. Their device is a crucible in the middle of the fire, with this motto, *Limpia, Fya, y da Eſplendor;* "it purifies, fixes, and gives brightneſs." The number of members is limited to 24; the duke d' Eſcalona to be director for life, but his ſucceſſors choſen yearly, and the ſecretary to be perpetual. Their object, as marked out by the royal declaration, was to cultivate and improve the national language: they were to begin with chuſing carefully ſuch words and phraſes as have been uſed by the beſt Spaniſh writers; noting the low, barbarous, or obſolete ones; and compoſing a dictionary wherein theſe may be diſtinguiſhed from the former.

XI. ACADEMIES *of Dancing;* as that erected by Lewis XIV. with privileges above all the reſt.

XII. ACADEMIES *of Painting;* as the *Academy of Painting and Sculpture* at Paris. This took its riſe from the diſputes that happened between the maſter painters and ſculptors in that capital; in conſequence of which, M. Le Brun, Sarazin, Comeille, and others of the king's painters, formed a deſign of inſtituting a particular academy; and, having preſented a petition to the king, obtained an arret dated Jan. 20. 1648. In the beginning of 1655, they obtained from cardinal Mazarin a brevet, and letters patent, which were regiſtered in parliament; in gratitude for which favour, they choſe the cardinal for their protector, and the chancellor for their vice-protector. In 1663, by means of M. Colbert, they obtained a penſion of 4000 livres. The academy conſiſts of a protector; a vice-protector; a director; a chancellor; four rectors; adjuncts to the rectors; a treaſurer; four profeſſors, one of which is profeſſor of anatomy, and another of geometry; ſeveral adjuncts and counſellors, an hiſtoriagrapher, a ſecretary, and two uſhers.

The Academy of Painting holds a public aſſembly every day for two hours in the afternoon, to which the painters reſort either to deſign or to paint, and where the ſculptors model after a naked perſon. There are 12 profeſſors, each of whom keeps the ſchool for a month; and there are 12 adjuncts to ſupply them in caſe of need. The profeſſor upon duty places the naked man as he thinks proper, and ſets him in two different attitudes every week. This is what they call *ſetting the model*. In one week of the month he ſets two models together, which is called *ſetting the group*. The paintings and models made after this model, are called *academics*, or *academy-figures*. They have likewiſe a woman who ſtands for a model in the public ſchool. Every three months, three prizes for deſign are diſtributed among the *eleves* or diſciples; two others for painting, and two for ſculpture, every year.

There is alſo an Academy of Painting, Sculpture, &c. at Rome, eſtabliſhed by Lewis XIV. wherein thoſe who have gained the annual prize at Paris are intitled to be three years entertained at the king's expence, for their further improvement.

XIII. *Academies of* ARCHITECTURE; as that eſtabliſhed by M. Colbert in 1671, conſiſting of a company of ſkilful architects, under the direction of the ſuperintendant of the buildings.

XIV. *Academies of* POLITICS; as that at Paris, conſiſting of ſix perſons, who met at the Louvre, in the chamber where the papers relating to foreign affairs were lodged. But this Academy proved of little ſervice, as the kings of France were unwilling to truſt any but their miniſters with the inſpection of foreign affairs.

ACADEMY is alſo a term for ſchools and other ſeminaries of learning among the Jews, where their rabbins and doctors inſtructed their youth in the Hebrew language, and explained to them the Talmud and the ſecrets of the Cabbala: Thoſe of Tiberias and Babylon have been the moſt noted.

ACADEMY is often uſed with us to denote a kind of collegiate ſchool, where youth are inſtructed in arts and ſciences. There is one at Portſmouth for teaching navigation, drawing, &c.; another at Woolwich, for fortification, gunnery, &c.—Beſides theſe, there are numerous academies, eſpecially in London, for teaching mathematics, languages, writing, accounts, drawing, and other branches of learning.

ACADEMY is likewiſe a name given to a riding-ſchool, where young gentlemen are taught to ride the great horſe, &c. and the ground allotted is uſually called the *Menage*.

ACADEMY *Figure*, a drawing of a naked man or woman, taken from the life, which is uſually done on paper with red or black chalk, and ſometimes with paſtils or crayons*. See ACADEMY, N° XII. par. 2. *ſupra*.

ACADIE, or ACADY, in geography, a name formerly given to Nova Scotia, or New Scotland, one of our American colonies. See NOVA SCOTIA.

ACÆNA, in antiquity, a Grecian meaſure of length, being a ten feet-rod, uſed in meaſuring their lands.

ACAJOU, or CASHEW-NUT-TREE. See ANACARDIUM.

ACALANDRA, a town of Lucania, on the other ſide the Apennine, (Strabo); now *Salandra*, in the Baſilicata, on the river Acalandrus.

ACALANDRUS, a river falling into the bay of Tarentum, not far from the Metapontum, (Pliny, Strabo); now *Fiume de Roſeto*.

ACALEPTIC, in ancient proſody, a complete verſe.

ACALYPHA, the Three-ſeeded Mercury, in botany, a genus of plants belonging to the monœcia monadelphia claſs. There are only four ſpecies of this plant; the acalypha virginica, which is a native of Ceylon; the virgata, indica, and auſtralis, all natives of America. Sir Hans Sloan ranks this plant with the nettle, under the name of *urtica minor iners ſpicata*. As theſe plants have no beauty to recommend them, and at the ſame time are too tender to thrive eaſily in this climate, a particular deſcription of the ſpecies or their culture ſeems unneceſſary.

ACAMANTIS, the ancient name of the iſland Cyprus, taken from one of its promontories, ſituate to the weſt.

ACAMAS, ſon of Theſeus, followed the reſt of the Grecian princes to the ſiege of Troy; and was deputed, with Diomedes, to the Trojans, in order to get Helen reſtored. Laodice, Priam's daughter, fell in love with him, ſtole a night with him, and had a ſon by him called Munitus. He was one of the heroes who concealed themſelves in the wooden horſe. One of the tribes of Athens was called *Acamantides* from him, by the appointment of the oracle. He founded a city in Phrygia Major, called *Acamantium*; and made war againſt the Solyms.

ACAMBOU, a kingdom of Africa, on the coaſt of Guinea.

ACANACEOUS PLANTS, ſuch as are armed with prickles.

ACANGIS, that is, *Ravagers* or *Adventurers*; a name which the Turks give their huſſars or light-troops, who are generally ſent out in detachments to procure intelligence, haraſs the enemy, or ravage the country.

ACANTHA, in botany, the prickle of any plant; in zoology, a term for the ſpine or prickly fins of fiſhes.

ACANTHABOLUS, in ſurgery, an inſtrument for pulling thorns, or the like, out of the ſkin.

ACANTHINE, any thing reſembling or belonging to the herb acanthus. Acanthine garments, among the ancients, are ſaid to be made of the down of thiſtles; others think they were garments embroidered in imitation of the acanthus.

ACANTHOPTERYGIOUS FISHES, a term uſed by Linnæus and others for thoſe fiſhes whoſe back-fins are hard, oſſeous, and prickly.

ACANTHOS, a town of Egypt, near Memphis, (Pliny); now *Biſalta*. Alſo a maritime town of Macedonia, to the weſt of mount Athos, a colony of Andrians, (Thucydides, Ptolemy); now *Eriſſo*; near which was ſhewn Xerxes's ditch, of ſeven ſtadia, in order to ſeparate mount Athos from the continent, and convey his ſhips, without doubling Athos, into the Singitic Bay. *Acanthos*, is alſo a town of Epirus.

ACANTHUS, bears-breech, or brank-urſine, in botany; a genus of plants of the angioſpermia order belonging to the didynamia claſs. For the figure of this plant, which is extremely beautiful, ſee Plate I. fig. 3. There are five

Species. 1. The mollis, or common bear's-breech, a native of Italy, is the ſort that is uſed in medicine*, and is ſuppoſed to be the *mollis acanthus* of Virgil:

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* See Crayon-painting.

* See Materia Medica, n° 68.

the leaves of this ſpecies are famous for having given riſe to the capital of the Corinthian pillars †. 2. The ſpinoſus, or prickly bear's-breech; the leaves of which are deeply jagged in very regular order, and each ſegment is terminated with a ſharp ſpine, as are alſo the footſtalks of the leaves and the empalement of the flower, which renders it troubleſome to handle them. 3. Ilicifolius, or ſhrubby bear's-breech, grows naturally in both the Indies. It is an evergreen ſhrub, which riſes about four feet nigh; and is divided into many branches, garniſhed with leaves like thoſe of the common holly, and armed with ſpines in the ſame manner: the flowers are white, and ſhaped like thoſe of the common acanthus, but ſmaller. 4. The nigra, or Portugal bear's-breech, with ſmooth ſinuated leaves of a livid green colour, was diſcovered in Portugal by Dr Juſſieu of the royal garden at Paris. 5. The middle bear's-breech, with entire leaves, having ſpines on their border, is ſuppoſed to be the acanthus of Dioſcorides.

Culture. They are all perennial plants. The firſt and ſecond ſpecies may be propagated either by ſeeds, or by off-ſets from the roots. The beſt way is to raiſe them from the ſeeds; which ſhould be ſown about the end of March, in a light ſoil. They are beſt dropped at diſtances into ſhallow drills, and covered three quarters of an inch with mould. When the plants are come up, the ſtrongeſt ſhould be marked, and the reſt ſhould be pulled up, that theſe may ſtand at a yard diſtance one from another. They require no other culture, but to keep them clear from weeds. The third, fourth and fifth ſorts, are propagated only by ſeeds; which, as they do not ripen in Europe, muſt be obtained from the places in which they grow naturally: the plants are ſo tender, that they cannot be preſerved out of the ſtove in this country.

Acanthus is likewiſe uſed by Theophraſtus as a ſynonime of the acacia.

Acanthus, in architecture, an ornament repreſenting the leaves of the acanthus, uſed in the capitals of the Corinthian and Compoſite orders.

ACANUS, in botany, a ſynonime of carduus caſabonæ of Linnæus. See Carduus.

ACAPULCO, a conſiderable town and port in Mexico, on the South Sea. It has a fine harbour, from whence a ſhip annually ſails to Manila in the Philippine iſlands, near the coaſt of China in Aſia: and another returns annually from thence with all the treaſures of the Eaſt Indies, ſuch as diamonds, rubies, ſapphires, and other precious ſtones; the rich carpets of Perſia; the camphire of Borneo; the benjamin and ivory of Pegu and Cambodia; the ſilks, muſlins, and calicoes, of the Mogul's country; the gold-duſt, tea, china-ware, ſilk, and cabinets, of China and Japan; beſides cinnamon, cloves, mace, nutmegs, and pepper; inſomuch that this ſingle ſhip contains more riches that many whole fleets. The goods brought to Acapulco are carried to the city of Mexico by mules and pack-horſes; and from thence to Vera Cruz on the North Sea, in order to be ſhipped for Europe. Acapulco itſelf is a ſmall place, conſiſting of about 2 or 300 thatched houſes. Ships arrive at the port by two inlets, ſeparated from each other by a ſmall iſland; the entrance into them in the day-time is by means of a ſea-breeze, as the ſailing out in the night-time is effected by a land-breeze. A wretched fort, 42 pieces of cannon, and a garriſon of 60 men, defend it. It is equally extenſive, ſafe, and commodious. The baſon which conſtitutes this harbour is ſurrounded by lofty mountains, which are ſo dry, that they are even deſtitute of water. The air here is hot, heavy, and unwholeſome; to which none can habituate themſelves, except certain negroes that are born under a ſimilar climate, or ſome mulattoes. This feeble and miſerable colony is crowded with a vaſt acceſſion to its numbers upon the arrival of the galleons; traders flocking here from all the provinces of Mexico, who come to exchange European toys, their own cochineal, and about ten millions † of ſilver for ſpices, muſlins, printed linens, ſilk, perfumes, and the gold works of Aſia. W. Long. 102. 29. N. Lat. 17. 30.

ACARAI, a town of Paraguay in South America, built by the Jeſuits in 1624. Long. 116. 40. S. lat. 26′.

ACARAUNA, a ſmall American fiſh, called by our ſailors the old-wife. See Labrus.

ACARNANIA, the firſt country of Free Greece, or Greece Proper, bounded on the weſt by the Sinus Ambracius, and ſeparated from Ætolia by the river Achelous on the eaſt, and by the Sinus Ambracius from Epirus. The people were called *Acarnanes*, denoting perſons unſhorn; other Etolians, to the eaſt of the Achelous, being called *Curetes*, (Homer,) from being ſhorn. According to Lucian, they were noted for effeminacy and incontinence; hence the proverb, *Porcellus Acarnanius*. This country was famous for an excellent breed of horſes; ſo that Ακαρνικος ιππος, is a proberbial ſaying for a thing excellent in its kind. It is now called *la Carnia* and *il Deſpotato*.

ACARON, or Accaron, a town of Paleſtine, called *Ekron* in ſcripture. It was the boundary of the Philiſtines to the north; ſtood at ſome diſtance from the ſea, near Bethſhemeſh; and was famous for the idol of Baalzebub.

ACARUS, a genus of inſects belonging to the order of aptera, or ſuch as have no wings. The acarus has eight legs, two eyes, one on each ſide of the head, and two jointed tentacula. Moſt of the ſpecies of this genus have been alſo arranged among the microſcopic animalcules, but with no reaſon; they are all ſufficiently viſible to the naked eye. The term *Acarus* is not to be underſtood, in this ſenſe, as reſtrained to the inſect commonly underſtood by it, the Mite: that animal is poſſeſſed of characters in common with a great number of other inſects, which have been called by other names, but which are all connected by nature, and are therefore of the ſame genus; ſome of them have been called ſpiders, others lice, and others by other names, referring them to genera to which they have as little alliance in nature as to theſe. The genus, on bringing theſe back to it, appears a very numerous one *, and conſiſts of ſome which are inhabitants of the earth, ſome of waters; ſome which live on trees, others among ſtones, and others on the bodies of other animals, and even under their ſkin. The deſcription of a few of the moſt remarkable will here ſuffice.

The Cheeſe-mite, &c.

1. The ſiro, or cheeſe-mite, is a very minute ſpecies. To the naked eye, theſe mites appear like moving particles of duſt. But the microſcope diſcovers them to be perfect animals, having as regular a figure, and performing all the functions of life as perfectly, as creatures that exceed them many times in bulk. The principal parts of them are the head, the neck, and the body. The

† See *Architecture*, nº 15, 25.

† £437,500 Sterling.

* Linnæus enumerates 35 ſpecies.

The head is ſmall in proportion to the body; and has a ſharp ſnout, and a mouth that opens and ſhuts like a mole's. They have two ſmall eyes, and are extremely quickſighted; and when they have been once touched with a pin, you will eaſily perceive how cunningly they avoid a ſecond touch. Their legs are each furniſhed at the extremity with two little claws, with which the animal very nicely takes hold of any thing. The hinder part of the body is plump and bulky; and ends in an oval form, from which there iſſue out a few exceeding long hairs. Other parts of the body are alſo beſet with thin and long hairs. The males and females are eaſily diſtinguiſhed in theſe little animals. The females are oviparous, as the louſe and ſpider; and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are however, when firſt hatched, extremely minute; and, in their growing to their full ſize, they caſt their ſkins ſeveral times. Theſe little creatures may be kept alive many months between two concave glaſſes, and applied to the microſcope at pleaſure. They are thus often ſeen *in coitu*, conjoined tail to tail; and this is performed by an incredibly ſwift motion. Their eggs, in warm weather, hatch in twelve or fourteen days; but, in winter, they are much longer. Theſe eggs are ſo ſmall, that a regular computation ſhews, that 90 millions of them are not ſo large as a common pigeon's egg *. They are very voracious animals, and have often been ſeen to eat one another. Their manner of eating is by thruſting alternately one jaw forward and the other backward, and in this manner grinding their food; and after they have done feeding, they ſeem to chew the cud. There are ſeveral varieties of this ſpecies found in different ſubſtances beſides cheeſe; as in malt-duſt, flour, oat-meal, *&c.* Thoſe in malt-duſt and oat-meal are much nimbler than the cheeſe-mites, and have more and longer hairs. There are alſo a ſort of wandering mites, which range wherever there is any thing they can feed on: They are often ſeen in the form of a white duſt, and are not ſuſpected to be living creatures.—The mite is called by authors, ſimply, *Acarus*. It is an animal very tenacious of life, and will live months without food. Mr Lewenhoek * had one which lived eleven weeks on the point of a pin, on which he had fixed it for examining by his microſcope.—2. The ſanguiſugus. The hinder part of the abdomen is crenated, the ſcutellum is oval and yellowiſh, and the beak is trifid. It is a native of America, and ſticks ſo faſt on the legs of travellers, ſucking their blood, that they can hardly be extracted. 3. The telarius is of a greeniſh yellow colour. It has a ſmall ſting or weapon, with which it wounds the leaves of plants, and occaſions them to fold backward. They are very frequently to be met with in the autumn, incloſed in the folded leaves of the lime-tree.

The h-animal.

4. The exulcerans, or itch-acarus, is a very ſmall ſpecies: its body is of a figure approaching to oval, and lobated; the head is ſmall and pointed; its colour is whitiſh, but it has two duſky ſemicircular lines on the back. It has long ſetaceous legs, but the two firſt are ſhort. It is found in the puſtules of the itch: authors in general have ſuppoſed that it cauſes that diſeaſe; but, if this were ſo, it would be found more univerſally in thoſe puſtules. It is more probable that theſe only make a proper nidus for it. 5. The batatas, is of a blood-colour, and a little rough; the fore pair of legs are as long as the body. It inhabits the potatoes of Surinam. 6. The ovinus, or ſheep-tick, has a flat body, of a roundiſh figure, but ſomewhat approaching to oval, and of a yellowiſh white colour, and has a ſingle large round ſpot on the back: the anus is viſible in the lower part of the body; the thorax is ſcarce conſpicuous; the head is very ſmall and black; the mouth is bifid: the antennæ are of a clavated figure, and of the length of the ſnout; the legs are ſhort and black. It is common on ſheep, and its excrements ſtain the wool green: it will live in the wool many months after it is ſhorn from the animal.

Acarus of inſects.

7. The coleoptratorum, or acarus of inſects, is extremely minute: its body is round, reddiſh, and covered with a firm and hard ſkin; the head is very ſmall, the neck ſcarce viſible; the legs are moderately long, the anterior pair longer than the others; it has a whiteneſs about the anus. It is frequent on the bodies of many inſects, which it infeſts, as the louſe does others; it runs very ſwiftly: the humble-bee, and many other of the larger inſects, are continually infeſted with it; but none ſo much as the common black beetle, which has thence been called the louſy beetle. 7. The baccarum, or ſcarlet tree-mite, is a ſmall ſpecies: its body is roundiſh, and the back not at all flatted, as it is in many others; the ſkin is ſmooth, ſhining, and gloſſy; and the whole animal ſeems diſtended, and ready to burſt; the colour is a bright red, but a little duſkier on the ſides than elſewhere: the head is very ſmall, and the legs ſhort; there is on each ſide a ſmall duſky ſpot near the thorax, and a few hairs grow from different parts of the body. It is very common on trees, particularly on the currant, on the fruit of which we frequently ſee it running. 9. The longicornis, or red ſtone-acarus, is very ſmall, and of a bright red colour; the body is round, and diſtended; the head is very ſmall, and pointed; the legs are moderately long, and of a paler red than the body: the antennæ are much longer than in any other ſpecies. It is frequent about old ſtone-walls and on rocks, and runs very nimbly. 10. The aquaticus is a ſmall ſpecies: the body is of a figure approaching to an oval, and the back appears depreſſed; it is of a bright and ſtrong ſcarlet colour. The head is ſmall; the legs are moderately long and firm, and are of a paler red than the body. It is common in ſhallow waters, where it runs very ſwiftly along the bottom. 11. The holoſericeus is a ſmall ſpecies: its body is roundiſh, but a little approaching to oval; the back ſomewhat depreſſed: it is of a fine ſcarlet colour, and covered with a velvety down. The head is very ſmall; the eyes are two, and very ſmall; the legs are ſhort and of a paler red, and there is a ſmall black ſpot near the inſertion of the anterior ones. It is very common under the ſurface of the earth, and ſometimes on herbs and among hay. It is ſuppoſed to be poiſonous, if ſwallowed; but we do not ſeem to have any certain account of ſuch an effect.

Long-leg'd Acarus. Pl. I. fig. 4.

12. The longipes is the largeſt of the acarus kind: its body is roundiſh, of a duſky brown on the back, with a duſkier ſpot of a rhomboidal figure near the middle of it; the belly is whitiſh; the legs are extremely long and ſlender. On the back part of the head there ſtands a little eminence, which has on it a kind of double creſt, formed as it were of a number of minute ſpines: the eyes are ſmall and black, and are

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* Baker's Microſcope, p. 187.

* Acar. Nat. tom. iv. p. 368.

two in number. It is very common in our paſtures, towards the end of ſummer. Ray and Liſter call it *araneus cruſtatus longpipes;* Mouffet, *araneus longpipes;* and, notwithſtanding its having but two eyes, it has been almoſt univerſally ranked among the ſpiders.

ACASTUS, in claſſic hiſtory, the ſon of Pelias king of Theſſaly, and one of the moſt famous hunters of his time, married Hippolyta, who falling deſperately in love with Peleus her ſon-in-law, and he refuſing to gratify her wiſhes, ſhe accuſed him to her huſband of a rape; on which he ſlew them both.

ACATALECTIC, a term, in the ancient poetry, for ſuch verſes as have all their feet or ſyllables, in contradiſtinction to thoſe that have a ſyllable too few.

ACATALEPSY, ſignifies the impoſſibility of comprehending ſomething.—The diſtinguiſhing tenet of the Pyrrhoniſts was their aſſerting an abſolute acatalepſy in regard to every thing.

ACATERY, or ACCATRY, an officer of the king's houſehold, deſigned for a check betwixt the clerks of the kitchen and the purveyors.

ACATHARSIA, an impurity of the blood or humours.

ACATHISTUS, the name of a ſolemn hymn anciently ſung in the Greek church, on the Saturday of the fifth week of Lent, in honour of the Virgin, for having thrice delivered Conſtantinople from the invaſions of the barbarous nations.

ACCA (St), biſhop of Haguſtaldt, or Hexham, in Northumberland, ſucceeded Wilfrid in that ſee in 709. He ornamented his cathedral in a moſt magnificent manner: he furniſhed it alſo with plate and holy veſtments; and erected a noble library, conſiſting chiefly of eccleſiaſtical learning, and a large collection of the lives of the ſaints, which he was at great pains to procure.—He was accounted a very able divine, and was famous for his ſkill in church-muſic. He wrote ſeveral pieces: particularly, *Paſſiones Sanctorum*, the Sufferings of the Saints: *Pro illuſtrandis ſcripturis, ad Bedam;* For explaining the ſcriptures, addreſſed to Bede. He died in 740, having enjoyed the ſee of Hexham 31 years, under Egbert king of the Northumbrians.

ACCALIA, in Roman antiquity, ſolemn feſtivals held in honour of Acca Laurentia, Romulus's nurſe: they were otherwiſe called *Laurentalia*.

ACCAPITARE, in law, the act of becoming vaſſal of a lord, or of yielding him homage and obedience. Hence,

ACCAPITUM, ſignifies the money paid by a vaſſal upon his admiſſion to a feu.

ACCAPITUM, in our ancient law, was uſed alſo to expreſs the relief due to the chief lord. See RELIEF.

ACCEDAS *ad curiam*, in the Engliſh law, a writ lying, where a man has received, or fears, falſe judgment in an inferior court. It lies alſo for juſtice delayed, and is a ſpecies of the writ *recordare*.

ACCEDONES. See ACCENDONES.

ACCELERATED, implies, in a general ſenſe, quickened, continually increaſing. Thus, *accelerated motion* is a motion continually increaſing. See MOTION.

ACCELERATION, an increaſe of velocity in the motion of a body; it is oppoſed to *retardation*, which is a diminution of motion.

ACCELERATION, is alſo a term uſed by ancient aſtronomers, with whom it ſignified the difference between the revolution of the primum mobile and that of the ſun, computed to be three minutes and fifty-ſix ſeconds.

ACCELERATOR, in anatomy, the name of two muſcles of the penis, which ſerve for ejecting the urine or ſemen. See ANATOMY, n° 176.

ACCENDENTES, a lower order of miniſters in the Romiſh church, whoſe office is to light and trim the candles.

ACCENDONES, or ACCEDONES, in Roman antiquity, a kind of gladiators, whoſe office was to excite and animate the combatants during the engagement *. The orthography of the word is conteſted: the firſt edition of Tertullian, by Rhenanus, has it *accedones;* an ancient manuſcript, *accendones*. Aquinas adheres to the former, Pitiſcus to the latter. The origin of the word, ſuppoſing it *accendones*, is from *accendo*, I kindle; ſuppoſing it *accedones*, from *accedo*, I accede, am added to. The former places their diſtinguiſhing character in enlivening the combat by their exhortations and ſuggeſtions; the latter ſuppoſes them to be much the ſame with what among us are called *ſeconds*, among the Italians *patroni:* excepting that theſe latter only ſtand by to ſee the laws of the ſword duly obſerved, without intermeddling to give advice or inſtruction.

ACCENSI, in the Roman armies, certain ſupernumerary ſoldiers, deſigned to ſupply the places of thoſe who ſhould be killed or anywiſe diſabled. They were thus denominated, *quia accenſebantur*, or *ad cenſum adjiciebantur*. Vegetius calls them *ſupernumerarii legionum*. Cato calls them *ferentarii*, in regard they furniſhed thoſe engaged in battle with weapons, drink, &c. Though Nonnius ſuggeſts another reaſon of that appellation, *viz.* becauſe they fought with ſtones, ſlings, and weapons *quæ ferruntur*, ſuch as are thrown, not carried in the hand. They were ſometimes alſo called *velites*, and *velati*, becauſe they fought clothed, but not in armour; ſometimes *adſcripticii*, and *adſcriptivi;* ſometimes *rorarii*. The *accenſi*, Livy obſerves, were placed at the rear of the army, becauſe no great matter was expected from them: they were taken out of the fifth claſs of citizens.

ACCENSI, in antiquity, denotes an inferior order of officers, appointed to attend the Roman magiſtrates, ſomewhat in the manner of uſhers, ſerjeants, or tipſtaves among us. They were thus called from *accire*, to ſend for; one part of their office being to call aſſemblies of the people, ſummon parties to appear and anſwer before the judges, &c.

ACCENSI, was alſo an appellation given to a kind of adjutants, appointed by the tribune to aſſiſt each centurion and decurion. In which ſenſe, *accenſus* is ſynonymous with *optio*.—In an ancient inſcription, given by à Torre, we meet ACCENSUS EQUITUM ROMANORUM; an office no where elſe heard of. That author ſuſpects it for a corruption; and inſtead thereof reads, A CENSIBUS.

ACCENSION, the action of ſetting a body on fire: thus the accenſion of tinder is effected by ſtriking fire with flint and ſteel.

ACCENT, in reading or ſpeaking, an inflection of the voice, which gives to each ſyllable of a word its due pitch in reſpect of height or lowneſs. See the article READING, N° IV.—The word is originally Latin, *accentus:* a compound of *ad*, to; and *cano*, to ſing. *Accentus, quaſi adcantus*, or *juxta cantum*. In this ſenſe, accent is ſynonymous with the Greek τονος; the Latin *tenor*, or *tonor;* and the Hebrew טעם, *guſtus*, taſte.—For the doctrine of *Accents* in *Compoſition*, ſee Poetry, Part II. nº 53, 62, 70, 90,—98.

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* See Gladiator.

Accent, among grammarians, is a certain mark or character placed over a ſyllable, to direct the ſtreſs of its pronunciation. We generally reckon three grammatical accents in ordinary uſe, all borrowed from the Greeks, *viz.* the *acute accent*, (ʹ), which ſhews when the tone of the voice is to be raiſed. The *grave accent* (ˋ), when the note or tone of the voice is to be depreſſed. The *circumflex accent* (˜ or ^), is compoſed of both the acute and the grave, and points out a kind of undulation of the voice. The Latins have made the ſame uſe of theſe three accents.

The Hebrews have a grammatical, a rhetorical, and muſical accent: though the firſt and laſt ſeem, in effect, to be the ſame; both being compriſed under the general name of *tonic accents*, becauſe they give the proper tone to ſyllables; as the rhetorical accents are ſaid to be euphonic, inaſmuch as they tend to make the pronunciation more ſweet and agreeable. There are four euphonic accents, and 25 tonic; of which ſome are placed above, and others below the ſyllables; the Hebrew accents ſerving not only to regulate the riſings and fallings of the voice, but alſo to diſtinguiſh the ſections, periods, and members of periods, in a diſcourſe; and to anſwer the ſame purpoſes with the points in other languages.—Their accents are divided into *emperors*, *kings*, *dukes*, *&c.* each bearing a title anſwerable to the importance of the diſtinction it makes. Their emperor rules over a whole phraſe, and terminates the ſenſe completely; anſwering to our point. Their king anſwers to our colon; and their duke to our comma. The king, however, occaſionally becomes a duke, and the duke a king, as the phraſes are more or leſs ſhort. It muſt be noted, by the way, that the management and combination of theſe accents differ in Hebrew poetry from what they are in proſe. The uſe of the tonic or grammatical accents has been much controverted: ſome holding that they diſtinguiſh the ſenſe; while others maintain that they are only intended to regulate the muſic, or ſinging; alledging that the Jews ſing, rather than read, the ſcriptures in their ſynagogues *. Be this, however, as it will, it is certain the ancient Hebrews were not acquainted with theſe accents. The opinion which prevails amongſt the learned, is, that they were invented about the ſixth century, by the Jewiſh doctors of the ſchool of Tiberias, called the Maſſoretes.

As to the Greek accents, now ſeen both in manuſcripts and printed books, there has been no leſs diſpute about their antiquity and uſe than about thoſe of the Hebrews. Iſaac Voſſius endeavours to prove them of modern invention; aſſerting, that anciently they had nothing of this kind, but only a few notes in their poetry, which were invented by Ariſtophanes the grammarian, about the time of Ptolemy Philopater; and that theſe were of muſical, rather than grammatical uſe, ſerving as aids in the ſinging of their poems, and very different from thoſe introduced afterwards. He alſo ſhews from ſeveral ancient grammarians, that the manner of writing the Greek accents in theſe days was quite different from that which appears in our books. The author of *La Methode Greque*, p. 546, obſerves, that the right pronunciation of the Greek language being natural to the Greeks, it was needleſs for them to mark it by accents in their writings: ſo that, according to all appearance, they only began to make uſe of them ſo low as the time in which the Romans, being curious to learn the Greek tongue, ſent their children to ſtudy at Athens, thinking thereby to fix the pronunciation, and to facilitate it to ſtrangers; which happened, as the ſame author obſerves, a little before Cicero's time. Wetſtein, Greek profeſſor at Baſil, in a learned diſſertation endeavours to prove the Greek accents of an older ſtanding. He owns that they were not always formed in the ſame manner by the ancients; but thinks that difference owing to the different pronunciation which obtained in the different parts of Greece. He brings ſeveral reaſons, *a priori*, for the uſe of accents, even in the earlieſt days: as that they then wrote all in capital letters equidiſtant from each other, without any diſtinction either of words or phraſes, which without accents could ſcarce be intelligible; and that accents were neceſſary to diſtinguiſh ambiguous words, and to point out their proper meaning; which he confirms from a diſpute on a paſſage in Homer, mentioned by Ariſtotle in his *Poëtics*, chap. v. Accordingly, he obſerves, that the Syrians, who have tonic, but no diſtinctive accents, have yet invented certain points, placed either below or above the words, to ſhew their mood, tenſe, perſon, or ſenſe.

The uſe of accents, to prevent ambiguities, is moſt remarkably perceived in ſome eaſtern languages, particularly the Siameſe and Chineſe. Among the people of China, every word, or (which is the ſame thing) ſyllable, admits of five accents, as ſpoken more acutely or remiſsly; and thus ſtands for many different things. The ſame ſound *ya*, according to the accent affixed to it, ſignifies *God*, a *wall*, *excellent*, *ſtupidity*, and a *gooſe*.—The Chineſe have but 330 ſpoken words in their language; but theſe being multiplied by the different accents or tones, which affect the vowels, furniſh a language tolerably copious. By means hereof, their 330 ſimple ſounds come to denote 1650 things; but this being hardly ſufficient, they are increaſed further by aſpirates added to each word, to double the number. The Chineſe only reckon four *accents:* for which the miſſionaries uſe the following marks, *aú*, *â*, *à*, *ā*; to which they have added a fifth, thus, *ã*. They make a kind of modulation; wherein, prolonging the duration of the ſound of the vowel, they vary the tone, raiſing and ſinking it by a certain pitch of voice: ſo that their talking is a ſort of muſic or ſinging. Attempts have been made to determine the quantity of the riſe or fall in each accent by means of muſical notes; but this is hard to effect, as being different in different perſons. Hence the great difficulty of the language to foreigners; they are forced to ſing moſt ſcrupulouſly: if they deviate ever ſo little from the accent, they ſay quite a different thing from what was intended. Thus, meaning to compliment the perſon you are talking to with the title *Sir*, you call him a beaſt, with the ſame word, only a little varied in the tone. Magalhon makes the language the eaſier to learn on this account.—The Siameſe are alſo obſerved to ſing rather than talk. Their alphabet begins with ſix characters, all only equivalent to a K, but differently accented. For tho' in the pronunciation the accents are naturally on the vowels, yet they have ſome to diverſify ſuch of their conſonants as are in other reſpects the ſame.

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* Cooper, om. Mo- ic. Clav. 31.

ACCENT, in muſic, is a certain modulation of ſounds to expreſs a paſſion, whether by the voice or inſtruments.

ACCENTER, in muſic, one of the three ſingers in a trio, *viz.* the perſon who ſings the higheſt part*.

ACCEPTANCE, in law, a perſon's agreeing to offers made in bargaining, by which the bargain is concluded.

ACCEPTANCE, in the church of Rome, is put for receiving the pope's conſtitutions.

ACCEPTANCE, in commerce, is the ſubſcribing, ſigning, and making one's ſelf debtor for the ſum contained in a bill of exchange or other obligation. See BILLS.

ACCEPTATION, in grammar, the ſenſe or meaning wherein any word is taken.

ACCEPTER, or ACCEPTOR, the perſon who accepts a bill of exchange, &c.

ACCEPTILATION, among civilians, an acquittance or diſcharge given by the creditor to the debtor without the payment of any value.

ACCESSIBLE, ſomething that may be approached, or that acceſs may be had to. Thus we ſay, Such a place is acceſſible on one ſide, &c.

ACCESSION, in law, is a method of acquiring property, by which, in things that have a cloſe connexion or dependence upon one another, the property of the principal thing draws after it the property of the acceſſory. Thus, the owner of a cow becomes likewiſe the owner of the calf. See LAW, Part III. nº clxii. 6. It ſometimes likewiſe ſignifies conſent or acquieſcence.

ACCESSION, among phyſicians, is uſed for a paroxiſm of a diſeaſe; among politicians, it ſignifies a prince's ſucceeding to the government upon the death of his predeceſſor.

ACCESSORY, in law, is the ſubject acquired by acceſſion: Or, in crimes, it ſignifies the perſon by whoſe aſſiſtance, advice, or command, the crime was committed; in which ſenſe, it is the ſame with accomplice, art and part, &c. See LAW, Part III. nº clxxxiv. 4, 45, 50.

ACCI, a town of Tarraconenſis, (Pliny, Ptolemy;) formerly called *Acti*, ſuppoſed to be Guadix, to the eaſt of the city of Granada, at the foot of a mountain, near the ſource of the rivulet Guadalantin. Now greatly decayed. It is the Colonia Accitana Gemella, (coins); and was of ſome repute among the Roman colonies. The people were called Gemellenſes, becauſe the colony conſiſted of coloniſts from the third and ſixth legions.

ACCIAIOLI (Donato), a man famous for his learning and the honourable employments he poſſeſſed in Florence his native country, in the 15th century. He wrote, A Latin tranſlation of ſome of Plutarch's Lives; Commentaries on Ariſtotle's Ethics and Politics; and the Life of Charlemagne. He was ſent to France by the Florentines, to ſue for ſuccour from Lewis XI. againſt Pope Sextus IV. but died on his journey at Milan; his body was carried to Florence, and buried in the church of the Carthuſians. The ſmall fortune he left his children is a proof of his probity and diſintereſtedneſs. His daughters, like thoſe of Ariſtides, were married at the public expence, as an acknowledgment of his ſervices. His funeral elogium was ſpoken by Chriſtopher Landini; and an elegant epitaph, by Politian, was inſcribed on his tomb.

ACCIDENT, in a general ſenſe, denotes any caſual event.

ACCIDENT, among logicians, is uſed in a threefold ſenſe. 1. Whatever does not eſſentially belong to a thing; as the clothes a man wears, or the money in his pocket. 2. Such properties in any ſubject as are not eſſential to it; thus whiteneſs in paper is an accidental quality. 3. In oppoſition to ſubſtance, all qualities whatever are called accidents; as ſweetneſs, ſoftneſs, *&c.*

ACCIDENT, in grammar, implies a property attached to a word, without entering into its eſſential definition; for every word, notwithſtanding its ſignification, will be either primitive, derivative, ſimple, or compound, which are the accidents of words. A word is ſaid to be primitive, when it is taken from no other word in the language in which it is uſed: thus *heaven*, *king*, *good*, are primitive words. It is ſaid to be derivative, when it is taken from ſome other word: thus *heavenly*, *kingdom*, *goodneſs*, &c. are derivatives. A ſimple word is eaſily diſtinguiſhed from a compound: thus *juſt*, *juſtice*, are ſimple words; *unjuſt*, *injuſtice*, are compound: *res* is a ſimple word, as well as *publica;* but *reſpublica* is a compound. Beſides theſe accidents, which are common to all ſorts of words, each particular ſpecies has its accidents: thus the accidents of the noun ſubſtantive are the gender, declenſion, and number; and the adjective has another accident, namely, the compariſon. See GRAMMAR, nº 14, &c. and the article LANGUAGE.

ACCIDENT, in heraldry, an additional point or mark in a coat of arms, which may be either omitted or retained without altering the eſſence of the armour; ſuch as, abatement, difference, and tincture.

ACCIDENTAL, in a general ſenſe, implies ſomething that happens by accident, or that is not eſſential to its ſubject.

ACCIDENTAL, in philoſophy, is applied to that effect which flows from ſome cauſe intervening by accident, without being ſubject, or at leaſt without any appearance of being ſubject, to general laws or regular returns. In this ſenſe, *accident* is oppoſed to *conſtant* and *principal.* Thus the ſun's place is, with reſpect to the earth, the conſtant and principal cauſe of the heat in ſummer, and the cold in winter; whereas winds, ſnows, and rains, are the accidental cauſes which often alter and modify the action of the principal cauſe.

ACCIDENTAL *Point*, in perſpective, is that point in the horizontal line where the projections of two lines parallel to each other meet the perſpective plane.

ACCIPENSER, in ichthyology, a genus of fiſhes belonging to the Amphibia Nantes of Linnæus. The accipenſer has a ſingle linear noſtril: the mouth is in the under part of the head, and contains no teeth; the cirri are below the ſnout, and before the mouth. There are three ſpecies of this genus, *viz.*

The Iſingla fiſh, Plat fig. 6.

1. The huſo has 4 cirri; the body is naked, *i. e.* has no prickles or protuberances. The ſkin of the huſo is ſo tough and ſtrong, that it is employed for ropes in carts and other wheel-carriages; and the ichthyocolla *, or iſinglaſs of the ſhops, famous as an agglutinant, and uſed alſo for the fining of wines, is made from its ſound or ſcales. The ancients were acquainted with the fiſh that afforded this drug. Pliny † mentions it under the name of ichthyocolla; and ſays, that the

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* See *Trio.*

* See I *thyocolla.*

† Lib. xxx c. 7.

Plate I.

Fig. 1. Abacus

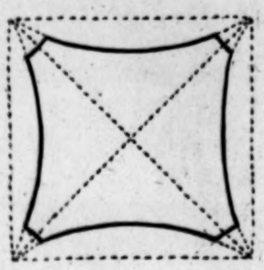


Fig. 2. Abacus or Counting Board

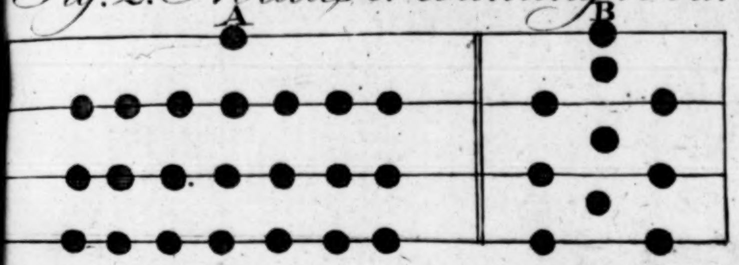


Fig. 3. Acanthus

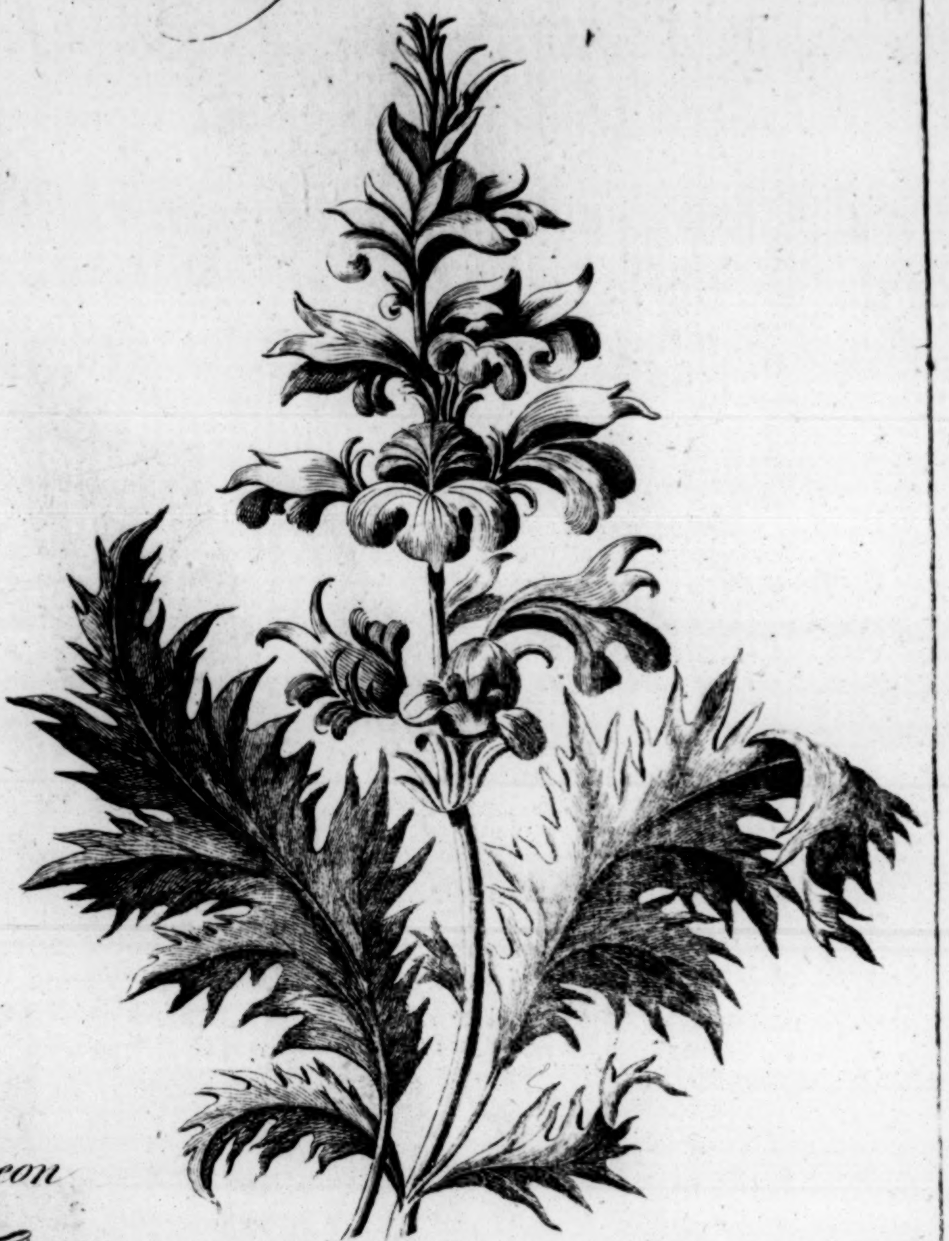


Fig. 4. Acarus

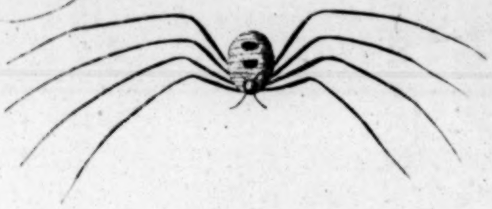


Fig. 5. Accipenser sturio or Sturgeon

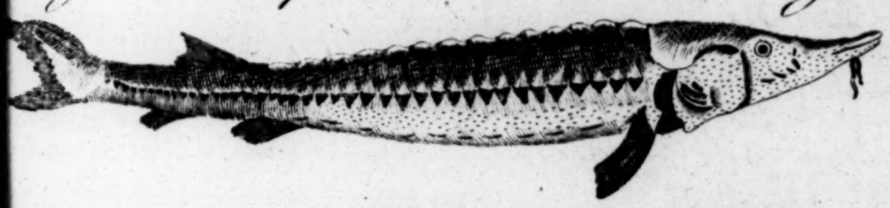
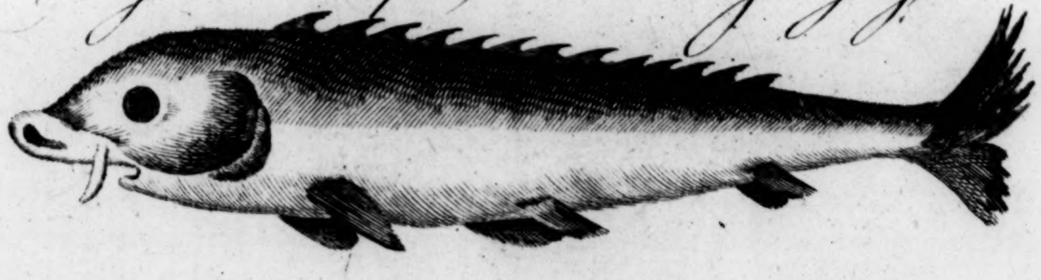


Fig. 6. Accipenser huso or Isinglass Fish



A. Bell Sculp.t

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the glue that was produced from it had the ſame title; and afterwards adds, that it was made out of the belly of the fiſh. The huſo is the largeſt of the genus, and grows to 24 feet in length. It inhabits the Danube and the rivers of Ruſſia.

The rgeon, l. fig. 5. 2. The ſturio, or ſturgeon, with 4 cirri and 11 ſquamous protuberances on the back. That this is the ’Ονισκος of Dorion, as quoted by Athenæus, is very probable, as well from the account he gives of its form as of its nature. He ſays its mouth is always open, with which it agrees with the ſturgeon; and that it conceals itſelf in the hot months: this ſhews it to be a fiſh of a cold nature; which is confirmed by the hiſtory of the European fiſh of this ſpecies given by Mr Forſter ‡, in his Eſſay on the *Volga;* who relates, that they are ſcarce ever found in that river in ſpring or ſummer, but in vaſt quantities in autumn and winter, when they crowd from the ſea under the ice, and are then taken in great numbers. Whether the *acipenſer* is the ſturgeon of the moderns, may be doubted; otherwiſe Ovid would never have ſpoken of it as a foreign fiſh:

‡ il. Tran. 352.

> *Tuque peregrinis, Acipenſer, nobilis undis.*
> And thou, a fiſh in foreign ſeas renown'd—

it being well known that it is not uncommon in the Mediterranean, and even in the mouth of the Tiber, at certain ſeaſons. But this paſſage leaves us as much in the dark as to the particular ſpecies intended by the word *acipenſer*, as the deſcription Pliny has given us: for that philoſopher relates, that its ſcales are placed in a contrary direction to thoſe of other fiſh, being turned towards the mouth; which diſagrees with the character of all that are known at preſent. Whatever fiſh it might be, it was certainly the ſame with the *elops*, or *helops;* as appears from Pliny, who makes it ſynonymous with the acipenſer †; and from another line of the poet beforementioned:

† b. ix. 17.

> *Et pretioſus Helops, noſtris incognitus undis.*
> The precious Helops, ſtranger to our ſeas.

The ſturgeon annually aſcends our rivers, but in no great numbers, and is taken by accident in the ſalmon-nets. It ſeems a ſpiritleſs fiſh, making no manner of reſiſtance when entangled, but is drawn out of the water like a lifeleſs lump. It is a fiſh that is ſeldom taken far out at ſea, but frequents ſuch parts as are not remote from the æſtuaries of great rivers. It is admired for the delicacy and firmneſs of its fleſh, which is white as veal, and extremely good when roaſted. It is generally pickled. The moſt we receive comes either from the Baltic rivers, or North America: thoſe cured at Pillau have been, till of late, in the greateſt repute; but through the encouragement given by the ſociety inſtituted for promoting trade and manufactures, the ſturgeon from our colonies begins to rival thoſe of the Baltic. Great numbers are taken during ſummer in the lakes Friſchehaff, and Curiſch-haff near Pillau, in large nets made of ſmall cord. The adjacent ſhores are formed into diſtricts, and farmed out to companies of fiſhermen, ſome of which are rented for ſix thouſand guilders, or near three hundred pounds, *per annum.* They are found in vaſt abundance in the American rivers in May, June, and July; at which time they leap ſome yards out of the water, and, falling on their ſides, make a noiſe to be heard in ſtill weather at ſome miles diſtance. Caviare is made of the roes of this, and alſo of all the other ſorts of ſturgeons, dried, ſalted, and packed up cloſe. Ichthyocolla, or iſing-glaſs, is alſo made of the ſound of our fiſh, as well as that of the others; but in very ſmall quantity. The ſturgeon grows to a great ſize, to the length of 18 feet, and to the weight of 500 pounds, but it is ſeldom taken in our rivers of that bulk. The largeſt we have known caught in thoſe of Great Britain, weighed 460 pounds; which was taken about three years ago in the Eſk, where they are more frequently found than in our ſouthern waters. In the manner of breeding, this fiſh is an exception among the cartilaginous kind; being, like the bony fiſh, oviparous, ſpawning in water.

3. The ruthenus has 4 cirri, and 15 ſquamous protuberances. It is a native of Ruſſia.

ACCIPITER, the name of Linnæus's firſt order of Birds. See Zoology, nº 8, a.

Among the Romans, the term *accipiter* ſignified a hawk; and which, from its being very carnivorous, they conſidered as a bird of bad omen:

> *Odimus accipitrem, quia ſemper vivit in armis.* Ovid.

Pliny, however, tells us, that in ſome caſes, particularly in marriage, it was eſteemed a bird of good omen, becauſe it never eats the hearts of other birds; intimating thereby, that no differences in a married ſtate ought to reach the heart. The accipiter was worſhipped as a divinity by the inhabitants of Tentyra, an iſland in the Nile, being conſidered by them as the image of the ſun; and hence we find that luminary repreſented, in hieroglyphics, under the figure of a hawk.

ACCISMUS, denotes a feigned refuſal of ſomething which a perſon earneſtly deſires. The word is Latin; or rather Greek, Ακκισμος; ſuppoſed to be formed from *Acco*, the name of a fooliſh old woman noted in antiquity for an affectation of this kind.

Acciſmus is ſometimes conſidered as a virtue; ſometimes as a vice, which Auguſtus and Tiberius practiſed with great ſucceſs. Cromwell's refuſal of the crown of England, may be brought as an inſtance of an Acciſmus.

Accismus is more particularly uſed, in rhetoric, as a ſpecies of irony.

ACCIUS (Lucius), a Latin tragic poet, the ſon of a freedman, and, according to St Jerom, born in the conſulſhip of Hoſtilius Mancinus and Attilius Serranus, in the year of Rome 583; but there appears ſomewhat of confuſion and perplexity in this chronology. He made himſelf known before the death of Pacuvius, a dramatic piece of his being exhibited the ſame year that Pacuvius brought one upon the ſtage, the latter being then eighty years of age, and Accius only thirty. We do not know the name of this piece of Accius's, but the titles of ſeveral of his tragedies are mentioned by various authors. He wrote on the moſt celebrated ſtories which had been repreſented on the Athenian ſtage; as Andromache, Andromeda, Atreus, Clytemneſtra, Medea, Meleager, Philoctetes, the civil wars of Thebes, Tereus, the Troades, *&c.* He did not always, however, take his ſubjects from the Grecian ſtory; for he compoſed one dramatic piece wholly Roman: it was entitled *Brutus*, and related to the expulſion of the Tarquins. It is affirmed by ſome, that he wrote alſo comedies; which is not unlikely, if he was the author of two pieces, the Wedding, and the Merchant, which have been aſcribed to him. He did not confine himſelf to dramatic writing; for he left other productions, particularly his annals, mentioned by Macrobius, Priſcian, Feſtus, and Nonius Marcellus. He has been cenſured for writing in too harſh a ſtyle, but in all other reſpects has been eſteemed a very great poet. He was ſo much eſteemed by the public, that a comedian was puniſhed for only mentioning his name on the ſtage. Cicero ſpeaks with great deriſion of one Accius who had written a hiſtory; and, as our author had wrote annals, ſome inſiſt that he is the perſon cenſured: but as Cicero himſelf, Horace, Quintilian, Ovid, and Paterculus, have ſpoken of our author with ſo much applauſe, we cannot think it is him whom the Roman orator cenſures with ſo much ſeverity.

There was alſo in this age a pretty good orator of the ſame name, againſt whom Cicero defended Cluentius. He was born in Piſaurum, and perhaps was a relation of our poet.

ACCIUS, a poet of the 16th century, to whom is attributed *A Paraphraſe on Æſop's Fables*, on which Julius Scaliger beſtows great encomiums.

ACCLAMATION, a confuſed noiſe or ſhout of joy, by which the public expreſs their applauſe, eſteem, or approbation.

Acclamation, in a more proper ſenſe, denotes a certain form of words, uttered with extraordinary vehemence, and in a peculiar tone ſomewhat reſembling a ſong, frequent in the ancient aſſemblies. Acclamations were uſually accompanied with applauſes, with which they are ſometimes confounded: though they ought to be diſtinguiſhed; as acclamation was given by the voice, applauſe by the hands; add, that acclamation was alſo beſtowed on perſons abſent, applauſe only on thoſe preſent. Acclamation was alſo given by women, whereas applauſe ſeems to have been confined to men.

Acclamations are of various kinds; eccleſiaſtical, military, nuptial, ſenatorial, ſynodical, ſcholaſtic, theatrical, *&c.* We meet with loud acclamations, muſical and rhythmical acclamations; acclamations of joy and reſpect, and even of reproach and contumely. The former, wherein words of happy omen were uſed, were alſo called, *Laudationes, et bona vota*, or good wiſhes; the latter, *Execrationes et convicia.* Suetonius furniſhes an inſtance of this laſt kind in the Roman ſenate, on occaſion of the decree for demoliſhing the ſtatues of Domitian, when the fathers, as the hiſtorian repreſents it, could not refrain from contumelious acclamations of the deceaſed. The like were ſhown after the death of Commodus, where the acclamations run in the following ſtrain: *Hoſti patriæ honores detrahantur, parricidæ honores detrahantur; hoſtis ſtatuas undique, parricidæ ſtatuas undique, gladiatoris ſtatuas undique, &c.*—The formula, in acclamations, was repeated ſometimes a greater, ſometimes a leſſer, number of times. Hence we find in Roman writers, *acclamatum eſt quinquies, et vicies;* five times, and twenty times: ſometimes alſo *ſexagies*, and even *octuagies;* ſixty and eighty times.

Acclamations were not unknown on the theatres in the earlieſt ages of the Roman commonwealth; but they were artleſs then, and little other than confuſed ſhouts. Afterwards they became a ſort of regular concerts. That mentioned by Phædrus, *lætare incolumis Roma ſalvo principe*, which was made for Auguſtus, and proved the occaſion of a pleaſant miſtake of a flute-player called *Princeps*, ſhews that muſical acclamations were in uſe in that emperor's reign. *Revertentem ex Provincia modulatis carminibus proſequebantur*, ſays Suetonius, who gives another inſtance in the time of Tiberius: a falſe report of Germanicus's recovery being ſpread through Rome, the people ran in crouds to the capitol with torches and victims, ſinging, *Salva Roma, Salva Patria, Salvus eſt Germanicus.*—Nero, paſſionately fond of muſic, took ſpecial care to improve and perfect the muſic of acclamations. Charmed with the harmony wherewith the Alexandrians, who came to the games celebrated at Naples, had ſung his praiſes, he brought ſeveral over to inſtruct a number of youth, choſen from among the knights and people, in the different kinds of acclamations practiſed at Alexandria. Theſe continued in uſe as low as the reign of Theodoric. But the people did not always make a ſingle chorus; ſometimes there were two, who anſwered each other alternately: thus, when Nero played on the theatre, Burrhus and Seneca, who were on either hand, giving the ſignal by clapping, 5000 ſoldiers called Auguſtals, began to chant his praiſe, which the ſpectators were obliged to repeat. The whole was conducted by a muſic-maſter called *Meſochorus* or *Pauſarius.*—The honour of acclamations was chiefly rendered to emperors, their children, and favourites; and to the magiſtrates who preſided at the games. Perſons of diſtinguiſhed merit alſo ſometimes received them, of which Quintilian gives us inſtances in Cato and Virgil. The moſt uſual forms were, *Feliciter, Longiorem vitam, Annos felices.* The actors themſelves, and they who gained the prizes in the games of the circus, were not excluded the honour of acclamations.

To theatrical acclamations may be added thoſe of the ſoldiery and the people in time of triumph. The victorious army accompanied their general to the capitol; and, among the verſes they ſung in his praiſes, frequently repeated, Io Triumphe, which the people anſwered in the ſame ſtrain. It was alſo in the way of acclamation, that the ſoldiers gave their general the title of *Imperator*, after ſome notable victory: a title which he only kept till the time of his triumph.

The acclamations of the ſenate were ſomewhat more ſerious than the popular ones; but aroſe from the ſame principle, *viz.* a deſire of pleaſing the prince or his favourites; and aimed likewiſe at the ſame end, either to expreſs the general approbation and zeal of the company, or to congratulate him on his victories, or to make him new proteſtations of fidelity. Theſe acclamations were uſually given after a report made by ſome ſenator, to which the reſt all expreſſed their conſent by crying Omnes, Omnes; or elſe, Æquum est, Justum est. Sometimes they began with acclamations, and ſometimes ended with them without other debates. It was after this manner that all the elections and proclamations of emperors, made by the ſenate, were conducted; ſomething of which practice is ſtill retained at modern elections of kings and emperors, where *Vivat Rex, Vive le Roy*, and *Long live the King*, are cuſtomary forms.

The Greeks borrowed the cuſtom of receiving their emperors in the public places from the Romans. Luitprand relates, that at a proceſſion where he was preſent, they ſung to the emperor Nicephorus, πολλα ετη; that is, Many years: which Codin expreſſes thus, by το ψαλλειν το πολυχρονιον, or by το πολυχρονιζειν; and the wiſh or ſalutation by πολυχρονισμα. And at dinner, the Greeks then preſent wiſhed with a loud voice to the emperor and Bardas, *Ut Deus annos multiplicet;* as he tranſlates the Greek. Plutarch mentions an acclamation ſo loud, upon occaſion of Flaminius's reſtoring liberty to Greece, that the very birds fell from heaven with the ſhout. The Turks practiſe ſomething like this on the ſight of their emperors and grand viziers, to this day.

For the acclamations wherewith authors, poets, &c. were received, who recited their works in public; it is to be obſerved, the aſſemblies for this purpoſe were held with great parade in the moſt ſolemn places, as the capitol, temples, the Athæneum, and the houſes of great men. Invitations were ſent every where, in order to get the greater appearance. The chief care was that the acclamations might be given with all the order and pomp poſſible. Men of fortune who pretended to wit, kept able applauders in their ſervice, and lent them to their friends. Others endeavoured to gain them by preſents and treats. Philoſtratus mentions a young man named Vavus, who lent money to the men of letters, and forgave the intereſt to ſuch as applauded his exerciſes. Theſe acclamations were conducted much after the ſame manner as thoſe on the theatre, both as to the muſic and the accompaniments: they were to be ſuited both to the ſubject and to the perſon. There were particular ones for the philoſophers, for orators, for hiſtorians, and for poets. It would be difficult to rehearſe all the forms of them; one of the moſt uſual was *Sophos*, which was to be repeated three times. Martial comprehends ſeveral other uſual forms in this verſe:

Graviter, Cito, Nequiter, Euge, Beate.

Neither the Greeks nor Romans were barren on this head. The names of gods and heroes were given thoſe whom they would extol. It was not enough to do it after each head of diſcourſe, chiefly after the exordium; but the acclamations were renewed at every fine paſſage, frequently at every period.

The acclamations wherewith the ſpectators honoured the victories of the athletæ, were a natural conſequence of the impetuous motions which attended the gymnaſtic games. The cries and acclamations of the people, ſometimes expreſſing their compaſſion and joy, ſometimes their horror and diſguſt, are ſtrongly painted by different poets and orators.

Acclamations made alſo a part of the ceremony of marriage. They were uſed for the omen's ſake; being the *Læta Omina*, ſometimes ſpoken of before marriage in Roman writers.

Acclamations, at firſt practiſed in the theatre, and paſſing thence to the ſenate, *&c.* was in proceſs of time received into the acts of councils, and the ordinary aſſemblies of the church. The people expreſſed their approbation of the preacher variouſly; the more uſual forms were, *Orthodox! Third Apoſtle, &c.* Theſe acclamations being ſometimes carried to exceſs, and often miſplaced, were frequently prohibited by the ancient doctors, and at length abrogated; though they appear to have been in ſome uſe as low as the time of St Bernard.

ACCLAMATION *Medals*, among antiquaries, ſuch as repreſent the people expreſſing their joy in the poſture of acclamation.

ACCLIVITY, the riſe or aſcent of a hill, in oppoſition to the declivity or deſcent of it. Some writers in fortification uſe it for the talus of a rampart.

ACCOLA, among the Romans, ſignified a perſon who lived *near* ſome place; in which ſenſe, it differed from *incola*, the *inhabitant* of ſuch a place.

ACCOLADE, a ceremony anciently uſed in the conferring of knighthood.

Antiquaries are not agreed wherein the accolade properly conſiſted. The generality ſuppoſe it to be the embrace, or kiſs, which princes anciently gave the new knight, as a token of their affection: whence the word *accolade; q. d.* a claſping, or taking round the neck. Others will rather have it to be a blow on the chine of the neck, given on the ſame occaſion. The Accolade is of ſome antiquity, in which ſoever of the two ſenſes it be taken. Greg. de Tours writes, that the kings of France, even of the firſt race, in conferring the gilt ſhoulder-belt, kiſſed the knights on the left cheek. For the *accoleé*, or blow, John of Saliſbury aſſures us, it was in uſe among the ancient Normans: by this it was that William the Conqueror conferred the honour of knighthood on his ſon Henry. At firſt, it was given with the naked fiſt; but was afterwards changed into a blow with the flat of the ſword on the ſhoulder of the knight.

ACCOLEE, ſometimes ſynonymous with ACCOLADE, which ſee.—It is alſo uſed in various ſenſes in heraldry: ſometimes it is applied to two things joined; at other times, to animals with crowns, or collars about their necks, as the lion in the Ogilvy's arms; and, laſtly, to kews, battons, maces, ſwords, *&c.* placed ſaltierwiſe behind the ſhield.

ACCOLTI (Bernardo), ſecretary to the republic of Florence, was ſurnamed L'Unico, or the Non-Such, probably from the great extent of his underſtanding, the variety of ſciences he had acquired, and the excellency of his poetic vein; which not only gained him a ſeat among the academicians of the court of Urbino, but made that great Mæcenas, pope Leo X. in 1520, create him prince of the ſtate of Nepi. He wrote many pieces; among others, a collection of beautiful poems, printed at Venice in 1519 and 1553.

ACCOMMODATION, the application of one thing, by analogy, to another; or the making two or more things agree with one another.

To know a thing by *accommodation*, is to know it by the idea of a ſimilar thing referred thereto.

A prophecy of ſcripture is ſaid to be fulfilled various ways; properly, as when a thing foretold comes to paſs; and improperly, or by way of *accommodation*, when an event happens to any place or people, like to what fell out ſome time before to another.—Thus, the words of Iſaiah, ſpoken to thoſe of his own time, are ſaid to be fulfilled in thoſe who lived in our Saviour's; and are *accommodated* to them: "Ye hypocrites, well did Iſaias propheſy of you," *&c.* which ſame words, St Paul afterwards *accommodates* to the Jews of his time.

The primitive church *accommodated* multitudes of Jewiſh, and even heathen ceremonies and practices, to Chriſtian purpoſes; but the Jews had before done the ſame by the Gentiles: ſome will even have circumciſion, the tabernacle, brazen ſerpent, &c. to have been originally of Egyptian uſe, and only *accommodated* by

Moſes to the purpoſes of Judaiſm*. Spencer maintains, that moſt of the rites of the old law, were an imitation of thoſe of the Gentiles, and particularly of the Egyptians; that God, in order to divert the children of Iſrael from the worſhip they paid to the falſe deities, conſecrated the greateſt part of the ceremonies performed by thoſe idolaters, and had formed out of them a body of the ceremonial law; that he had indeed made ſome alterations therein, as barriers againſt idolatry; and that he thus *accommodated* his worſhip to the genius and occaſions of his ancient people. To this condeſcenſion of God, according to Spencer†, is owing the origin of the tabernacle, and particularly that of the ark.

ACCOMPANIMENT, ſomething attending or added as a circumſtance to another, either by way of ornament, or for the ſake of ſymmetry.

Accompaniment, in muſic, denotes the inſtruments which accompany a voice to ſuſtain it, as well as to make the muſic more full. The accompaniment is uſed in recitative, as well as in ſong; on the ſtage, as well as in the choir, &c. The ancients had likewiſe their accompaniments on the threatre; they had even different kinds of inſtruments to accompany the chorus, from thoſe which accompanied the actors in the recitation.—The accompaniment, among the moderns, is frequently a different part or melody from the ſong it accompanies. It is diſputed whether it was ſo among the ancients. It is generally alleged, that their accompaniments went no farther than the playing in octave, or in antiphony to the voice. The Abbe Fraguier, from a paſſage in Plato, pretends to prove, that they had actual ſymphony, or muſic in parts: but his arguments ſeem far from being concluſive.

Accompaniment, in painting, denotes ſuch objects as are added, either by way of ornament, or probability; as dogs, guns, game, *&c.* in a hunting-piece.

Accompaniment, in heraldry, any thing added to a ſhield by way of ornament; as the belt, mantling, ſupporters, *&c.* It is alſo applied to ſeveral bearings about a principal one; as a ſaltier, bend, feſs, chevron, *&c.*

ACCOMPLICE. See Accessary.

ACCOMPLISHMENT, the entire execution or fulfilling of any thing.

Accompliſhment, is principally uſed in ſpeaking of events foretold by the Jewiſh prophets in the Old Teſtament, and fulfilled under the New. We ſay a literal accompliſhment, a myſtical or ſpiritual accompliſhment, a ſingle accompliſhment, a double accompliſhment, a Jewiſh accompliſhment, a Chriſtian, a heathen accompliſhment. The ſame prophecy is ſometimes accompliſhed in all, or ſeveral of thoſe different ways. Thus, of ſome of the prophecies of the Old Teſtament, the Jews find a literal accompliſhment in their own hiſtory, about the time when the prophecy was given: the Chriſtians find another in Chriſt, or the earlieſt days of the church; the heathens another, in ſome of their emperors; the Mahometans, another in their legiſlator; &c. There are two principal ways of accompliſhing a prophecy; *directly*, and by *accommodation*. See Accommodation, and Prophecy.

Accompliſhment, is alſo uſed for any mental or perſonal endowment.

ACCORD, in muſic. See Concord.

Accord, in painting, is the harmony that reigns among the lights and ſhades of a picture.

ACCOUNT, or Accompt, in a general ſenſe, a computation or reckoning of any thing by numbers.—Collectively, it is uſed to expreſs the books which merchants, traders, bankers, &c. uſe for recording their tranſactions in buſineſs. See Book-keeping.

Chamber of Accounts, in the French polity, is a ſovereign court of great antiquity, which takes cogniſance of and regiſters the accounts of the king's revenue. It is nearly the ſame with the Engliſh *Court of Exchequer*.

Account is taken ſometimes, in a particular ſenſe, for the computation of time: thus we ſay, The Julian Account, the Gregorian Account, *&c.* in which ſenſe it is equivalent to *ſtyle*.

ACCOUNTANT, or Accomptant, in the moſt general ſenſe, is a perſon ſkilled in accounts. In a more reſtricted ſenſe, it is applied to a perſon, or officer, appointed to keep the accounts of a public company or office; as the South-ſea, the India-company, the Bank, the Exciſe, *&c.*

ACCOUNTANTSHIP, the art of keeping and balancing accounts. See Book-keeping.

ACCOUNTANT-GENERAL, a new officer in the court of Chancery appointed by act of parliament to receive all moneys lodged in court inſtead of the maſters, and convey the ſame to the bank of England for ſecurity.

ACCOUNTING-HOUSE, counting-house, or compting-house, is a houſe, or office, ſet apart by a merchant, or trading-company, for tranſacting their buſineſs, as well as keeping their books, accounts, vouchers, *&c.*

ACCOUTREMENT, an old term, applied to the furniture of a ſoldier, knight, or gentleman.

ACCRETION, in phyſics, the increaſe, or growth, of an organical body, by the acceſſion of new parts*.

Accretion, among civilians, the property acquired in a vague or unoccupied thing, by its adhering to or following another already occupied: thus, if a legacy be left to two perſons, one of whom dies before the teſtator, the legacy devolves to the ſurvivor by right of accretion.

ACCROCHE, in heraldry, denotes a thing's being hooked with another.

ACCUBATION, a poſture of the body, between ſitting and lying. The word comes from the Latin *accubare*, compounded of *ad*, to, and *cubo*, I lie down. *Accubation*, or *Accubitus*, was the table-poſture of the Greeks and Romans; whence we find the words particularly uſed for the lying, or rather (as we call it) ſitting, down to meat. The Greeks introduced this poſture. The Romans, during the frugal ages of the republic, were ſtrangers to it. But as luxury got footing, this poſture came to be adopted, at leaſt by the men; for as to women, it was reputed an indecency in them to lie down among the men: though, afterwards, this too was got over. But children did not lie down; nor ſervants, nor ſoldiers, nor perſons of meaner condition; but took their meals ſitting, as a poſture leſs indulgent. The Roman manner of diſpoſing themſelves at table was this: A low round table was placed in the cœnaculum, or dining-room; and, about this, uſually three, ſometimes only two, beds or couches; according to the num-

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* Saurin. Diſſ. O. T. tom. i. p 506.

† De legib. Hebr. diſſ. i. l. 3. p. 32.

* See Nu tion, Pla and Veg tion.

ber of which, it was called *biclinium* or *triclinium*. Theſe were covered with a ſort of bed-clothes, richer or plainer according to the quality of the perſon, and furniſhed with quilts and pillows, that the gueſts might lie the more commodiouſly. There were uſually three perſons on each bed; to crowd more, was eſteemed ſordid. In eating, they lay down on their left ſides, with their heads reſting on the pillows, or rather on their their elbows. The firſt lay at the head of the bed, with his feet extended behind the back of the ſecond; the ſecond lay with the back of his head towards the navel of the firſt, only ſeparated by a pillow, his feet behind the back of the third; and ſo of the third, or fourth. The middle place was eſteemed the moſt honourable. Before they came to table, they changed their clothes, putting on what they called *cœnatoria veſtis*, the dining-garment; and pulled off their ſhoes, to prevent fouling the couch.

ACCUBITOR, an ancient officer of the emperors of Conſtantinople, whoſe buſineſs was to lie near the emperor. He was the head of the youths of the bed-chamber, and had the *cubicularius* and *procubitor* under him.

ACCUMULATION, in a general ſenſe, the act of heaping or amaſſing things together. Among lawyers, it is uſed in ſpeaking of the concurrence of ſeveral titles to the ſame thing, or of ſeveral circumſtances to the ſame proof.

Accumulation *of Degrees*, in an univerſity, is the taking ſeveral of them together, or at ſmaller intervals than uſual, or than is allowed by the rules of the univerſity.

ACCURSED, denotes ſomething that lies under a curſe, or is deteſtable. It is likewiſe uſed for an excommunicated perſon.

ACCURSIUS, a law-profeſſor in the 13th century, born in Florence. His authority was for ſome time ſo great, that he was called the Idol of the Lawyers.

Accursius (Mariangelus), a famous critic of the 16th century, born at Aquilo in the kingdom of Naples. His Diatrebes, printed at Rome in folio, in 1524, on Ovid and Solinus, are a proof of his abilities in that kind of erudition. In his edition of Ammianus Marcellinus there are five books more than in any of the preceding ones; and he affirms he had corrected 5000 errors in that hiſtorian. His predominant paſſion was the ſearching for and collecting of old manuſcripts: yet he made Latin and Italian verſes; was complete maſter of the French, German, and Spaniſh tongues; and underſtood optics and muſic. He purged himſelf by oath, being charged for being a plagiary with regard to his Auſonius; it being reported, that he had appropriated to himſelf the labours of Fabricio Varana, biſhop of Camerino.

ACCUSATION, the charging any perſon with a criminal action, either in one's own name, or in that of the public. The word is compounded of *ad*, to; and *cauſari*, to plead.

Writers on politics treat of the benefit and the inconveniencies of public accuſations. Various arguments are alleged, both for the encouragement and diſcouragement of accuſations againſt great men. Nothing, according to Machiavel, tends more to the preſervation of a ſtate, than frequent accuſations of perſons truſted with the adminiſtration of public affairs. This, accordingly, was ſtrictly obſerved by the Romans, in the inſtances of Camillus, accuſed of corruption by Manlius Capitolinus, *&c.* Accuſations, however, in the judgment of the ſame author, are not more beneficial than calumnies are pernicious; which is alſo confirmed by the practice of the Romans. Manlius not being able to make good his charge againſt Camillus, was caſt into priſon.

By the *Roman* law, there was no public accuſer for public crimes; every private perſon, whether intereſted in the crime or not, might accuſe, and proſecute the accuſed to puniſhment, or abſolution. Cato, the moſt innocent perſon of his age, had been accuſed 42 times, and as often abſolved. But the accuſation of *private* crimes was never received but from the mouths of thoſe who were immediately intereſted in them: None (*e. g.*) but the huſband could accuſe his wife of adultery.

The ancient Roman lawyers diſtinguiſhed between *poſtulatio*, *delatio*, and *accuſatio*. For, firſt, leave was deſired to bring a charge againſt one, which was called *poſtulare:* then he againſt whom the charge was laid, was brought before the judge; which was called *deferre*, or *nominis delatio:* laſtly, the charge was drawn up and preſented, which was properly the *accuſatio*. The accuſation properly commenced, according to Pædianus, when the *reus* or party charged, being interrogated, denied he was guilty of the crime, and ſubſcribed his name to the *delatio* made by his opponent.

In the *French* law, none but the Procureur general, or his deputies, can form an accuſation, except for high-treaſon and coining, where accuſation is open to every body. In other crimes, private perſons can only act the part of denouncers, and demand reparation for the offence, with damages.

In *Britain*, by Magna Charta, no man ſhall be impriſoned or condemned on any accuſation, without trial by his peers, or the law: none ſhall be vexed with any accuſation, but according to the law of the land: and no man may be moleſted by petition to the king, &c. unleſs it be by indictment or preſentment of lawful men, or by proceſs at common law. Promoters of ſuggeſtions, are to find ſurety to purſue them; and if they do not make them good, ſhall pay damages to the party accuſed, and alſo a fine to the king. No perſon is obliged to anſwer upon oath to a queſtion whereby he may accuſe himſelf of any crime.

ACCUSATIVE, in the Latin grammar, is the fourth caſe of nouns *, and ſignifies the relation of the noun on which the action implied in the verb terminates; and hence, in ſuch languages as have caſes, theſe nouns have a particular termination, called *accuſative:* as, *Auguſtus vicit Antonium*, Auguſtus vanquiſhed Antony. Here *Antonium* is the noun, on which the action implied in the verb *vicit* terminates; and, therefore, muſt have the accuſative termination. Ovid, ſpeaking of the palace of the ſun, ſays, *Materiem ſuperabat opus*, The work ſurpaſſed the materials. Here *materiem* has the accuſative termination; becauſe it determines the action of the verb *ſuperabat*.--In the Engliſh language there are no caſes, except the genitive; the relation of the noun being ſhewn by the aſſiſtance of prepoſitions, as *of*, *to*, *from*, &c.

ACCUSIORUM COLONIA, (Ptolemy;) an inland town in the Cavares, in Gallia Narbonenſis: now *Grenoble*, in Dauphiné. See Grenoble.

* See *Grammar*, n° 17. and *Language*, n° 23, *&c.*

ACE, among gameſters, a card or die marked only with one point.

ACEPHALI, or ACEPHALITÆ, a term applied to ſeveral ſects who refuſed to follow ſome noted leader. Thus the perſons who refuſed to follow either John of Antioch, or St Cyril, in a diſpute that happened in the council of Epheſus, were termed *Acephali*, without a head or leader. Such biſhops, alſo, as were exempt from the juriſdiction and diſcipline of their patriarch, were ſtyled *Acephali*.

ACEPHALI, the levellers in the reign of king Henry I. who acknowledged no head or ſuperior. They were reckoned ſo poor, that they had not a tenement by which they might acknowledge a ſuperior lord.

ACEPHALOUS, or ACEPHALUS, in a general ſenſe; without a head.

The term is more particularly uſed in ſpeaking of certain nations, or people, repreſented by ancient naturaliſts and coſmographers, as well as by ſome modern travellers, as formed without heads; their eyes, mouths, &c. being placed in other parts.

Such are the Blemmyes, a nation of Africa near the head of the Niger, repreſented to be by Pliny and Solinus; *Blemmyes traduntur capita abeſſe, ore & oculis pectore affixis.* Cteſias and Solinus mention others in India near the Ganges, *ſine cervice, oculos in humeris habentes.* Mela alſo ſpeaks of people, *quibus capita et vultus in pectore ſunt.* And Suidas, Stephanus Byzantinus, Vopiſcus, and others after them, relate the like. Some modern travellers ſtill pretend to find acephalous people in America.

Several opinions have been framed as to the origin of the fable of the Acephali. The firſt is that of Thomas Bartholin, who turns the whole into a metaphor; being convinced, that the name Acephali was anciently given to ſuch as had leſs brain, or conducted themſelves leſs by the rules of prudence, than others. Olearius rather apprehends, that the ancient voyagers, viewing certain barbarous people from the coaſts, had been impoſed on by their uncouth dreſs; for that the Samogitians, being ſhort of ſtature, and going in the ſeverity of winter with their heads covered in hoods, ſeem at a diſtance as if they were headleſs. F. Laſitau ſays, that by Acephali are only meant, people whoſe heads are ſunk below their ſhoulders. In effect, Hulſius, in his epitome of Sir Walter Raleigh's voyage to Guaiana, alſo ſpeaks of a people which that traveller found in the province of Irvipanama, between the lakes of Panama and Caſſipa, who had no head or neck; and Hondius, in his map, marks the place with the figures of theſe monſters. Yet De ‡ Laet rejects the ſtory; being informed by other hands, that the inhabitants of the banks of the Caora, a river that flows out of the lake of Caſſipa, have their head ſo far ſunk between their ſhoulders, that many believed they had their eyes in their ſhoulders and their mouths in their breaſts.

‡ Deſcript. Amer. l. 17 c. 22.

But though the exiſtence of a nation of *Acephali* be ill warranted, naturaliſts furniſh ſeveral inſtances of individuals born without heads, by ſome luſus or aberration of nature. Wepfer gives || a catalogue of ſuch acephalous births, from Schenckius, Licetus, Paræus, Wolfius, Mauriceau, &c.

|| In Eph. Ger. dec. 1. an. 3. obſ. 129. p. 184. Dec. 2. an. 9. obſer. 148. p. 258.

ACEPHALUS, an obſolete term for the tænia * or tape-worm, which was long ſuppoſed to be acephalous. The firſt who gave it a head, was Tulpius; and after him, Fehr: The former even makes it *biceps*, or two-headed.

* See *Tænia*.

ACEPHALUS, is alſo uſed to expreſs a verſe defective in the beginning.

ACER, the maple-tree; a genus of plants, of the monœcia order, belonging to the polygamia claſs. Of this genus there are ten

Species. 1. The pſeudo platanus, improperly called the *ſycamore*, is a very large and beautiful tree, with broad leaves divided into five lobes, ſerrated in their edges; of a dark-green colour on the upper ſide, but paler and ſomewhat hoary underneath; the flowers are very ſmall, and of a greeniſh white colour. The fruit is large, and beautifully variegated with green and purple. This ſpecies is a native of Germany; but thrives very well in Britain, where it is frequent in plantations. It is very proper for making plantations near the ſea, or ſheltering ſuch as are already too near it, becauſe the ſycamore-tree reſiſts the ſpray of the ocean much better than moſt other trees. It has however this inconvenience, that its leaves are devoured by inſects, ſo as to become full of holes and very unſightly, which has cauſed the planting of it to be much neglected of late. 2. The campeſtre, or common maple, is too well known to need any particular account; it growing very frequently, in hedge-rows, in moſt parts of Britain. The timber of the common mapple is far ſuperior to beech for all uſes of the turner; particularly for diſhes, cups, trenchers, *&c.* When it abounds with knots, as it frequently does, it is highly eſteemed by joiners for inlayings. It is alſo often employed in making muſical inſtruments, on account of its lightneſs; and for the whiteneſs of its wood was formerly eſteemed for making tables, &c. 3. The negundo, or Virginian aſh-leaved maple, is a very ſtrong ſhooting tree; and in Virginia, where it is a native, is one of the largeſt trees of this kind. It muſt be planted in places not too much expoſed to violent winds, being ſubject to ſplit thereby. 4. The platanoides, or Norway maple, grows naturally in Norway, Sweden, and other Northern countries in Europe: it riſes to a good height; and is well furniſhed with branches, with ſmooth leaves, of a ſhining green colour, divided in the form of an hand. Theſe have an acrid milky juice, which prevents them from being preyed upon by inſects as the ſycamore is; and as this ſpecies reſiſts the ſpray of the ſea equally with the firſt, it is preferred in plantations ſituated near the ſea. 5. The rubrum, or Virginian ſcarlet flowering maple, is a native of that country, and never grows to a large ſize in Britain. It is, however, cultivated in gardens for the beauty of its flowers, which appear in the beginning of April, in roundiſh bunches, at the bottom of the footſtalks of the leaves. The ſeeds are ripe in five or ſix weeks after; and ought to be immediately ſown, being otherwiſe very apt to periſh. The tree ought to be ſheltered, eſpecially whilſt young, from the north-eaſt winds; it delights in a moiſt light ſoil, where it will thrive much better, as well as produce many more flowers and much better ſeeds, than in a dry ground. A variety of this tree is known in England by the name of *Sir Charles Wager's Flowering Maple*, from its being firſt ſent from America to Sir Charles Wager. The flowers of this kind come out in larger cluſters than the other, and ſurround the ſmall branches, ſo that the tree appears entirely covered with them, and makes a much more beautiful appearance than the former,

mer, which now is not ſo much eſteemed. 6. The ſaccharinum, or American ſugar-maple, ſo called from a coarſe kind of ſugar being obtained from its juice by the inhabitants of North America *, grows to a large ſize. When young, it very much reſembles the Norway maple: but as it grows up, the leaves become more deeply divided, and their ſurfaces leſs ſmooth; they are, beſides, preyed upon by inſects, like the ſycamore; by which circumſtances the two ſpecies are eaſily diſtinguiſhed. 7. The Penſylvanicum, or American mountain-maple, very much reſembles the ſugar-maple, only its leaves are more pointed. 8. The opalus, or Italian maple, is very common in moſt parts of Italy, particularly about Rome; but in Britain is very rarely to be met with, though hardy enough to bear the open air. It is one of the largeſt ſpecies of trees in Italy, and affords a great ſhade by its numerous and large leaves. On this account it is planted on the road-ſides, and near habitations. 9. The monſpeſulanum, or Montpelier maple, is common in the ſouth of France, and in Italy; but is hardly met with in Britain. The leaves reſemble thoſe of the common maple; but are of a much thicker ſubſtance, a ſhining green colour, and not ſo large. They continue in verdure very late in the autumn, which renders the trees more valuable. 10. The creticum, or Cretan maple, grows naturally in the Levant; it ſomewhat reſembles the laſt ſpecies; but its leaves are of a much thinner texture, and their footſtalks covered with a ſoft hairy down; whereas thoſe of the other are ſmooth and ſoft.

Culture. All theſe ſpecies are propagated either by ſeeds or cuttings. If the firſt method is choſen, the ſeeds ſhould be ſown in autumn, ſoon after they are ripe, in a bed of common earth, covering them about half an inch thick with light mould. If they cannot be ſown in autumn, they muſt be put into ſand to preſerve their growing quality; for if kept dry till the ſpring, the ſeeds often fail, or at leaſt lie a whole year in the ground before they vegetate. The ſeeds ought alſo to be ſown in a ſheltered ſituation; becauſe moſt ſorts of maple, eſpecially thoſe which come from America, are very impatient of heat while young; and if the young plants are expoſed to the ſun but one day, few of them will ſurvive; being inſtantly attacked by inſects, which in that ſhort time devour their ſeed-leaves, after which the plants drop to the ground. This is moſt eſpecially remarkable in the American ſugar-maple. When the plants come up, they muſt be kept free from weeds, and in the following autumn tranſplanted into the nurſery, where they may grow two or three years, and then be planted where they are to remain. If maple-trees are to be propagated by cuttings, they ſhould be planted in autumn, if the ground is dry; but where the ſoil is cold and moiſt, the ſpring ſeaſon is preferable. If cut from the trees before the buds begin to ſwell, and the ground is not then fit to receive them, they may be wrapped in moſs, and put in a cool place, where they will keep a month or five weeks without injury; but the trees propagated from cuttings are not ſo valuable as thoſe from ſeeds, becauſe they ſeldom grow ſo large or ſo upright. Moſt, if not all the ſpecies of maples, take well by inoculation, or ingrafting on each other. Some of them are plain, and others variegated or ſtriped with different colours, which by the means juſt now mentioned may be eaſily intermixed.

ACERB, a ſour rough aſtringency of taſte, ſuch as that of unripe fruit.

ACERENZA. See Cirenza.

ACERNO, a town of Italy, in the citerior principality of Naples, with a biſhop's ſee. It is 17 miles S. W. of Conza, and 12 N. E. of Salerno. E. long. 15. 46. N. lat. 40. 50.

ACERNUM, a town of the Picentini, (Pliny;) now Acerno.

ACERRA, in antiquity, an altar erected, among the Romans, near the gate of a perſon deceaſed, on which his friends daily offered incenſe till his burial.—The Chineſe have ſtill a cuſtom like this: they erect an altar to the deceaſed in a room hung with mourning; and place an image of the dead perſon on the altar, to which every one that approaches it bows four times, and offers oblations and perfumes.

The *Acerra* alſo ſignified a little pot wherein were put the incenſe and perfumes to be burnt on the altars of the gods and before the dead. It appears to have been the ſame with what was otherwiſe called *thuribulum*, and *pyxis*.

We find mention of *Acerræ* in the ancient church. The Jews had alſo their *Acerræ*, in our verſion rendered *cenſers;* and the Romaniſts ſtill retain them under the name of *incenſe-pots*. In Roman writers, we frequently meet with *plena acerra*, a full acerra: to underſtand which, it is to be obſerved, that people were obliged to offer incenſe in proportion to their eſtate and condition; the rich in larger quantities, the poor only a few grains; the former poured out *acerras* full on the altar, the latter took out two or three bits with their fingers.

ACCERA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavoro; ſeated on the river Agno, 7 miles N. E. of Naples, and 20 S. W. of Benevento. E. Lon. 15. 10. N. lat. 40. 55.

ACCERRÆ, the ancient name of a town on the Clanius, in Campania, not far from Naples, (Virgil;) now Accerra.—The name alſo of another town, (Plutarch, Polybius,) now called *la Girola*, in the territory and to the ſouth-eaſt of Lodi, where the rivulet Serio falls into the Adda, to the weſt of Cremona and north of Placentia.

ACETABULUM, in antiquity, a meaſure uſed by the ancients, equal to one-eighth of our pint. It ſeems to have acquired its name from a veſſel in which acetum or vinegar was brought to their tables, and probably contained about this quantity.

Acetabulum, in anatomy, a cavity in any bone for receiving the protuberant head of another, and thereby forming that ſpecies of articulation called *enarthroſis*. See Anatomy, n° 2, c.

Acetabulum, in botany, the trivial name of a ſpecies of the peziza, or cup-peziza, a genus belonging to the cryptogamia fungi of Linnæus. It has got the name of *acetabulum*, from the reſemblance its leaves bear to a cup. See Peziza.

ACETARY. Nehemiah Grew, in his anatomy of plants, applies this term to a pulpy ſubſtance in certain fruits, *e. g.* the pear, which is incloſed in a congeries of ſmall calculous bodies towards the baſe of the fruit, and is always of an acid taſte.

ACETIFICATION, a term uſed by chemiſts for the making of vinegar.

*ce Sugar.

Acetoſa, or Sorrel.

ACETOSA, Sorrel; by Linnæus joined to the genus of Dock, under the title of *Rumex:* but as the plants have long been uſed in the kitchen, and ſometimes in the ſhops, under the title of *Sorrel,* we chuſe to preſerve it; eſpecially as, according to his method, they ſeem more properly ranked in his 22d claſs, intitled *Diœcia*.—Of this genus there are reckoned eight

Species. 1. The pratenſis, or common ſorrel, grows naturally in paſture-grounds in moſt places of England and Scotland, ſo requires no deſcription. It is alſo cultivated in gardens for culinary uſes, where it produces large leaves, though it is generally ſmall when growing in the fields. It is a perennial plant, and with proper management will continue many years. Its acidity gives it a conſiderable medicinal virtue in all putrid diſeaſes *; and formerly an eſſential ſalt was extracted from it by evaporating the juice of the freſh plant. This was, however, very difficult to procure, and yielded only in ſmall quantity; twenty pounds of the plant affording little more than two ounces of ſalt. What was worſe, the ſalt when thus procured was inferior in virtue to the plant itſelf; ſo that this preparation is now entirely diſuſed. This plant is fit for uſe all the year round. 2. The acetoſella, or ſheep's ſorrel, grows naturally on dry banks, and on gravelly ground, where by its creeping roots it proves a very troubleſome weed, ſo is not admitted into gardens. It poſſeſſes the ſame medicinal virtues with the former. 3. The ſcutata, round-leaved garden or French ſorrel, is a more grateful acid than either of the former; ſo is preferably cultivated for culinary uſes. About Paris it is cultivated in almoſt as great quantity as any other eſculent plant. It has alſo been much cultivated in England ſince the introduction of French cookery; being an ingredient in many of their ſauces and ſoups. 4. The digyna, or low creeping ſorrel, grows naturally in the northern counties of England, Wales, and Scotland. The leaves have very ſhort footſtalks, are indented at both ends, and thick in proportion to their ſize. They grow near the ground, and ſeldom riſe above ſix inches high. The roots creep in the ground, whereby it multiplies exceedingly in a proper ſituation. It is ſometimes preſerved in gardens for the ſake of variety, but is not uſed in the kitchen, though it is applicable to the ſame purpoſes with the other ſpecies. 5. The alpina, or alpine ſorrel, is full as hardy as the common, and fitter for the uſe of the kitchen, as having larger and more ſucculent leaves, of an equally grateful acid taſte. 6. The veſicaria, or American annual ſorrel, is kept in ſome gardens for variety, but is not of any uſe. It is a native of America and Egypt. 7. The roſea, or Egyptian ſorrel, grows naturally only in that country; it has its name from the bladders of the ſeeds being of a fine roſe colour. 8. The clunaria, or ſorrel-tree, is a native of the Canary Iſlands, and riſes with a ſtrong woody ſtalk to the height of 10 or 12 feet. It is frequently kept in Britain in gardens. 9. The ſterilis, or northern barren ſorrel, is uſed for culinary purpoſes; and is preferable to the common kind, very rarely running to ſeed, and being fit for uſe all the year round.

Culture. Moſt ſpecies of ſorrel may be propagated either by ſeeds, ſown early in the ſpring on a moiſt ſhady border; or by parting the roots, either in ſpring or autumn. The plants raiſed from the ſeeds, however, are more vigorous than thoſe propagated from cuttings. They ought to be placed at a good diſtance from one another, ſo as to allow of digging the ground about each plant. French ſorrel, particularly, ſpreads its roots ſo much, that the plants ought not to be placed at leſs than two feet diſtance from one another. It agrees better with an open ſituation than ſuch as are natives of Britain. As the ſeed neither of French ſorrel nor of the ſorrel-tree ripens well in England, they can only be propagated from cuttings. The French ſorrel thrives beſt on ſtony land, as it grows naturally on rocks. The ſorrel-tree requires to be houſed in winter, being unable to live in hard froſt. If the cuttings are planted in a ſhady border any time in ſummer, and duly ſupplied with water, they will ſoon put out roots: upon which they muſt be immediately taken up, and planted in pots; for if permitted to remain in the border, they will ſoon grow ſo vigorous as to render their tranſplanting hazardous. When planted in pots, they ſhould be placed in the ſhade, until they are again rooted; then they may enjoy the open air till October, when the froſts begin to be ſharp; at which time they ſhould be carried into the green-houſe, and treated in the ſame way as myrtles or other hardy green-houſe plants.

ACETOSELLA. See Oxalis.

ACETOUS, an epithet applied to ſuch ſubſtances as are ſour or partake of the nature of vinegar.

ACETUM, vinegar, the vegetable acid of the chemiſts. See Vinegar; and Materia Medica, nº 71. with the references *ib.*

Acetum *Diſtillatum,* diſtilled vinegar, or ſpirit of vinegar. See Pharmacy, nº 682.

Acetum *Eſuriens,* a diſtilled vinegar, rectified by the help of verdigreaſe. It has obtained this name, becauſe concentrated vinegar creates an appetite.

Acetum *Radicatum,* is likewiſe uſed to denote concentrated vinegar; but Boerhaave thinks the *tartarus regeneratus* is the *acetum radicatum* of the old chemiſts.

ACGIAH-SARAI, a town on the north ſhore of the Caſpian ſea.

ACH, or Ache, in medicine, a term uſed for any ſevere pain; as Head-ach, Tooth-ach, &c.

ACHÆANS, the inhabitants of Achaia Propria †, a Peloponneſian ſtate. This republic was not conſiderable in early times, for the number of its troops, nor for its wealth, nor for the extent of its territories; but it was famed for its probity, its juſtice, and its love of liberty. Its high reputation for theſe virtues was very ancient. The Crotonians and Sybarites, to re-eſtabliſh order in their towns, adopted the laws and cuſtoms of the Achæans. After the famous battle of Leuctra, a difference aroſe betwixt the Lacedæmonians and Thebans, who held the virtue of this people in ſuch veneration, that they terminated the diſpute by their deciſion. The government of the Achæans was democratical. They preſerved their liberty till the time of Philip and Alexander. But in the reign of thoſe princes, and afterwards, they were either ſubject to the Macedonians, who had made themſelves maſters of Greece, or oppreſſed by cruel tyrants. The Achæan commonwealth conſiſted of twelve inconſiderable towns in Peloponneſus. Its firſt annals are not marked by any great action, for they are not graced with one eminent character. After the death of Alexander, this little republic was a prey to all the evils which flow from political diſcord. A zeal for the good of the community was now extinguiſhed. Each town was only attentive to its private intereſt. There was no longer any ſtability in the ſtate; for it changed its maſters with every revolution in Macedonia. Towards the 124th Olympiad, about the time when Ptolemy Soter died, and when Pyrrhus invaded Italy, the republic of the Achæans recovered its old inſtitutions and unanimity. The inhabitants of Patra and of Dymæ were the firſt aſſertors of ancient liberty. The tyrants were baniſhed, and the towns again made one commonwealth. A public council was inſtituted, in which affairs of importance were diſcuſſed and determined. A regiſter was appointed to record the tranſactions of the council. This aſſembly had two preſidents, who were nominated alternately by the different towns. But inſtead of two preſidents, they ſoon elected but one. Many neighbouring towns which admired the conſtitution of this republic, founded on equality, liberty, the love of juſtice, and of the public good, were incorporated with the Achæans, and admitted to the full enjoyment of their laws and privileges.—The arms which the Achæans chiefly uſed, were ſlings. They were trained to the art from their infancy, by ſlinging from a great diſtance, at a circular mark of a moderate circumference. By long practice they took ſo nice an aim, that they were ſure, not only to hit their enemies on the head, but on any part of the face they choſe. Their ſlings were of a different kind from thoſe of the Balearians, whom they far ſurpaſſed in dexterity.

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* See Materia Medica, nº 69.

† See Achaia.

ACHÆI, (Achæans); the inhabitants of Achaia Propria. In Livy, the people of Greece; for the moſt part called *Achivi*, by the Roman poets. In Homer, the general name for Grecians.

ACÆMENES, according to Herodotus, was father of Cambyſes, and grandfather of Cyrus the firſt, king of Perſia. Moſt of the commentators of Horace are of opinion, that the Achæmenes whom that poet mentions, ode xii. of his 2d book, was one of the Perſian monarchs: but, if that were true, he muſt have reigned before the Medes ſubdued the Perſians; for we do not hear of any king of that name from the time that the Perſians founded that great monarchy, which is looked upon as the ſecond univerſal one. However this be, the epithet *Achæmenians* is frequently given to the Perſians, in the old Latin poets.

ACHÆMENES, ſon of Darius I. king of Perſia, and brother of Xerxes, had the government of Egypt beſtowed on him, after Xerxes had forced the Egyptians to return to their allegiance. He ſome time after commanded the Egyptian fleet in the celebrated expedition which proved ſo fatal to all Greece. The Egyptians having again taken up arms after the death of Xerxes, Achæmenes was ſent into Egypt to ſuppreſs the rebellion; but was vanquiſhed by Inarus, chief of the rebels, ſuccoured by the Athenians.

ACHÆUS, couſin-german to Seleucus Ceraunus and Antiochus the Great, kings of Syria, became a very powerful monarch, and enjoyed the dominions he had uſurped for many years; but at laſt he was puniſhed for his uſurpations in a dreadful manner, in the 140th year of Rome, as related by Polybius *.

* Lib. viii. 5, 6.

ACHAIA, a name taken for that part of Greece which Ptolemy calls *Hellas*; the younger Pliny, *Græcia*; now called *Livadia*: bounded on the north by Theſſaly, the river Sperchius, the Sinus Maliacus, and mount Oeta; on the weſt by the river Achelous; on the eaſt, turning a little to the north, it is waſhed by the Archipelago, down to the promontory of Sunium; on the ſouth, joined to the Peloponneſus, or Morea, by the iſthmus of Corinth, five miles broad. See LIVADIA.

ACHAIA PROPRIA, anciently a ſmall diſtrict in the north of Peloponneſus, running weſtward along the bay of Corinth, and bounded on the weſt by the Ionian Sea, on the ſouth by Elis and Arcadia, on the eaſt by Sicyonia: inhabitants, the *Achæans* *, properly ſo called; its metropolis, *Patræ*. It is now called *Romania Alta*, in the Morea.

* See *Achæans*.

Achaia was alſo taken for all thoſe countries that joined in the Achæan league, reduced by the Romans to a province. Likewiſe for Peloponneſus.

ACHAIÆ PRESBYTERI, or the Preſbyters of Achaia, were thoſe who were preſent at the martyrdom of St Andrew the apoſtle, A. D. 59; and are ſaid to have written an epiſtle in relation to it. Bellarmin, and ſeveral other eminent writers in the church of Rome, allow it to be genuine; while Du Pin, and ſome others, expreſsly reject it.

ACHAIUS, ſon of Ethwin, was raiſed to the crown of Scotland after the death of Soluatius, A. D. 788. The emperor Charlemagne ſent an embaſſy to deſire an alliance with him againſt the Engliſh, whoſe pirates ſo infeſted the ſeas, that the merchants could not carry on their trade. This alliance was concluded in France upon conditions ſo advantageous to the Scots, that Achaius, to perpetuate the memory of it, added to the arms of Scotland a double field ſowed with lilies. He died in 819.

ACHAN, the ſon of Carmi, of the tribe of Judah, at the taking of Jericho concealed two hundred ſhekels of ſilver, a Babyloniſh garment, and a wedge of gold, contrary to the expreſs command of God. This ſin proved fatal to the Iſraelites, who were repulſed at the ſiege of Ai. In this dreadful exigence, Joſhua proſtrated himſelf before the Lord, and begged that he would have mercy upon his people. Achan was diſcovered by caſting lots, and he and his children were ſtoned to death. This expiation being made, Ai was taken by ſtratagem. Joſh. vii. 8, 9.

ACHARACA, anciently a town of Lydia, ſituate between Tralles and Nyſa; in which were the temple of Pluto, and the cave Charonium, where patients ſlept in order to obtain a cure.

ACHAT, in law, implies a purchaſe or bargain. And hence probably purveyors were called *Achators*, from their making bargains.

ACHATES, the companion of Eneas, and his moſt faithful friend, celebrated in Virgil.

ACHATES, (Sil. Italicus); a river of Sicily, now the *Drillo*, (Cluverius); which runs from north to ſouth, almoſt parallel with, and at no great diſtance from, the Gela; and riſes in the north of the territory of Noto. It gave name to the Achates, or Agate, ſaid to be firſt found there.

ACHAZIB, or ACHZIB, a town of Galilee, in the tribe of Aſher, nine miles from Ptolemais.---Alſo a town in the more ſouthern parts of the tribe of Judah.

ACHELOUS, in fabulous hiſtory, wreſtled with

Hercules, for no leſs a prize than Deianira, daughter to king Oenus: but as Achelous had the power of aſſuming all ſhapes, the conteſt was long dubious: at laſt, as he took that of a bull, Hercules tore off one of his horns; ſo that he was forced to ſubmit, and to redeem it by giving the conqueror the horn of Amalthea, the ſame with the Cornucopia or horn of plenty; which Hercules having filled with a variety of fruits, conſecrated to Jupiter. Some explain this fable, by ſaying, That Achelous is a winding river of Greece, whoſe ſtream was ſo rapid, that it roared like a bull, and overflowed its banks; but Hercules, by bringing it into two channels, broke off one of the horns, and ſo reſtored plenty to the country. *See the next article.*

Achelous, a river of Acarnania; which riſes in mount Pindus, and, dividing Ætolia from Acarnania, falls from north to ſouth into the Sinus Corinthiacus. It was formerly called *Thoas*, from its impetuoſity, and *king of rivers*, (Homer.) The epithet *Acheloius* is uſed for *Aqueus*, (Virgil); the ancients calling all water *Achelous*, eſpecially in oaths, vows, and ſacrifices, according to Ephorus: Now called *Aſpro Potamo.* Rivers are by the ancient poets called *Tauriformes*, either from the bellowing of their waters, or from their ploughing the earth in their courſe: Hercules, reſtraining by dykes and mounds the inundations of the *Achelous*, is ſaid to have broken off one of his horns, and to have brought back plenty to the country. *See the preceding article.*

Achelous, a rivulet of Theſſaly, running by the city Lamia, (Strabo, Pauſanias.) Alſo a river of Peloponneſus, running by Dymæ, in Achaia, (Strabo); and by mount Lycæus in Arcadia, (Pauſanias.)

ACHERI (Luke d') a learned Benedictine of the congregation of St Maur, was born at St Quintin, in Picardy, in 1609; and made himſelf famous by printing ſeveral works, which till then were only in manuſcript: particularly, The epiſtle attributed to St Barnabas; The works of Lanfrank, archbiſhop of Canterbury; A collection of ſcarce and curious pieces, under the title of Spicilegium, *i. e.* Gleanings, in thirteen volumes, quarto. The prefaces and notes, which he annexed to many of theſe pieces, ſhew him to be a man of genius and abilities. He had alſo ſome ſhare in the pieces inſerted in the firſt volumes of The acts of the ſaints of the order of St Bennet, the title whereof acquaints us that they were collected and publiſhed by him and father Mabillon. After a very retired life, till the age of 73, he died at Paris the 29th of April 1685, in the abbey of St Germain in the fields, where he had been librarian.

ACHERON, a river of Epirus. The poets feigned it to have been the ſon of Ceres, whom ſhe hid in hell for fear of the Titans, and turned into a river, over which ſouls departed were ferried in their way to Elyſium.

Acheron, a river of Theſprotia, in Epirus; which, after forming the lake Acheruſia, at no great diſtance from, falls into the ſea near, the promontory of Chimerium, to the weſt of the Sinus Ambracius, in a courſe from north to ſouth.

Acheron, or Acheros, a river of the Bruttii in Italy, running from eaſt to weſt; where Alexander king of Epirus was ſlain by the Lucani, being deceived by the oracle of Dodona, which bid him beware of Acheron.

ACHERNER, in aſtronomy, a ſtar of the firſt magnitude in the ſouthern extremity of the conſtellation Eridanus. It longitude is 11°. 48″. 20″. of Piſces, and its latitude 32°. 46″. 3′. S.

ACHERUSIA PALUS, a lake between Cumæ and the promontory Miſenum, now *il Lago della Collucia*, (Cluverius.) Some confound it with the *Lacus Lucrinus*, and others with the *Lacus Averni*. But Strabo and Pliny diſtinguiſh them. The former takes it to be an effuſion, exundation, or waſhes of the ſea, and therefore called by Lycophron, Αχηρυσια χυσις.—Alſo a lake of Epirus, through which the Acheron runs.—There is alſo an *Acheruſia*, a peninſula of Bithynia on the Euxine, near Heraclea; and a cave there of the ſame name, through which Hercules is fabled to have deſcended to hell to drag forth Cerberus.

ACHIA, a kind of cane that grows in the Eaſt Indies, which is pickled green in the country, with ſtrong vinegar, pepper, and ſome other ſpice and ingredients. This pickle comes to Europe in a ſort of earthen jars, about a foot high, and the ſame in breadth, growing narrower at the mouth. The bits of cane are an inch and a half in diameter, and a little above two inches long, almoſt of the ſame conſiſtency with pickled cucumbers. They are of a pale yellow colour; and, inſtead of pulps, their inſide is a cloſe, fibrous ſubſtance, like that of the common canes when the outſide coat is off. The Dutch bring home great quantities of this pickle, which their cold climate makes them think wholſome. They generally eat it towards the end of their meals, judging it very good to quicken the appetite, and ſtrengthen the ſtomach.

ACHIAR, is a Malayan word, which ſignifies all ſorts of fruits and roots pickled with vinegar and ſpice. The Dutch import from Batavia all ſorts of achiar, which the Chineſe make after the manner of the Malayans; but particularly that of bamboe, a kind of cane, extremely thick, which grows in the Eaſt-Indies, and is preſerved there, whilſt it is ſtill green, with very ſtrong vinegar and ſpice. This is called Bamboe-achiar. The name changes according to the fruit with which the achiar is made.

ACHILLÆA, Yarrow, Milfoil, or Nosebleed; a genus of the order of the polygamia ſuperflua, belonging to the ſyngeneſia claſs of plants. The following are the principal

Species. 1. The millefolium, or common yarrow, is found naturally on banks, and by the ſides of footpaths, in moſt parts of England. It moſt commonly bears white flowers, though a variety of it is found which bears purple ones. Theſe, however, do not long continue to bear flowers of this colour, if tranſplanted into gardens. It was formerly uſed in medicine; but though it may ſtill have a place in ſome diſpenſatories, no phyſician of any note expects any virtue from it, or ever preſcribes it. It creeps greatly by its roots, and alſo multiplies by the ſeeds, ſo that it becomes a troubleſome weed where it is once allowed to get a footing. The cultivation of it is recommended by Mr Anderſon, in his Eſſays on Agriculture, as a proper food for cattle. 2. The ſantolina, or eaſtern ſneezwort, is ſometimes cultivated in gardens; it has large yellow flowers, which ſtand upon pretty long footſtalks placed ſingly, not in bunches as in the common kind. It has leaves like lavender-cotton, which, when rubbed, emit a ſtrong oily odour. The flowers appear in June and July. 3. The tomentoſa, or woolly yarrow, is a native of the ſouth of France and Spain, but lives in the open air in England. The flowers are of a bright yellow, and continue long in beauty, growing in cluſters at the top of the ſtalks, which ſeldom riſe above a foot high. The leaves are finely cut, and very hoary. 4. The abrotanifolia, or tall eaſtern yarrow, is a native of the iſlands in the Archipelago: it grows to the height of two feet and a half, with large umbels of yellow flowers on the top; the leaves reſemble thoſe of the common wormwood, and are cut into long narrow ſegments. 5. The clavenna, or Alpine umbelliferous wormwood, takes its name from the mountains of which it is a native. It ſeldom grows above ſix or ſeven inches in height; it ſupports umbels of white flowers, like thoſe of the common ſneezwort, which appear in April and May. The leaves are ſilvery, and ſhaped like thoſe of wormwood, which often decay in the autumn and winter. 6. The tanacetifolia, or eaſtern ſneezwort, with tanſey leaves, is a very humble plant, ſeldom riſing above ſix inches in height. The flowers are nearly as large as thoſe of the common ſneezwort, white, and growing in flat umbels. They appear in June and July. The leaves of the plant have ſome likeneſs to thoſe of the common wormwood, are very hoary, grow cloſe to the ground, and decay in autumn ſo as to make little appearance in winter. Like the laſt ſpecies, this is a native of the Alps. 7. The ageratum, or ſweet maudlin, was formerly much uſed in medicine and for culinary purpoſes; but has now fallen ſo much into neglect as to be totally unknown in the markets; ſo that when it is demanded, the white maudlin is ſubſtituted in its ſtead. The reaſon of this ſubſtitution was, that the latter is more hardy and eaſily propagated than the ſweet maudlin, which is apt to rot in wet winters. The common maudlin flowers in June and July, and the ſeeds are ripe in September. 8. The Egyptiaca, or hoary ſneezwort, is a native of the Archipelago. It hath very hoary leaves, which remain all the year; and the plants growing cloſe and low, make a pretty appearance at all ſeaſons. The flowers are yellow, and are produced in umbels on the top of the ſtalks; they appear in June, and continue till the end of September. 9. The ptarmica, or common ſneezwort, grows wild in the woods, and other ſhady places, in many parts of England; ſo is not admitted into gardens. There is a variety, however, with double flowers, which is preſerved in gardens, and is commonly known by the name of double maudlin. This ſpecies creeps greatly by the roots, ſo as ſoon to overſpread a large ſpot of ground. If planted in pots, ſo as to confine its roots from creeping, the ſtalks grow cloſe together, and make a tolerable appearance when in flower; but when at a diſtance, ſo that the roots have full liberty to run, the flowers appear but indifferently. 10. The macrophylla, or Alpine ſneezwort, with feverfew leaves, is a native of the Alps. It produces many ſtalks riſing near three feet high; having looſe branching umbels of white flowers on their top, reſembling thoſe of the common ſneezwort, but larger. 11. The nana, or hoary Alpine milfoil, is likewiſe a native of the Alps; the leaves are hoary, and the umbels of its flowers are more compact than the former; the ſtalks do not riſe more than a foot high. 12. The nobilis, or ſweet milfoil, approaches to the nature of the common milfoil; but its leaves are of a paler green, and are neither ſo long nor ſo much cut off as thoſe of the common milfoil are: they have a ſtrong ſweet ſcent when bruiſed. 13. The alpina, or white maudlin, bears ſome reſemblance to the common ſneezwort; but the leaves are longer, of a deeper green colour, and deeply indented in their edges; the flowers are white, and the roots creep far under ground. The plant will riſe, in good land, to the height of four feet.

Pl. II. fig. 1.

Culture. All the ſorts of yarrow are eaſily propagated by ſeeds, which may be ſown either in the ſpring or autumn, upon a bed of common earth. When the plants come up, and are ſtrong enough for tranſplanting, they ſhould be planted in beds in the nurſery, where they may continue till autumn, when they ſhould be tranſplanted to the places where they are to remain. The Archipelago kinds, however, are often deſtroyed by ſevere froſt; ſo they ought to be ſheltered during the winter. Theſe kinds alſo rarely bring their ſeeds to perfection in England; they are therefore to be propagated by ſlips, which may be taken off and planted in a ſhady border any time in ſummer, when they will take root in about ſix weeks, and then may be tranſplanted where they are to remain.

Achillæa, a name frequently given by the ancients to the gum called dragons-blood. See Dragons-blood.

ACHILLEID, Achilleis, a celebrated poem of Statius, in which that author propoſed to deliver the whole life and exploits of Achilles; but being prevented by death, he has only treated of the infancy and education of his hero. See Statius.

ACHILLES, in fabulous hiſtory, one of the greateſt heroes of ancient Greece, was the ſon of Peleus and Thetis. He was a native of Phthia, in Theſſaly; and, according to the poets, his mother fed him by day with ambroſia, and by night covered him with celeſtial fire. She dipped him alſo in the waters of the river Styx, by which his whole body became invulnerable, except that part of his heel by which ſhe held him; and afterwards intruſted him to the care of the centaur Chiron, who, to give him the ſtrength neceſſary for martial toil, fed him with honey, and the marrow of lions and wild boars, &c. To prevent his going to the ſiege of Troy, ſhe diſguiſed him in female apparel, and hid him among the maidens at the court of king Lycomedes: but Ulyſſes diſcovering him, perſuaded him to follow the Greeks. Achilles diſtinguiſhed himſelf by a number of heroic actions at the ſiege. Being diſguſted, however, with Agamemnon for the loſs of Briſeis, he retired from the camp. But returning to avenge the death of his friend Patroclus, he ſlew Hector, faſtened his corpſe to his chariot, and dragged it round the walls of Troy. At laſt Paris, the brother of Hector, wounded him in the heel with an arrow, while he was in the temple treating about his marriage with Philoxena, daughter to king Priam. Of this wound he died, and was interred on the promontory of Sigæum; and after Troy was taken, the Greeks ſacrificed Philoxena on his tomb. It is ſaid, that Alexander, ſeeing this tomb, honoured it by placing a crown upon it; at the ſame time crying out, that "Achilles was happy in having, during his life, "ſuch a friend as Patroclus; and, after his death, a "poet like Homer." Achilles is ſuppoſed to have died 1183 years before the Chriſtian æra.

Achilles Tatius. See Tatius.

Tendo Achillis, in anatomy is a ſtrong tendinous cord formed by the tendons of ſeveral muſcles, and inſerted into the os calcis *. It has its name from the fatal wound Achilles is ſaid to have received in that part from Paris the ſon of Priam.

ACHILLINI (Alexander), born at Bologna, and doctor of philoſophy in that univerſity. He flouriſhed in the 15th and 16th centuries, and by way of eminence was ſtyled the Great Philoſopher. He was a ſtedfaſt follower and accurate interpreter of Averroes upon Ariſtotle, but moſt admired for his acuteneſs and ſtrength of arguing in private and public diſputations. He made a ſurpriſing quick progreſs in his ſtudies, and was very early promoted to a profeſſorſhip in the univerſity, in which he acquitted himſelf with ſo much applauſe that his name became famous throughout all Italy. He continued at Bologna till the year 1506; when the univerſity of Padua made choice of him to ſucceed Antonio Francatiano in the firſt chair of philoſophy, and his fame brought vaſt numbers of ſtudents to his lectures at Padua: but the war, wherein the republic of Venice was engaged againſt the league of Cambray, putting a ſtop to the lectures of that univerſity, he withdrew to his native country, where he was received with the ſame marks of honour and diſtinction as before, and again appointed profeſſor of philoſophy in Bologna. He ſpent the remainder of his life in this city, where he died, and was interred with great pomp in the church of St Martin the Great, which belongs to the Carmelite friars. Jovius, who knew Achillini, and heard his lectures, ſays, that he was a man of ſuch exceeding ſimplicity, and ſo unacquainted with addreſs and flattery, that he was a laughing-ſtock to the pert and ſaucy young ſcholars, although eſteemed on account of his learning. He wrote ſeveral pieces on philoſophical ſubjects, which he publiſhed, and dedicated to John Bentivogli.

Achillini (Claudius), grandſon of the former, read lectures at Bologna, Ferrara, and Parma; where he was reputed a great philoſopher, a learned divine, an excellent lawyer, an eloquent orator, a good mathematician, and an elegant poet. He accompanied Cardinal Ludovino, who went as legate into Piedmont; but being afterward neglected by this cardinal, when he became pope under the name of Gregory XV. he left Rome in diſguſt, and retired to Parma; where the duke appointed him profeſſor of law, with a good ſalary. He publiſhed a volume of Latin Letters, and another of Italian Poems, which gained him great reputation: he died in 1640, aged 66.

ACHIOTTE, or Achiotl, a foreign drug, uſed in dying, and in the preparation of chocolate. It is the ſame with what the French commonly call *Rocou*, and the Dutch *Orleane*. It has been commonly eſteemed a kind of argilla, or earth; but later obſervers find it a flower, or ſeed of a tree *, which grows chiefly in very hot countries, as Yucutan, or Campechy, and Guatimala. It is about the ſize of a plumb-tree, only more tufted; its branches being longer than the trunk. The fruit is incloſed in a rind like a cheſnut, except that it is of an oval figure. It begins to open croſſwiſe from the middle to the top; and ſubdivides into four parts, having in the middle a beautiful carnation-coloured flower. The tree has no leaves; but inſtead thereof ſhoots out filaments like thoſe of ſaffron, only bigger and longer. Between theſe grow little ſoft vermilion-coloured grains, about the ſize of pepper-corns; which the Indians, ſeparating from the filaments, bake in cakes of about half a pound each; in which form the drug is brought into Europe. The poor people uſe Achiotte inſtead of ſaffron: others mix it as an ingredient in chocolate, during the grinding of the cacoa, the quantity of two drams to a pound, to give it a reddiſh colour, *&c.* though this practice was formerly more frequent than at preſent, the opinion of its being an earth, which even Mr Ray fell into, having diſcredited its uſe. Some alſo uſe it to dye wax of a vermilion colour. Phyſicians hold it a good cordial, and preſervative againſt ſuppreſſion of urine. F. Labat deſcribes the achiotte ſomewhat differently; eſpecially the preparation of it for dying. The tree, according to him, produces yearly its crops of flowers, of a carnation colour; not unlike wild roſes. Theſe are ſucceeded by a kind of rough pods, or fruit reſembling cheſnuts, full of ſmall grains; which being fermented in water, and this water afterwards paſſed through a carribbe ſieve, it contracts a red colour. It is then boiled, ſcummed, ſet on the fire again, and ſtirred; till at length it thickens, and will fall looſe from the ſpatula; which is the Achiotte or Rocou in perfection; though to make it more beautiful, they have two further proceſſes, which are deſcribed by F. Labat *. According to Savary, to procure the Achiotte, they ſhake out the grains in an earthen veſſel, ſoak and then waſh them in ſeveral repeated warm waters, till they have diſcharged all their vermilion colour: after which, letting the water ſtand to ſettle, the fecula at the bottom is taken and formed into little cakes and balls; which when pure, and not adulterated either with red earth, or fine brick-duſt, are highly valued. Some alſo uſe fire to boil the Achiotte, and give it a farther conſiſtence.

ACHISH, king of Gath, to whom David retired; and who gained a complete victory over Saul, which was fatal both to that prince and his ſon Jonathan.

AHITOPHEL, a counſellor, who, revolting from David king of Iſrael, ſided with his rebellious ſon Abſalom; to whom he gave crafty advice, which not being complied with, he hanged himſelf.

ACHLAR, a river of the greater Armenia, otherwiſe called *Araſs*, *Caiacz*, and by the ancients *Araxis*.

ACHMETSCHET, a town of the peninſula of the Crimea, the reſidence of the ſultan Galga, who is eldeſt ſon of the Khan of Tartary. Long. 51. 20. Lat. 45. 0.

ACHMET, ſon of Sarim, has left a book concerning the interpretation of dreams according to the doctrine of the Indians, Perſians, and Egyptians, which was tranſcribed out of Greek into Latin by Leo Tuſcus in 1160. He lived in the 9th century.

ACHMET GEDUC, a famous general under Mahomet II. and Bajazet II. in the 15th century. When Mahomet II. died, Bajazet and Zezan both claimed the throne: Achmet ſided with the former, and by his bravery and conduct fixed the crown on his head. But Bajazet took away his life; ſhining virtue being always an unpardonable crime in the eyes of a tyrant.

ACHONRY, a ſmall town of Ireland, in the province of Connaught and county of Sligo, ſeated on the river Shannon.

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* See *Anatomy*, n°65, b.

* *viz.* The mitella diphylla. See *Mitella*.

* Mem. Trev. p. 637.

ACHOR, a valley of Jericho, lying along the river Jordan, not far from Gilgal; ſo called from Achan, the troubler of Iſrael, being there ſtoned to death.

Achor, in medicine. Trallian ſays it is a ſore on the outſide of the head, full of little perforations, which diſcharge a humour like ichor, whence its name. He further ſays, that the cerion reſembles an achor; but that the mouths of the perforations are larger, reſembling the cells of a honey-comb, whence the name; the matter is alſo nearly of the conſiſtence of thin honey. When theſe diſeaſes ſpread, the ſerum which ouzes out dries, and forms a ſcab.—The achor differs from the favus and tinea only in the degree of virulence. It is called *favus* when the perforations are large, and *tinea* when they are like thoſe which are made by moths in cloth. But generally by tinea is underſtood a dry ſcab on the hairy ſcalp of children, with thick ſcales and an offenſive ſmell. When this diſorder affects the face, it is called *cruſta lactea;* which, when it happens to children, if in other reſpects they are healthy, the beſt treatment, beſides keeping the belly moderately lax, is cleanlineſs and a moderate diet; an iſſue may be made, and continued till the diſorder is cleared and the ſtrength of the conſtitution is eſtabliſhed, keeping the hair ſhort and waſhing the head with ſoap ſuds.—Some inſtances of this ſort are very difficult of cure, and attended with violent itching, a pale countenance, &c. but ſtill the ſame method generally ſucceeds in all the ſpecies and degrees of virulence. Small doſes of calomel [†] may be given as an alterative, rather than as a laxative; and the vin. antim. [‡] in ſuch doſes, at proper intervals, as the ſtomach will eaſily retain. Externally, the unguent è pice [||] may be uſed two or three times in a week, or cream mixed with ſalt in fine powder. If the humour is repelled, give warm ſudorifics until it return.—Writers of medical obſervations afford divers anomalous inſtances of achores, *viz.* Some found even in aged people; ſome not on the head, but the feet; others reſembling the venereal diſeaſe; others which diſappeared upon cutting the hair, and returned on its growing anew; others followed by a thickneſs of hearing, others by pannics, and others by a gutta ſerena. Their drying up has ſometimes been followed by a fever, their repulſion inwards by an epilepſy.

ACHRADINA, (Plutarch, Cicero, Livy); one of the four cities or diviſions of Syracuſe, and the ſtrongeſt, largeſt, and moſt beautiful part of it; ſeparated by a very ſtrong wall from the outer town, *Tycha* and *Neapolis*. It was adorned with a very large forum, with beautiful porticos, a moſt elegant prytaneum, a ſpacious ſenate-houſe, and a ſuperb temple of Jupiter Olympius. (Plutarch.)

ACHRAS. See Sapota.

ACHROMATIC an epithet expreſſing want of colour. The word is Greek, being compounded of α privative, and *χρωμια colour*.

Achromatic *Teleſcopes*. See Optics, n° 20.

ACHYR, a ſtrong town and caſtle of the Ukarin, ſubject to the Ruſſians ſince 1667. It ſtands on the river Uorſklo near the frontiers of Ruſſia, 127 miles W. of Kiow, Long. 36. 0. Lat. 49. 32.

ACHRYANTHES, in botany, a genus of the pentandria order, belonging to monogynia claſs of plants. There are ſeven ſpecies, all natives of the Indies. Only one of them, the amaranthus, is commonly cultivated in botanical gardens, and that more for the ſake of variety than beauty. This ſpecies grows to the height of three feet, with oblong pointed leaves. The flowers come out in long ſpikes from the extremities of the branches, and appear in July, the ſeeds ripening in September. Plants of this kind muſt be reared in a hot-bed, and may be tranſplanted when they have acquired ſufficient ſtrength. If kept in pots, and ſheltered during the winter in a warm green-houſe, they will live two or three years.

ACHZIB. See Achazib.

ACICULÆ, the ſmall pikes or prickles of the hedge-hog, echinus marinus, &c.

ACIDALUS, a fountain in Orchomenus a city of Bœotia, in which the Graces, who are ſacred to Venus, bathed. Hence the epithet *Acidalia*, given to Venus, (Virgil.)

ACIDS, ſubſtances which give a ſour, ſharp, or tart taſte. Among the chemiſts, the acid ſalts are diſtinguiſhed into the nitrous, vitriolic, muriatic, and vegetable. See Chemistry, n° 22, 76, 103.

Acids, in the Materia Medica, are ſuch medicines as poſſeſs an acid quality See Mat. Med. n° 10.

ACIDALIUS (Valens,) would, in all probability, have been one of the greateſt critics in theſe latter ages, had he lived longer to perfect thoſe talents which nature had given him. He was born at Witſtock, in Brandenburg; and having viſited ſeveral academies in Germany, Italy, and other countries, where he was greatly eſteemed, he afterwards took up his reſidence at Breſlaw, the metropolis of Sileſia. Here he remained a conſiderable time, in expectation of ſome employment; but nothing offering, he turned Roman-catholic, and was choſen rector of a ſchool at Nieſſa. It is related, that about four months after, as he was following a proceſſion of the hoſt, he was ſeized with a ſudden phrenzy; and being carried home, expired in a very ſhort time. But Thuanus tells us, that his exceſſive application to ſtudy was the occaſion of his untimely death; and that his ſitting up a-nights in compoſing his Conjectures on Plautus, brought upon him a diſtemper which carried him off in three days, on the 25th of May 1595, being juſt turned of 28. He wrote a Commentary on Quintus Curtius; alſo, Notes on Tacitus, on the Twelve Panegyrics; beſides ſpeeches, letters, and poems. His poetical pieces are inſerted in the *Deliciæ* of the German poets, and conſiſt of epic verſes, odes, and epigrams. A little piece, printed in 1595, under the title of *Mulieres non eſſe homines*, "That women were not of the human ſpecies," was falſely aſcribed to him. But the fact was, that Acidalius happening to meet with the manuſcript, and thinking it very whimſical, tranſcribed it, and gave it to the bookſeller, who printed it. The performance was highly exclaimed againſt, inſomuch that the bookſeller being ſeized, he diſcovered the perſon who gave him the manuſcript, and a terrible outcry was made againſt Acidalius. A ſtory goes, that being one day to dine at a friend's houſe, there happened to be ſeveral ladies at table, who ſuppoſing him to be the author, were moved with ſo much indignation, that they threatened to throw their plates at his head. Acidalius, however, ingeniouſly diverted their wrath. In his opinion, he ſaid, the

[†] See *armacy*, 762.

[‡] Ibid. 366.

[||] Ibid. 913, b.

the author was a judicious perſon, the ladies being certainly more of the ſpecies of *angels* than of *men*.—Mr Baillet has given him a place among his *Enfans Celebres;* and ſays, that he wrote a comment upon Plautus when he was but 17 or 18 years old, and that he compoſed ſeveral Latin poems at the ſame age.

ACIDITY, that quality which renders bodies acid.

ACIDULÆ. Mineral waters that contain a briſk ſpirit, when unaccompanied with heat, are thus named; but if they are hot alſo, they are called *thermæ* [*].

ACIDULATED, a name given to medicines that have an acid in their compoſition

ACILA, (Strabo;) OCILA, (Pliny;) and OCELIS, (Ptolemy;) a ſtaple or mart town in Arabia Felix, on the Arabic gulf, from which, according to Pliny, they ſet ſail for India. Now *Ziden*.

ACILIUS GLABRIO (Marcus), conſul in the year of Rome 562, and 211 years before the Chriſtian æra, diſtinguiſhed himſelf by his bravery and conduct in gaining a complete victory over Antiochus the Great, king of Syria, at the Streights of Thermopylæ in Theſſaly, and on ſeveral other occaſions. He built the Temple of Piety at Rome, in conſequence of a vow he made before the above-mentioned battle; and the reaſon of his giving it that name, is very remarkable. The ſtory is mentioned by Pliny, Valerius Maximus, and others [†].

ACINIPPO, a town of Bætica, (Pliny;) its ruins, called *Ronda la Viega*, are to be ſeen near Arunda, in the kingdom of Granada.

ACINUS, or ACINI, the ſmall protuberances of mulberries, ſtrawberries, &c. and by ſome applied to grapes. Generally it is uſed for thoſe ſmall grains growing in bunches, after the manner of grapes, as Leguſtrum, &c.

ACIS, in fabulous hiſtory, the ſon of Faunus and Simetheis, was a beautiful ſhepherd of Sicily, who being beloved by Galatea, Polyphemns the giant was ſo enraged, that he daſhed out his brains againſt a rock; after which Galatea turned him into a river, which was called by his name.

ACIS, (Ovid, Theocritus); a river of Sicily, running from a very cold ſpring, in the woody and ſhady foot of mount Ætna, eaſtward into, and not much above a mile from, the ſea, along green and pleaſant banks, with the ſpeed of an arrow, from which it takes its name. It is now called *Aci Iaci*, or *Chiaci*, according to the different Sicilian dialects: Antonine calls it *Acius*. Alſo the name of a hamlet at the mouth of the *Acis*.

ACKNOWLEDGMENT, in a general ſenſe, is a perſon's owning or confeſſing a thing; but, more particularly, is the expreſſion of gratitude for a favour.

ACKNOWLEDGMENT-*Money*, a certain ſum paid by tenants, in ſeveral parts of England, on the death of their landlords, as an acknowledgment of their new lords.

ACLIDES, in Roman antiquity, a kind of miſſive weapon, with a thong affixed to it, whereby to draw it back. Moſt authors deſcribe it as a ſort of dart or javelin; but Scaliger makes it roundiſh or globular, with a ſlender wooden ſtem to poiſe it by.

ACLOWA, in botany, a barbarous name of a ſpecies of colutea; ſee COLUTEA. It is uſed by the natives of Guinea to cure the itch: They rub it on the body, as we do unguents.

ACME, the top or height of any thing. It is uſually applied to the maturity of an animal juſt before it begins to decline; and phyſicians have uſed it to expreſs the utmoſt violence or criſis of a diſeaſe.

ACMONIA, and AGMONIA, in Peutinger's map, a town of Phrygia Major, now in ruins. The inhabitants are called *Acmonenſes* by Cicero, and the city *Civitas Acmonenſis*. Alſo a city of Dacia, (Ptolemy,) on the Danube, near the ruins of Trajan's bridge, built by Severus, and called *Severicum;* diſtant 12 German miles from Temeſwar, to the ſouth-eaſt.

ACNIDA, VIRGINIAN HEMP, in botany, a genius of the diœcia order, belonging to the pentandria claſs of plants. There is only one ſpecies of it, *viz.* the acnida canabina. It is a native of Virginia; but rarely cultivated in Europe, except for the ſake of variety. It has little beauty, and at preſent is applied to no uſeful purpoſe.

ACNUA, in Roman antiquity, ſignified a certain meaſure of land, near about the Engliſh rood, or fourth part of an acre.

ACOEMETÆ, or ACOEMETI, in church-hiſtory; or, Men who lived without ſleep; a ſet of monks who chaunted the divine ſervice night and day in their places of worſhip. They divided themſelves into three bodies, who alternately ſucceeded one another, ſo that their churches were never ſilent. This practice they founded upon the precept, *Pray without ceaſing*. They flouriſhed in the eaſt about the middle of the 5th century. There are a kind of acoemeti ſtill ſubſiſting in the Roman church, *viz.* the religious of the holy ſacrament, who keep up a perpetual adoration, ſome one or other of them praying before the holy ſacrament day and night.

ACOLUTHI, or ACOLUTHISTS, in antiquity, was an appellation given to thoſe perſons who were ſteady and immoveable in their reſolutions: and hence the ſtoics, becauſe they would not forſake their principles, nor alter their reſolutions, acquired the title of Acoluthi. The word is Greek, and compounded of α, priv. and κολευθος, way; as never turning from the original courſe.

ACOLUTHI, among the ancient Chriſtians, implied a peculiar order of the inferior clergy in the Latin church; for they were unknown to the Greeks for above 400 years. They were next to the ſub-deacon; and we learn from the fourth council of Carthage, that the archdeacon, at their ordination, put into their hands a candleſtick with a taper, giving them thereby to underſtand that they were appointed to light the candles of the church; as alſo an empty pitcher, to imply that they were to furniſh wine for the euchariſt. Some think they had another office, that of attending the biſhop wherever he went. The word is Greek, and compounded of α, priv. and κωλυω, to hinder or diſturb.

ACOLYTHIA, in the Greek church, denotes the office or order of divine ſervice; or the prayers, ceremonies, hymns, &c. whereof the Greek ſervice is compoſed.

ACOMA, a town of North America, in New Mexico, ſeated on a hill, with a good caſtle. To go into the town, you muſt walk up 50 ſteps cut out of the rock. It is the capital of that province, and was taken by the Spaniards in 1599. W. Long. 104. 15. Lat. 35. 0.

ACOMAC, the name of a county in Virginia. It is on the eaſtern ſide of Cheſepeak bay, on a ſlip of land, by the Virginians called the *eaſtern ſhore*. It is

[*] See *Water*.

[†] See the article *Piety*.

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Plate II.

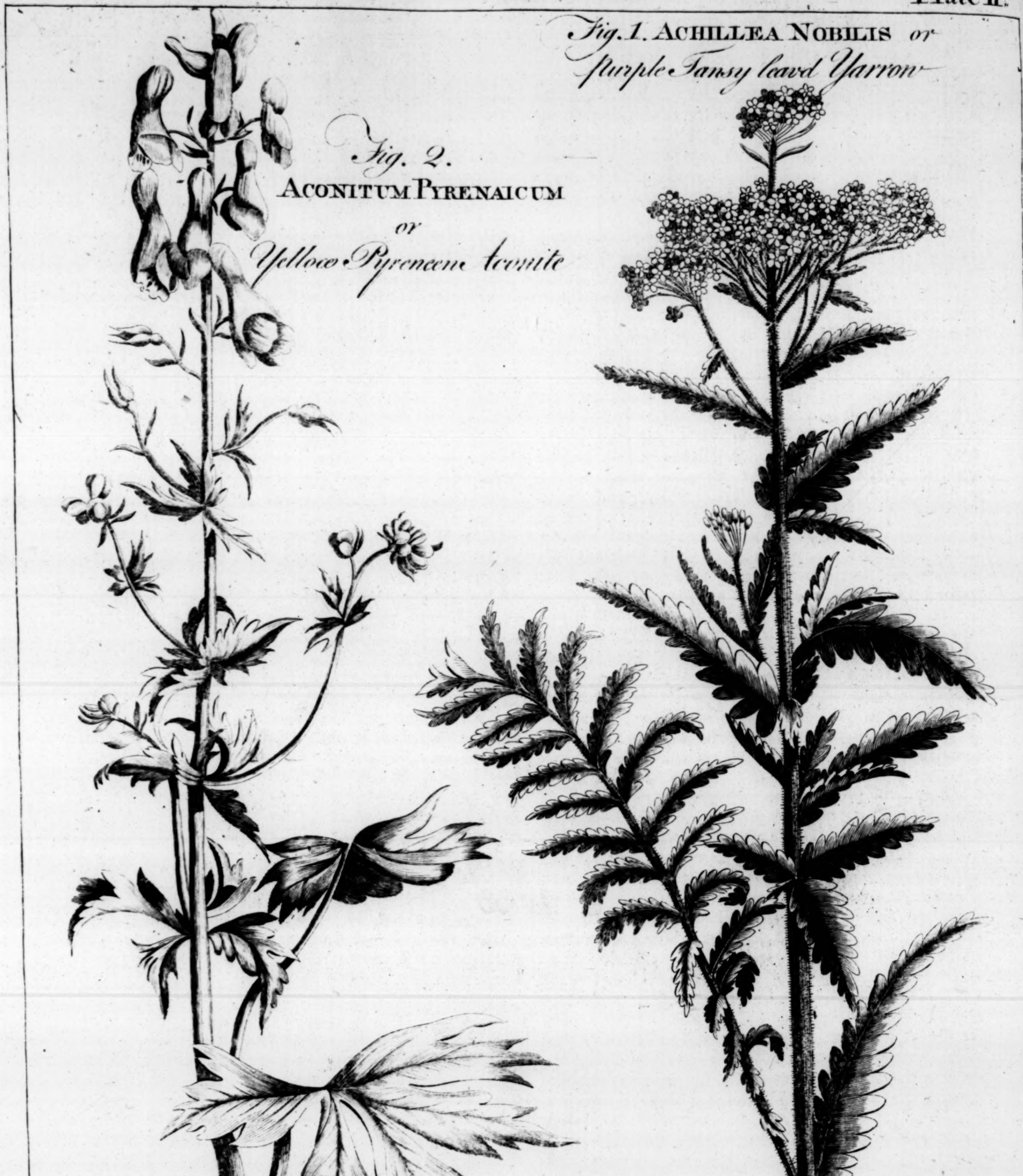

Fig. 1. ACHILLEA NOBILIS or Purple Tansy leav'd Yarrow

Fig. 2. ACONITUM PYRENAICUM or Yellow Pyreneen Aconite

A. Bell Sculp.

a large county, and yet contains but one pariſh, the inhabitants being but thin at preſent, and ſcattered up and down in diſtinct ſettlements.

ACOMINATUS (Nicetas), was ſecretary to Alexius Comnenus and to Iſaacus Angelus ſucceſſively: he wrote an hiſtory from the death of Alexius Comnenus in 1118, where Zonaras ended his, to the year 1203, which has undergone many impreſſions, and is much applauded by the beſt critics.

ACONITUM, Aconite, Wolfsbane, or Monkshood; a genus of the trigynia order, belonging to the polyandria claſs of plants. There are 10

Species. 1. The lycoctonum, or yellow wolfsbane, grows upwards of three feet high, flowers about the middle of June, and if the ſeaſon is not warm will continue in flower till Auguſt. 2. The altiſſimum, or greateſt yellow wolfsbane, grows upwards of four feet high, and the ſpikes of its flower are much longer in this ſort than the former. 3. The variegatum, or leſſer wolfsbane, ſeldom grows more than two feet high; it carries blue flowers, and the ſpikes of them are much ſhorter than either of the two laſt. 4. The anthora, or wholeſome wolfsbane, flowers in the middle of Auguſt, and often continues in beauty till the middle of September; its flowers are not large, but are of a beautiful ſulphur-yellow colour. 5. The napellus, bears large blue flowers, which appear in Auguſt, and make a pretty appearance. There are two or three varieties of this kind; one with white, another with roſe-coloured, and a third with variegated flowers; but theſe are only varieties which often change. 6. The pyramidale, or common blue monkſhood, bears a long ſpike of blue flowers, which appear ſooner than any of the other ſorts, being ſo early as June, or ſometimes even May. The ſpikes of flowers are upwards of two feet long, ſo that it makes a pretty appearance; the ſeeds are ripe in September. 7. The alpinum, or large-flowered monkſhood, flowers in Auguſt, and will grow to the height of five feet in good ground; the flowers are very large, of a deep blue colour, but not many upon each ſpike. 8. The pyrenaicum, or Pyrenean monkſhood, flowers in July. It grows about four feet high, and carries a long ſpike of yellow flowers. 9. The cammarum, grows about four feet high, and flowers in the beginning of July. 10. The orientale, or eaſtern monkſhood, grows ſometimes more than ſix feet high, and bears a white flower.

II. fig. 2.

Culture. All theſe ſpecies, except the laſt, are natives of the Alps, the mountains of Germany, Auſtria, and Tartary; ſo require a cool ſhady ſituation, except the wholeſome wolfsbane, which muſt have an open expoſure. They thrive better in a moiſt than dry ſoil; but the ground muſt not be ſo wet as to have the water ſtanding near their roots in the winter-time. They may all be propagated by ſowing their ſeeds in autumn, upon a north border, where they are ſcreened from the ſun. The plants will come up in the ſpring, when they muſt be kept clean from weeds during the ſummer-months; and, in very dry ſeaſons, if they are frequently refreſhed with water, their growth will be greatly promoted. The following autumn they ſhould be tranſplanted into ſhady borders, in rows a foot aſunder, and the plants ſix inches diſtant from one another. In this ſituation they may remain two years, when they will carry flowers, and ſo may be tranſplanted to thoſe places where they are to remain. The eaſtern monkſhood is a native of the Levant, from whence the ſeeds of it were firſt ſent by Dr Tournefort to the royal garden at Paris, from whence ſome other gardens have been furniſhed with the ſeeds. It is very rare in Europe at preſent.

Qualities. All theſe ſpecies of plants are poiſonous, except the anthora, which has been ſaid to be an antidote to the reſt. This, however, reſts on the ſingle authority of Matthiolus; from whom others have implicitly and confidently copied this particular: but till the efficacy of this antidote is eſtabliſhed by repeated trials, made by experienced phyſicians, we apprehend it ought not to be mentioned; as the mentioning an antidote of this kind may occaſion the neglect of other more powerful remedies. Of the effects of this, however, and other vegetable poiſons, medical writers give but a confuſed account. In general, thoſe which are not of the narcotic kind, nor excite violent vomitings and purgings, produce their pernicious effects by irritating the nervous coats of the ſtomach and inteſtines, ſo as to occaſion violent convulſions, not only in them, but through the whole body. The proper cure is evacuation by vomit: but this is not to be obtained without ſome difficulty; becauſe there is uſually ſuch a contraction about the upper orifice of the ſtomach, that nothing can either be ſwallowed or thrown up. In this caſe, an infuſion of tobacco has been recommended, and may probably be of ſervice: for being itſelf of a very ſtimulating nature, it may for a moment take off the violent ſpaſms occaſioned by the poiſon; in which caſe, a violent vomiting will immediately enſue.—The ſtomach being thoroughly emptied, and deglutition rendered eaſy, the cure may be completed by oily and mucilaginous medicines. On account of the poiſonous qualities of monkſhood, no ſpecies of it ſhould be planted where children have acceſs, leſt they ſhould ſuffer by putting the leaves or flowers in their mouths, or rubbing them about their eyes; for the juice of the leaves will occaſion great diſorder by being only rubbed upon very tender fleſh; and the farina of the flowers, when blown into the eyes, cauſes them to ſwell greatly.

Aconitum *Hyemale*. See Helleborus.

ACONTIAS, in zoology, an obſolete name of the anguis jaculus, or dart-ſnake, belonging to the order of amphibia ſerpentes. See Anguis.

ACONTIUM, ακοντιον, in Grecian antiquity, a kind of dart or javelin, reſembling the Roman pilum.

ACONTIUS (James), a philoſopher, civilian, and divine, born at Trent in the 16th century: he embraced the reformed religion; and, coming into England in the reign of queen Elizabeth, was much honoured by her, which he acknowledges in a book dedicated to that queen. This work is his celebrated Collection of the Stratagems of Satan, which has been ſo often tranſlated, and borne ſo many editions.

ACORN, the fruit of the oak-tree. See Quercus.

Acorn, (in ſea-language,) a little ornamental piece of wood, faſhioned like a cone, and fixed on the uppermoſt point of the ſpindle, above the vane, on the maſthead. It is uſed to keep the vane from being blown off from the ſpindle in a whirlwind, or when the ſhip leans much to one ſide under ſail.

ACORUS, Calamus Aromaticus, Sweet Flag, or Sweet Rush; a genus of the monogynia order, belonging

Acorus, or Sweet Flag.

longing to the hexandria claſs of plants, of which only one ſpecies is known. It grows naturally in ſhallow ſtanding waters, and is found wild in ſome parts of Britain. The leaves are ſometimes two feet long, narrow, compreſſed, ſmooth, and of a bright green, terminating in a point; the root is pretty long, of a whitiſh, reddiſh, and partly greeniſh colour. Among the leaves there ariſes a ſingle one, thicker and more robuſt than the reſt, furrowed on the ſurface, and of a paler green. On this grow frequently two ſpikes of flowers, by many writers called *juli*. Theſe are of a brown colour, having a chequered ſurface. The root of this plant has a very agreeable flavour, which is greatly improved by drying. It is reckoned carminative and ſtomachic, having a warm, pungent, bitteriſh taſte; ſo is frequently uſed as an ingredient in bitters *. It has been complained of, however, as communicating a nauſeous flavour to thoſe bitters in which it was infuſed; and Neumann obſerves, that its agreeable flavour, as well as its diſtinguiſhing taſte, reſide entirely in a volatile eſſential oil; the reſiduum after diſtillation having a nauſeous flavour, not at all reſembling that of the calamus.—The Turks candy the roots, and imagine them a preſervative againſt contagion. They are uſually imported from the Levant into Britain; though thoſe of our own country might anſwer equally well. Neither horſes, cows, goats, ſheep, or ſwine, will eat the herb, or its roots.

* See *Materia Medica*, nº 194.

Acorus || Acouſtics.

Culture. The acorus being a perennial plant, may be tranſplanted into a garden, where it will thrive very well if the ground is moiſt; but never flowers unleſs it grows in water. It loves an open ſituation, and will not thrive well under the ſhade of trees. The flowers appear the latter end of June, and continue till Auguſt.

Acorus, in the materia medica, a name ſometimes given to the great galangal *.

* See Galangal; and *Mat. Med.* nº 194.

ACOUSMATICI, ſometimes alſo called *Acouſtici*, in Grecian antiquity, ſuch of the diſciples of Pythagoras as had not completed their five years probation.

ACOUSTIC, in general, denotes any thing that relates to the ear, the ſenſe of hearing, or the doctrine of ſounds.

Acoustic *Duct*, in anatomy, the ſame with meatus auditorius, or the external paſſage of the ear *.

* See *Anatomy*, nº 405, b.

Acoustic *Inſtrument*, or auricular tube. See Acoustics, nº 2^{d} 26.

Acoustic *Veſſels*, in the ancient theatres, were a kind of veſſels, made of braſs, ſhaped in the bell faſhion, which being of all tones within the pitch of the voice, or even of inſtruments, rendered the ſounds more audible, ſo that the actors could be heard through all parts of theatres, which were even 400 feet in diameter.

Acoustic *Diſciples*, among the ancient Pythagoreans, thoſe more commonly called *Acouſmatici*.

The *Science* of

ACOUSTICS

1 Diacouſtics.

2 Catacouſtics

INSTRUCTS us in the nature of ſound. It is divided by ſome writers into *Diacouſtics*, which explains the properties of thoſe ſounds that come directly from the ſonorous body to the ear; and *Catacouſtics*, which treats of reflected ſounds: but ſuch diſtinction does not appear to be of any real utility.

Chap. I. *Different Theories of Sound.*

3 Of the vehicles of ſound

Moſt ſounds, we all know, are conveyed to us on the boſom of the air. In whatever manner they either float upon it, or are propelled forward in it, certain it is, that, without the vehicle of this or ſome other fluid, we ſhould have no ſounds at all. Let the air be exhauſted from a receiver, and a bell ſhall emit no ſound when rung in the void; for, as the air continues to grow leſs denſe, the ſound dies away in proportion, ſo that at laſt its ſtrongeſt vibrations are almoſt totally ſilent.

4 Air not the only one.

Thus air is a vehicle for ſound. However, we muſt not, with ſome philoſophers, aſſert, that it is the only vehicle; that, if there were no air, we ſhould have no ſounds whatſoever: for it is found by trial, that ſounds are conveyed through water almoſt with the ſame facility with which they move through air. A bell rung in water returns a tone as diſtinct as if rung in our aerial atmoſphere. This was obſerved by Derham, who alſo remarked that the tone came a quarter deeper. Some naturaliſts aſſures us alſo, that fiſhes have a ſtrong perception of ſounds, even at the bottom of deep rivers (A). From hence, it would ſeem not to be very material in the propagation of ſounds, whether the fluid which conveys them be elaſtic or otherwiſe. Water, which, of all ſubſtances that we know, has the leaſt elaſticity, yet ſerves to carry them forward; and if we make allowance for the difference of its denſity, perhaps the ſounds move in it with a proportional rapidity to what they are found to do in the elaſtic fluid of air.

5 What ſound is, and how propagated.

One thing however is certain, that whether the fluid which conveys the note be elaſtic or non-elaſtic, whatever ſound we hear is produced by a ſtroke, which the ſounding body makes againſt the fluid, whether air or water. The fluid being ſtruck upon, carries the impreſſion forward ot the ear, and there produces its ſenſation. Philoſophers are ſo far agreed, that they all allow that ſound is nothing more than the impreſſion made by an elaſtic body upon the air or water, and this impreſſion carried along by either fluid to the organ of hearing. But the manner in which this conveyance is made, is ſtill diſputed: Whether the ſound is diffuſed into the air, in circle beyond circle, like the waves of water when we diſturb the ſmoothneſs of its ſurface by dropping in a ſtone; or whether it travels along, like rays diffuſed from a center, ſomewhat in the ſwift manner that electricity runs along a rod of iron; theſe are the queſtions which at preſent divide the learned.

6 Newton's theory.

Newton was of the firſt opinion. He has explained the progreſſion of ſound by an undulatory, or rather a vermicular, motion in the parts of the air. If we have an exact idea of the crawling of ſome inſects, we ſhall have a tolerable notion of the progreſſion of ſound upon this hypotheſis. The inſect, for inſtance, in its motion, firſt carries its contractions from the hinder part, in order

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(A) Others, however, deny this; aſſerting, that fiſhes are totally deaf. Nor have anatomiſts, from examining their organs of hearing, been able to pronounce with certainty upon the matter. See Fish; and Comparative *Anatomy*, nº 175.

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der to throw its fore part to the proper diſtance, then it carries its contractions from the fore part to the hinder to bring that forward. Something ſimilar to this is the motion of the air when ſtruck upon by a ſounding body. To be a little more preciſe, ſuppoſe ABC, the ſtring of an harpſichord ſcrewed to a proper pitch, and drawn out of the right line by the finger at B. We have elſewhere obſerved *, that ſuch a ſtring would, if let go, vibrate to E; and from E to D, and back again. We obſerved, that it would continue thus to vibrate like a pendulum for ever, if not externally reſiſted, and, like a pendulum, all its little vibrations would be performed in equal times, the laſt and the firſt being equally long in performing. We ſhewed alſo, that, like a pendulum, its greateſt ſwiftneſs would always be when it arrived at E, the middle part of its motion. Now then, if this ſtring be ſuppoſed to fly from the finger at B, it is obvious, that whatever be its own motion, ſuch alſo will be the motion of the parts of air that fly before it. Its motion, as is obvious, is firſt uniformly accelerated forward from B to E, then retarded as it goes from E to D, accelerated back again as it returns from D to E, and retarded from E to B. This motion being therefore ſent in ſucceſſion through a range of elaſtic air, it muſt happen, that the parts of one range of air muſt be ſent forward with accelerated motion, and then with a retarded motion. This accelerated motion reaching the remoteſt end of the firſt range will be communicated to a ſecond range, while the neareſt parts of the firſt range being retarded in their motion, and falling back with the receſſion of the ſtring, retire firſt with an accelerated, then with a retarded motion, and the remoteſt parts will ſoon follow. In the mean time, while the parts of the firſt range are thus falling back, the parts of the ſecond range are going forward with an accelerated motion. Thus there will be an alternate condenſation and relaxation of the air, during the time of one vibration; and as the air going forward ſtrikes any oppoſing body with greater force than upon retiring, ſo each of theſe accelerated progreſſions have been called by Newton a *pulſe* of ſound.

Thus will the air be driven forward in the direction of the ſtring. But now we muſt obſerve, that theſe pulſes will move every way; for all motion impreſſed upon fluids in any direction whatſoever, operates all around in a ſphere: ſo that ſounds will be driven in all directions, backwards, forwards, upwards, downwards, and on every ſide. They will go on ſucceeding each other, one on the outſide of the other, like circles in diſturbed water; or rather, they will lie one without the other, in concentric ſhells, ſhell above ſhell, as we ſee in the coats of an onion.

Different
Theories of
Sound.

All who have remarked the tone of a bell, while its ſounds are decaying away, muſt have an idea of the pulſes of ſound, which, according to Newton, are formed by the air's alternate progreſſion and receſſion. And it muſt be obſerved, that as each of theſe pulſes are formed by a ſingle vibration of the ſtring, they muſt be equal to each other; for the vibrations of the ſtring are known to be ſo.

Again, as to the velocity with which ſounds travel, this Newton determines, by the moſt difficult calculation that can be imagined, to be in proportion to the thickneſs of the parts of the air, and the diſtance of theſe parts from each other. From hence he goes on to prove, that each little part moves backward and forward like a pendulum; and from thence he proceeds to demonſtrate, that if the atmoſphere were of the ſame denſity every where as at the ſurface of the earth, in ſuch a caſe, a pendulum, that reached from its higheſt ſurface down to the ſurface of the earth, would by its vibrations diſcover to us the proportion of the velocity with which ſounds travel. The velocity with which each pulſe would move, he ſhews, would be as much greater than the velocity of ſuch a pendulum ſwinging with one complete vibration, as the circumference of a circle is greater than the diameter. From hence he calculates, that the motion of ſound would be 979 feet in one ſecond. But this not being conſonant to experience, he takes in another conſideration, which deſtroys entirely the rigour of his former demonſtration, namely, vapours in the air; and then finds the motion of ſound to be 1142 feet in one ſecond, or near 13 miles in a minute: a proportion which experience had eſtabliſhed nearly before.

7
Preceding
Theory oppoſed.

Thus much will ſerve to give an obſcure idea of a moſt obſcure theory; a theory which has met with numbers of oppoſers. Even John Bernouilli, Newton's greateſt diſciple, modeſtly owns that he did not pretend to underſtand this part of the *Principia*. He attempted therefore to give a more perſpicuous demonſtration of his own, that might confirm and illuſtrate the

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Note *on* N° 5th. *preceding page.*] Though air and water are both vehicles of ſound, yet neither of them ſeem to be ſo by themſelves, but only as they contain an exceedingly ſubtile fluid capable of penetrating the moſt ſolid bodies. Hence, by the medium of that fluid, ſounds can be propagated through wood, or metals, even more readily than through the open air. By the ſame means, deaf people may be made ſenſible of ſounds, if they hold a piece of metal in their mouth, one end of which is applied to the ſounding body. As it is certain, therefore, that air cannot penetrate metals, we muſt acknowledge the medium of ſound to be of a more ſubtile nature; and thus the electrical fluid will naturally occur as the proper one. But why then is ſound no longer heard in an exhauſted receiver, if the air is not the fluid by which it is conveyed, ſeeing the electrical matter cannot be excluded? The reply to this is obvious: The electrical fluid is ſo exceedingly ſubtile, and pervades ſolid bodies with ſo much eaſe, that any motion of a ſolid body in a quantity of electric matter by itſelf, can never excite a degree of agitation in it ſufficient for producing a ſound; but if the electric fluid is entangled among the particles of air, water, wood, metal, &c. whatever affects their particles will alſo affect this fluid, and produce an audible noiſe. In the experiment of the air-pump, however, there may be an ambiguity, as the gradual exhauſting of the air creates an increaſing difference of preſſure on the outſide, and may occaſion in the glaſs a difficulty of vibrating, ſo as to render it leſs fit to communicate to the air without the vibrations that ſtrike it from within. From this cauſe the diminution of ſound in an exhauſted receiver may be ſuppoſed to proceed, as well as from the diminution of the air. But if any internal agitation of its parts ſhould happen to the electrical fluid, exceeding loud noiſes might be propagated through it, as has been the caſe when large meteors have kindled at a great diſtance from the earth. Of this an inſtance is recorded in the Philoſophical Tranſactions by Dr Halley. (See Fire). It is alſo difficult to account for the exceeding great ſwiftneſs of ſound, upon the ſuppoſition that it is propagated by means of air alone; for nothing is more certain, than that the ſtrongeſt and moſt violent gale is, in its courſe, inert and ſluggiſh, compared with the motion of ſound.

the Newtonian theory. The ſubject ſeemed to reject elucidation: his theory is obviouſly wrong, as D'Alembert has proved in his Theory of Fluids. Euler, therefore, rejecting the Newtonian doctrine entirely, has attempted to eſtabliſh another; but as he has hitherto only given the reſult of his calculations, without the progreſſive proofs that confirm his opinion, the learned continue in ſuſpenſe as to the merit of his work.

8 The objections.

Various have been the objections that have been made to the Newtonian ſyſtem of ſounds. Firſt, it is urged, that if the firſt pulſe of ſound be driven by that which immediately follows, and that by the ſucceeding, and ſo on, it muſt then happen, that the more numerous the pulſes, the farther will the ſound be driven; ſo that a ſtring which vibrates the longeſt will be heard at the greateſt diſtance, which is contrary to known experience. Again, it is urged, that this theory can only agree with the motion of ſound in an elaſtic fluid, whereas ſounds are known to move forward through water that is not elaſtic. To explain their progreſs therefore through water, a ſecond theory muſt be formed: ſo that two theories muſt be made to explain a ſimilar effect; which is contrary to the ſimplicity of true philoſophy, for it is contrary to the ſimplicity of nature. It is ſtill farther urged, that this ſlow vermicular motion but ill repreſents the velocity with which ſounds travel, as we know by experience that it is almoſt 13 miles in a minute. In ſhort, it is urged, that ſuch undulations as have been deſcribed, when coming from ſeveral ſonorous bodies at once, would croſs, obſtruct, and confound each other; ſo that, if they were conveyed to the ear by this means, we ſhould hear nothing but a medley of diſcord and broken articulations. But this is equally with the reſt contradictory to experience, ſince we hear the fulleſt concert, not only without confuſion, but with the higheſt pleaſure. Theſe objections, whether well founded or not, have given riſe to another theory: which we ſhall likewiſe lay before the reader; though it too appears liable to objections, which ſhall be afterwards mentioned.

9 Another Theory.

Every ſound may be conſidered as driven off from the ſounding body in ſtraight lines, and impreſſed upon the air in one direction only; but whatever impreſſion is made upon a fluid in one direction, is diffuſed upon its ſurface into all directions: ſo that the ſound firſt driven directly forward ſoon fills up a wide ſphere, and is heard on every ſide. Thus, as it is impreſſed, it inſtantaneouſly travels forward with a very ſwift motion, reſembling the velocity with which we know electricity flies from one end of a line to another.

Now, as to the pulſes, or open ſhakes as the muſicians expreſs it, which a ſounding body is known to make, each pulſe (ſay the ſuporters of this theory) is itſelf a diſtinct and perfect ſound, and the interval between every two pulſes is profoundly ſilent. Continuity of ſound from the ſame body is only a deception of the hearing; for as each diſtinct ſound ſucceeds at very ſmall intervals, the organ has no time to tranſmit its images with equal ſwiftneſs to the mind, and the interval is thus loſt to ſenſe: juſt as in ſeeing a flaming torch, if flared round in a circle, it appears as a ring of fire. In this manner a beaten drum, at ſome ſmall diſtance, preſents us with the idea of continuing ſound. When children run with their ſticks along a rail, a continuing ſound is thus repreſented, though it need ſcarce be obſerved, that the ſtroke againſt each rail is perfectly diſtinct and inſulated.

According to this theory, therefore, the pulſes are nothing more than diſtinct ſounds repeated by the ſame body, the firſt ſtroke or vibration being ever the loudeſt, and travelling farther than thoſe that follow; while each ſucceeding vibration gives a new ſound, but with diminiſhed force, till at laſt the pulſes decay away totally, as the force decays that gives them exiſtence.

All bodies whatſoever that are ſtruck, return more or leſs a ſound: but ſome, wanting elaſticity, give back no repetition of the ſound; the noiſe is at once begotten and dies: while other bodies, however, there are, which being more elaſtic, and whoſe parts are capable of vibration, give back a ſound, and repeat the ſame ſeveral times ſucceſſively. Theſe laſt are ſaid to have a tone; the others are not allowed to have any.

This tone of the elaſtic ſtring, or bell, is notwithſtanding nothing more than a ſimilar ſound of what the former bodies produced, but with the difference of being many times repeated, while their note is but ſingle. So that, if we would give the former bodies a tone, it will be neceſſary to make them repeat their ſound, by repeating our blows ſwiftly upon them. This will effectually give them a tone, and even an unmuſical inſtrument has often had a fine effect by its tone in our concerts.

Let us now go on then to ſuppoſe, that by ſwift and equably continued ſtrokes we give any non-elaſtic body its tone, it is very obvious, that no alterations will be made in this tone by the quickneſs of the ſtrokes, though repeated ever ſo faſt. Theſe will only render the tone more equal and continuous, but make no alteration in the tone it gives. On the contrary, if we make an alteration in the force of each blow, a different tone will then undoubtedly be excited. The difference will be ſmall, it muſt be confeſſed; for the tones of theſe inflexible bodies are capable but of ſmall variation; however, there will certainly be a difference. The table on which we write, for inſtance, will return a different ſound when ſtruck with a club, from what it did when ſtruck only with a ſwitch. Thus non-elaſtic bodies return a difference of tone, not in proportion to the ſwiftneſs with which their ſound is repeated, but in proportion to the greatneſs of the blow which produced it; for in two equal non-elaſtic bodies, that body produced the deepeſt tone that was ſtruck by the greateſt blow.

We now then come to a critical queſtion, What is it that produces the difference of tone in two elaſtic ſounding bells or ſtrings? Or what makes one deep and the other ſhrill? This queſtion has always been hitherto anſwered by ſaying, that the depth or height of the note proceeded from the ſlowneſs and ſwiftneſs of the times of the vibrations. The ſloweſt vibrations, it has been ſaid, are qualified for producing the deepeſt tones, while the ſwifteſt vibrations produce the higheſt tones. In this caſe, an effect has been given for a cauſe. It is in fact the force with which the ſounding ſtring ſtrikes the air when ſtruck upon, that makes the true diſtinction in the tones of ſounds. It is this force, with greater or leſs impreſſions, reſembling the greater or leſs force of the blows upon a non-elaſtic body, which produces correſpondent affections of ſound. The greateſt forces produce the deepeſt ſounds: the high notes are the effect of ſmall efforts. In the ſame manner a bell, wide at ifferent ories of ound.

at the mouth, gives a grave ſound; but if it be very maſſy withal, that will render it ſtill graver; but if maſſy, wide, and long or high, that will make the tone deepeſt of all.

Thus, then, will elaſtic bodies give the deepeſt ſound, in proportion to the force with which they ſtrike the air: but if we ſhould attempt to increaſe their force by giving them a ſtronger blow, this will be in vain; they will ſtill return the ſame tone; for ſuch is their formation, that they are ſonorous only becauſe they are elaſtic, and the force of this elaſticity is not increaſed by our ſtrength, as the greatneſs of a pendulum's vibration will not be increaſed by falling from a greater height.

Thus far of the lengths of cords. Now as to the frequency with which they vibrate the deepeſt tones, it has been found, from the nature of elaſtic ſtrings, that the longeſt ſtrings have the wideſt vibrations, and conſequently go backward and forward ſloweſt; while, on the contrary, the ſhorteſt ſtrings vibrate the quickeſt, or come and go in the ſhorteſt intervals. From hence thoſe who have treated of ſounds, have aſſerted, as was ſaid before, that the tone of the ſtring depended upon the length or the ſhortneſs of the vibrations. This, however, is not the caſe. One and the ſame ſtring, when ſtruck, muſt always, like the ſame pendulum, return preciſely ſimilar vibrations; but it is well known, that one and the ſame ſtring, when ſtruck upon, does not always return preciſely the ſame tone: ſo that in this caſe the vibrations follow one rule, and the tone another. The vibrations muſt be invariably the ſame in the ſame ſtring, which does not return the ſame tone invariably, as is well known to muſicians in general. In the violin, for inſtance, they can eaſily alter the tone of the ſtring an octave or eight notes higher, by a ſofter method of drawing the bow; and ſome are known thus to bring out the moſt charming airs imaginable. Theſe peculiar tones are by the Engliſh fiddlers called *flute-notes*. The only reaſon that can be aſſigned for the ſame ſtring thus returning different tones, muſt certainly be the different force of its ſtrokes upon the air. In one caſe, it has double the tone of the other; becauſe upon the ſoft touches of the bow, only half its elaſticity is put into vibration.

This being underſtood (continue the authors of this theory) we ſhall be able clearly to account for many things relating to ſounds that have hitherto been inexplicable. Thus, for inſtance, if it be aſked, When two ſtrings are ſtretched together of equal lengths, tenſion, and thickneſs, how does it happen, that one of them being ſtruck, and made to vibrate throughout, the other ſhall vibrate throughout alſo? the anſwer is obvious: The force that the ſtring ſtruck receives is communicated to the air, and the air communicates the ſame to the ſimilar ſtring; which therefore receives all the force of the former; and the force being equal, the vibrations muſt be ſo too. Again, put the queſtion, If one ſtring be but half the length of the other, and be ſtruck, how will the vibrations be? The anſwer is, The longeſt ſtring will receive all the force of the ſtring half as long as itſelf, and therefore it will vibrate in proportion, that is, through half its length. In the ſame manner, if the longeſt ſtring were three times as long as the other, it would only vibrate in a third of its length; or if four times, in a fourth of its length. In ſhort, whatever force the ſmaller ſtring impreſſes upon the air, the air will impreſs a ſimilar force upon the longer ſtring, and partially excite its vibrations.

Different Theories of Sound.

10 EolianLyre. See Plate III. fig. 2.

From hence alſo we may account for the cauſe of thoſe charming, melancholy gradations of ſound in the Eolian lyre; an inſtrument (ſays Sir John Hawkins) lately obtruded upon the public as a new invention, tho' deſcribed above a century ago by Kircher *. This inſtrument is eaſily made, being nothing more than a long narrow box of thin deal, about 30 inches long, 5 inches broad, and 1¾ inches deep, with a circle in the middle of the upper ſide or belly about 1½ inch diameter, pierced with ſmall holes. On this ſide are ſeven, ten, or (according to Kircher) fifteen or more ſtrings of very fine gut, ſtretched over bridges at each end, like the bridge of a fiddle, and ſcrewed up or relaxed with ſcrew-pins (B). The ſtrings are all tuned to one and the ſame note; and the inſtrument is placed in ſome current of air, where the wind can bruſh over its ſtrings with freedom. A window with the ſaſh juſt raiſed to give the air admiſſion, will anſwer this purpoſe exactly. Now when the entering air blows upon theſe ſtrings with different degrees of force, there will be excited different tones of ſound; ſometimes the blaſt brings out all the tones in full concert; ſometimes it ſinks them to the ſofteſt murmurs; it feels for every tone, and by its gradations of ſtrength ſolicits thoſe gradations of ſound which art has taken different methods to produce.

We come now, in the laſt place, to conſider (by this theory) the loudneſs and lowneſs, or, as the muſicians ſpeak, the ſtrength and ſoftneſs, of ſounds. In vibrating elaſtic ſtrings, the loudneſs of the tone is in proportion to the deepneſs of the note; that is, in two ſtrings, all things in other circumſtances alike, the deepeſt tone will be loudeſt. In muſical inſtruments upon a different principle, as in the violin, it is otherwiſe; the tones are made in ſuch inſtruments, by a number of ſmall vibrations crowded into one ſtroke. The roſined bow, for inſtance, being drawn along a ſtring, its roughneſſes catch the ſtring at very ſmall intervals, and excite its vibrations. In this inſtrument, therefore, to excite loud tones, the bow muſt be drawn quick, and this will produce the greateſt number of vibrations. But it muſt be obſerved, that the more quick the bow paſſes over the ſtring, the leſs apt will the roughneſs of its ſurface be to touch the ſtring at every inſtant; to remedy this, therefore, the bow muſt be preſſed the harder as it is drawn quicker, and thus its fulleſt ſound will be brought from the inſtrument. If the ſwiftneſs of the vibrations in an inſtrument thus rubbed upon, exceed the force of the deeper ſound in another, then the ſwift vibrations will be heard at a greater diſtance, and as much farther off as the ſwiftneſs in them exceeds the force in the other.

11 The nature of Muſical Sounds illuſtrated according to the ſame theory.

By the ſame theory (it is alleged) may all the phenomena of muſical ſounds be eaſily explained.—The fables of the ancients pretend, that muſic was firſt found out by the beating of different hammers upon the ſmith's anvil. Without purſuing the fable, let us endeavour to explain the nature of muſical ſounds by a ſimilar me-

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* *Vide* Kircheri Muſurgia, lib. ix.

(B) The figure repreſents the inſtrument with ten chords; of which ſome direct only eight to be tuned uniſons, and the two outermoſt octaves below them. But this ſeems not to be material.

Of Muſical Sounds.

thod. Let us ſuppoſe an anvil, or ſeveral ſimilar anvils, to be ſtruck upon by ſeveral hammers of different weights or forces. The hammer, which is double that of another, upon ſtriking the anvil will produce a ſound double that of the other: this double ſound muſicians have agreed to call an Octave. The ear can judge of the difference or reſemblance of theſe ſounds with great eaſe, the numbers being as one and two, and therefore very readily compared. Suppoſe that an hammer three times leſs than the firſt, ſtrikes the anvil, the ſound produced by this will be three times leſs than the firſt: ſo that the ear, in judging the ſimilitude of theſe ſounds, will find ſomewhat more difficulty; becauſe it is not ſo eaſy to tell how often one is contained in three, as it is to tell how often it is contained in two. Again, ſuppoſe that an hammer four times leſs than the firſt ſtrikes the anvil, the ear will find greater difficulty ſtill in judging preciſely the difference of the ſounds; for the difference of the numbers four and one cannot ſo ſoon be determined with preciſion as three and one. If the hammer be five times leſs, the difficulty of judging will be ſtill greater. If the hammer be ſix times leſs, the difficulty ſtill increaſes, and ſo alſo of the ſeventh, inſomuch that the ear cannot always readily and at once determine the preciſe gradation. Now, of all compariſons, thoſe which the mind makes moſt eaſily, and with leaſt labour, are the moſt pleaſing. There is a certain regularity in the human ſoul, by which it finds happineſs in exact and ſtriking and eaſily-made compariſons. As the ear is but an inſtrument of the mind, it is therefore moſt pleaſed with the combination of any two ſounds, the differences of which it can moſt readily diſtinguiſh. It is more pleaſed with the concord of two ſounds which are to each other as one and two, than of two ſounds which are as one and three, or one and four, or one and five, or one and ſix or ſeven. Upon this pleaſure, which the mind takes in compariſon, all harmony depends. The variety of ſounds is infinite; but becauſe the ear cannot compare two ſounds ſo as readily to diſtinguiſh their diſcriminations when they exceed the proportion of one and ſeven, muſicians have been content to confine all harmony within that compaſs, and allowed but ſeven notes in muſical compoſition.

Let us now then ſuppoſe a ſtringed inſtrument fitted up in the order mentioned above. For inſtance: Let the firſt ſtring be twice as long as the ſecond; let the third ſtring be three times ſhorter than the firſt, let the fourth be four times, the fifth ſtring five times, and the ſixth ſix times as ſhort as the firſt. Such an inſtrument would probably give us a repreſentation of the lyre as it came firſt from the hand of the inventor. This inſtrument will give us all the ſeven notes following each other, in the order in which any two of them will accord together moſt pleaſingly; but yet it will be a very inconvenient and a very diſagreeable inſtrument: inconvenient, for in a compaſs of ſeven ſtrings only, the firſt muſt be ſeven times as long as the laſt; and diſagreeable, becauſe this firſt ſtring will be ſeven times as loud alſo; ſo that when the tones are to be played in a different order, loud and ſoft ſounds would be intermixed with moſt diſguſting alternations. In order to improve the firſt inſtrument, therefore, ſucceeding muſicians very judiciouſly threw in all the other ſtrings between the two firſt, or, in other words, between the two Octaves, giving to each, however, the ſame proportion to what it would have had in the firſt natural inſtrument. This made the inſtrument more portable, and the ſounds more even and pleaſing. They therefore diſpoſed the ſounds between the Octave in their natural order, and gave each its own proportional dimenſions. Of theſe ſounds, where the proportion between any two of them is moſt obvious, the concord between them will be moſt pleaſing. Thus Octaves, which are as two to one, have a moſt harmonious effect; the fourth and fifth alſo ſound ſweetly together, and they will be found, upon calculation, to bear the ſame proportion to each other that Octaves do. "Let it "not be ſuppoſed, (ſays Mr. Saveur) that the muſical ſcale is merely an arbitrary combination of ſounds: "it is made up from the conſonance and differences of "the parts which compoſe it. Thoſe who have often "heard a fourth and a fifth accord together, will be "naturally led to diſcover their difference at once; and "the mind unites itſelf to their beauties." Let us then ceaſe to aſſign the coincidences of vibrations as the cauſe of harmony, ſince theſe coincidences in two ſtrings vibrating at different intervals, muſt at beſt be but fortuitous; whereas concord is always pleaſing. The true cauſe why concord is pleaſing, muſt ariſe from our power, in ſuch a caſe, of meaſuring more eaſily the differences of the tones. In proportion as the note can be meaſured with its fundamental tone by large and obvious diſtinctions, then the concord is moſt pleaſing; on the contrary, when the ear meaſures the diſcriminations of two tones by very ſmall parts, or cannot meaſure them at all, it loſes the beauty of their reſemblance: the whole is diſcord and pain (c).

But there is another property in the vibration of a muſical ſtring not yet taken notice of, and which is alleged to confirm the foregoing theory. If we ſtrike the ſtring of an harpſichord, or any other elaſtic ſounding chord whatever, it returns a continuing ſound. This till of late was conſidered as one ſimple uniform tone; but all muſicians now confeſs, that inſtead of one tone it actually returns four tones, and that conſtantly. The notes are, beſide the fundamental tone, an octave above, a twelfth above, and a ſeventeenth. One of the baſs-notes of an harpſichord has been diſſected in this manner by Rameau, and the actual exiſtence of theſe tones proved beyond a poſſibility of being controverted. In fact, the experiment is eaſily tried; for if we ſmartly ſtrike one of the lower keys of an harpſichord, and then take the finger briſkly away, a tolerable ear will be able to diſtinguiſh, that, after the fundamental tone has ceaſed, three other ſhriller tones will be diſtinctly heard; firſt the octave above, then the twelfth, and laſtly the ſeventeenth: the octave above is in general almoſt mixed with the fundamental tone, ſo as not to be eaſily perceived, except by an ear long habituated to the minute diſcriminations of ſounds. So that we may obſerve, that the ſmalleſt tone is heard laſt, and the deepeſt and largeſt one firſt: the two others in order.

(c) It is certain, that in proportion to the ſimplicity of relations in ſound, the ear is pleaſed with its combinations; but this is not to be admitted as the cauſe why muſicians have confined all harmony to an octave. Diſcriminated ſounds, whoſe vibrations either never coincide, or at leaſt very rarely, do not only ceaſe to pleaſe, but violently grate, the ear. Harmony and diſcord, therefore, are neither diſcriminated by the judgment of hearers, nor the inſtitution of muſicians, but by their own eſſential and immutable nature.

In the whole theory of ſounds, nothing has given greater room for ſpeculation, conjecture, and diſappointment, than this amazing property in elaſtic ſtrings. The whole ſtring is univerſally acknowledged to be in vibration in all its parts, yet this ſingle vibration returns no leſs than four different ſounds. They who account for the tones of ſtrings by the number of their vibrations are here at the greateſt loſs. Daniel Bernouilli ſuppoſes, that a vibrating ſtring divides itſelf into a number of curves, each of which has a peculiar vibration; and though they all ſwing together in the common vibration, yet each vibrates within itſelf. This opinion, which was ſupported, as moſt geometrical ſpeculations are, with the parade of demonſtration, was only born ſoon after to die. Others have aſcribed this to an elaſtic difference in the parts of the air, each of which, at different intervals, thus received different impreſſions from the ſtring, in proportion to their elaſticity. This is abſurd. If we allow the difference of tone to proceed from the force, and not the frequency, of the vibrations, this difficulty will admit of an eaſy ſolution. Theſe ſounds, though they ſeem to exiſt together in the ſtring, actually follow each other in ſucceſſion: while the vibration has greateſt force, the fundamental tone is brought forward: the force of the vibration decaying, the octave is produced, but almoſt only inſtantaneouſly; to this ſucceeds, with diminiſhed force, the twelfth; and, laſtly, the ſeventeenth is heard to vibrate with great diſtinctneſs, while the three other tones are always ſilent. Theſe ſounds, thus excited, are all of them the harmonic tones, whoſe differences from the fundamental tone are, as was ſaid, ſtrong and diſtinct. On the other hand, the diſcordant tones cannot be heard. Their differences being but very ſmall, they are overpowered, and in a manner drowned in the tones of ſuperior difference: yet not always neither; for Daniel Bernouilli has been able, from the ſame ſtroke, to make the ſame ſtring bring out its harmonic and its diſcordant tones alſo (D.) So that from hence we may juſtly infer, that every note whatſoever is only a ſucceſſion of tones; and that thoſe are moſt diſtinctly heard, whoſe differences are moſt eaſily perceivable.

12 ctions e prece- theory.

To this theory, however, though it has a plauſible appearance, there are ſtrong and indeed inſuperable objections. The very fundamental principle of it is falſe. No body whatever, whether elaſtic or non elaſtic, yields a graver ſound by being ſtruck with a larger inſtrument, unleſs either the ſounding body, or that part of it which emits the ſound, is enlarged. In this caſe, the largeſt bodies always return the graveſt ſounds.

In ſpeaking of elaſtic and non-elaſtic bodies in a muſical ſenſe, we are not to puſh the diſtinction ſo far as when we ſpeak of them philoſophically. A body is *muſically* elaſtic, all of whoſe parts are thrown into vibrations ſo as to emit a ſound when only part of their ſurface is ſtruck. Of this kind are bells, muſical ſtrings, and all bodies whatever that are conſiderably hollow.—Muſical non-elaſtics are ſuch bodies as emit a ſound only from that particular place which is ſtruck: thus, a table, a plate of iron nailed on wood, a bell ſunk in the earth, are all of them non-elaſtics in a muſical ſenſe, though not philoſophically ſo. When a ſolid body, ſuch as a log of wood, is ſtruck with a ſwitch, only that part of it emits a ſound which comes in contact with the ſwitch; the note is acute and loud, but would be no leſs ſo though the adjacent parts of the log were removed. If, inſtead of the ſwitch, a heavier or larger inſtrument is made uſe of, a larger portion of its ſurface then returns a ſound, and the note is conſequently more grave; but it would not be ſo, if the large inſtrument ſtruck with a ſharp edge, or a ſurface only equal to that of the ſmall one.

In ſounds of this kind, where there is only a ſingle thwack, without any repetition, the immediate cauſe of the gravity or acuteneſs ſeems to be the quantity of air diſplaced by the ſounding body; a large quantity of air diſplaced produces a grave ſound, and a ſmaller quantity a more acute one, the force wherewith the air is diſplaced ſignifying very little.—What we here advance is confirmed by ſome experiments made by Dr Prieſtley, concerning the *muſical tone* of electrical diſcharges. The paſſage being curious, and not very long, we ſhall here tranſcribe it:

"As the courſe of my experiments has required a great variety of electrical exploſions, I could not help obſerving a great variety in the muſical tone made by the reports. This excited my curioſity to attempt to reduce this variation to ſome meaſure. Accordingly, by the help of a couple of ſpinets, and two perſons who had good ears for muſic, I endeavoured to aſcertain the tone of ſome electrical diſcharges; and obſerved, that every diſcharge made ſeveral ſtrings, particularly thoſe that were chords to one another, to vibrate: but one note was always predominant, and ſounded after the reſt. As every exploſion was repeated ſeveral times, and three of us ſeparately took the ſame note, there remained no doubt but that the tone we fixed upon was at leaſt very near the true one. The reſult was as follows.

"A jar containing half a ſquare foot of coated glaſs ſounded F ſharp, concert pitch. Another jar of a different form, but equal ſurface, ſounded the ſame.

"A jar of three ſquare feet ſounded C below F ſharp. A battery conſiſting of ſixty-four jars, each containing half a ſquare foot, ſounded F below the C.

"The ſame battery, in conjunction with another of thirty-one jars, ſounded C ſharp. So that a greater quantity of coated glaſs always gave a deeper note.

"Differences in the degree of a charge in the ſame jar made little or no difference in the tone of the exploſion: if any, a higher charge gave rather a deeper note.

Theſe experiments ſhew us how much the gravity or acuteneſs of ſounds depend on the quantity of air put in agitation by the ſounding body. We know that the noiſe of the electric exploſion ariſes from the return of the air into the vacuum produced by the electric flaſh. The larger the vacuum, the deeper was the note: for the ſame reaſon, the diſcharge of a muſquet produces a more acute note than that of a cannon; and thunder is deeper than either.

Beſides this, however, other circumſtances concur to produce different degrees of gravity or acuteneſs in ſounds. The ſound of a table ſtruck upon with a piece

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(D) Vid. Memoires de l'Academie de Berlin, 1753, p. 153.

of wood, will not be the ſame with that produced from a plate of iron ſtruck by the ſame piece of wood, even if the blows ſhould be exactly equal, and the iron perfectly kept from vibrating.—Here the ſounds are generally ſaid to differ in their degrees of acuteneſs, according to the ſpecific gravities or denſities of the ſubſtances which emit them. Thus gold, which is the moſt denſe of all metals, returns a much graver ſound than ſilver; and metalline wires, which are more denſe than therms, return a proportionably graver ſound.—But neither does this appear to be a general rule in which we can put confidence. Bell-metal is denſer than copper, but it by no means appears to yield a graver ſound; on the contrary, it ſeems very probable, that copper will give a graver ſound than bell-metal, if both are ſtruck upon in their non-elaſtic ſtate; and we can by no means think that a bell of pure tin, the leaſt denſe of all the metals, will give a more acute ſound than one of bell-metal, which is greatly more denſe.—In ſome bodies hardneſs ſeems to have a conſiderable effect. Glaſs, which is conſiderably harder than any metal, gives a more acute ſound; bell-metal is harder than gold, lead, or tin, and therefore ſounds much more acutely; though how far this holds with regard to different ſubſtances, there are not a ſufficient number of experiments for us to judge.

In bodies muſically elaſtic, the whole ſubſtance vibrates with the ſlighteſt ſtroke, and therefore they always give the ſame note whether they are ſtruck with a large or with a ſmall inſtrument; ſo that ſtriking a part of the ſurface of any body muſically elaſtic is equivalent, in it, to ſtriking the whole ſurface of a non-elaſtic one. If the whole ſurface of a table was ſtruck with another table, the note produced would be neither more nor leſs acute whatever force was employed; becauſe the whole ſurface would then yield a ſound, and no force could increaſe the ſurface; the ſound would indeed be louder in proportion to the force employed, but the gravity would remain the ſame. In like manner, when a bell, or muſical ſtring, is ſtruck, the whole ſubſtance vibrates, and a greater ſtroke cannot increaſe the ſubſtance.—Hence we ſee the fallacy of what is ſaid concerning the Pythagorean anvils. An anvil is a body muſically elaſtic, and no difference in the tone can be perceived whether it is ſtruck with a large, or with a ſmall hammer; becauſe either of them are ſufficient to make the whole ſubſtance vibrate, provided nothing but the anvil is ſtruck upon: ſmiths, however, do not ſtrike their anvils, but red-hot iron laid upon their anvils; and thus the vibrations of the anvil are ſtopped, ſo that it becomes a non-elaſtic body, and the differences of tone in the ſtrokes of different hammers proceed only from the ſurface of the large hammers covering the whole ſurface of the iron, or at leaſt a greater part of it than the ſmall ones. If the ſmall hammer is ſufficient to cover the whole ſurface of the iron as well as the large one, the note produced will be the ſame, whether the large or the ſmall hammer is uſed.

Laſtly, The argument for the preceding theory, grounded on the production of what are called *flute-notes* on the violin, is built on a falſe foundation; for theſe notes are not produced by drawing the bow ſoftly on the ſtring, but by ſlightly touching the ſtring with the finger. In this, caſe the ſame ſounds are produced as if the vibrations were transferred to the ſpace between the end of the finger-board and the finger, inſtead of that between the finger and the bridge. Why this ſmall part of the ſtring ſhould vibrate in ſuch a caſe, and not that which is under the immediate action of the bow, we muſt own ourſelves ignorant: nor dare we affirm that the vibrations really are transferred in this manner, only the ſame ſounds are produced as if they were.

Though theſe objections ſeem ſufficiently to overturn the foregoing theory, with regard to acute ſounds being the effects of weak ſtrokes, and grave ones of ſtronger impulſes, we can by no means admit that longer or ſhorter vibrations are the occaſion of gravity or acuteneſs in ſounds. A muſical ſound, however lengthened, either by ſtring or bell, is only a repetition of a ſingle one, whoſe duration by itſelf is but for a moment, and is therefore termed *inappretiable*, like the ſmack of a whip, or the exploſion of an electrical battery. The continuation of the ſound is nothing more than a repetition of this inſtantaneous inappretiable noiſe after the manner of an echo, and it is only this echo that makes the ſound agreeable. For this reaſon, muſic is much more agreeable when played in a large hall where the ſound is reverberated, than in a ſmall room where there is no ſuch reverberation. For the ſame reaſon, the ſound of a ſtring is more agreeable when put on a hollow violin than when faſtened to a plain board, &c.—In the ſound of a bell, we cannot avoid obſerving this echo very diſtinctly. The ſound appears to be made up of diſtinct pulſes, or repetitions of the ſame note produced by the ſtroke of the hammer. It can by no means be allowed, that the note would be more acute though theſe pulſes were to ſucceed one another more rapidly; the ſound would indeed become more ſimple, but would ſtill preſerve the ſame tone.—In muſical ſtrings the reverberations are vaſtly more quick than in bells; and therefore their ſound is more uniform or ſimple, and conſequently more agreeable than that of bells. In muſical glaſſes *, the vibrations muſt be inconceivably quicker than in any bell, or ſtringed inſtrument; and hence they are of all others the moſt ſimple and the moſt agreeable, though neither the moſt acute nor the loudeſt.—As far as we can judge, quickneſs of vibration contributes to the uniformity, or ſimplicity, but not to the acuteneſs, nor to the loudneſs, of a muſical note.

It may here be objected, that each of the different pulſes, of which we obſerve the ſound of a bell to be compoſed, is of a very perceptible length, and far from being inſtantaneous; ſo that it is not fair to infer what we have done, namely, that the ſound of a bell is only a repetition of a ſingle inſtantaneous ſtroke, ſeeing it is evidently the repetition of a lengthened note.—To this we reply, that the inappretiable ſound which is produced by ſtriking a bell in a non-elaſtic ſtate, is the very ſame which, being firſt propagated round the bell, forms one of theſe ſhort pulſes that is afterwards re-echoed as long as the vibrations of the metal continue, and it is impoſſible that the quickneſs of repetition of any ſound can either increaſe or diminiſh its gravity.

With regard to the production of the different tones from the baſs-ſtring of an harpſichord, we can only offer a conjecture, which is, that as the ſtrings of muſical inſtruments are faſtened at both ends, and very tenſe, the vibrations of the middle parts muſt be performed much more eaſily than thoſe towards the extremities;

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* Se *Harmon*

tremities; conſequently, as vibration muſt have a certain degree of ſtrength before a ſound is produced, the middle parts of the ſtring may vibrate ſo as to produce a ſound, while the extremities have loſt that power. This will be equivalent to ſhortening the ſtring, and conſequently the tone muſt gradually grow more acute.

Chap. II. *Of the Velocity*, &c. *of Sound. Axioms.*

13 city of d.

However it may be with regard to the theories of ſound, (which we leave to the judgment of our readers), experience has taught us, that it travels at about the rate of 1142 feet in a ſecond, or near 13 miles in a minute; nor do any obſtacles hinder its progreſs, a contrary wind only a ſmall matter diminiſhing its velocity.

14 progreſs lated.

The method of calculating its progreſs is eaſily made known. When a gun is diſcharged at a diſtance, we ſee the fire long before we hear the ſound. If then we know the diſtance of the place, and know the time of the interval between our firſt ſeeing the fire and then hearing the report, this will ſhew us exactly the time the ſound has been travelling to us. For inſtance, if the gun is diſcharged a mile off, the moment the flaſh is ſeen, you take a watch and count the ſeconds till you hear the ſound; the number of ſeconds is the time the ſound has been travelling a mile.—

15 ances lated eans of d.

Again, by the above axiom, we are enabled to find the diſtance between objects that would be otherwiſe immeaſurable. For example, ſuppoſe you ſee the flaſh of a gun in the night at ſea, and tell ſeven ſeconds before you hear the report, it follows therefore, that the diſtance is ſeven times 1142 feet, that is, 24 yards more than a mile and a half. In like manner, if you obſerve the number of ſeconds between the lightning and the report of the thunder, you know the diſtance of the cloud from whence it proceeds.

6 ſounds at the rate.

Derham has proved by experience, that all ſounds whatever travel at the ſame rate. The ſound of a gun, and the ſtriking of a hammer, are equally ſwift in their motions; the ſofteſt whiſper flies as ſwiftly, as far as it goes, as the loudeſt thunder.

To theſe axioms we may add the following.

7 Smooth and clear ſounds proceed from bodies that are homogeneous, and of an uniform figure; and harſh or obtuſe ſounds, from ſuch as are of a mixed matter and irregular figure.

8 The velocity of ſound is to that of a briſk wind as fifty to one.

9 The ſtrength of ſounds is greateſt in cold and denſe air, and leaſt in that which is warm and rarefied.

0 In all ſounds, the angle of incidence is equal to that of reflection; that is, if a line be drawn perpendicular to the reflecting ſurface, the point from which the ſound iſſues, and that to which it is reflected, will be equally diſtant from the perpendicular line.

Chap. III. *Of Reverberated Sounds.*

] 24 Sound, like light, after it has been reflected from ſeveral places, may be collected in one point, as into a focus; and it will be there more audible than in any other part, even than at the place from whence it proceeded.

5 pering ry.

On this principle it is that a whiſpering gallery is conſtructed.

III.

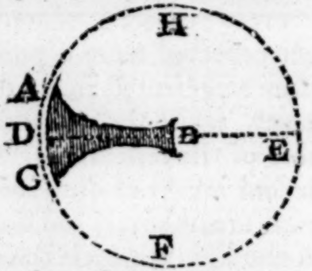
The form of this gallery muſt be that of a concave hemiſphere (E), as ABC; and if a low ſound or whiſper be uttered at A, the vibrations expanding themſelves every way will impinge on the points DDD, *&c.* and from thence be reflected to EEE, and from thence to the points F and G, till at laſt they all meet in C, where, as we have ſaid, the ſound will the moſt diſtinctly heard.

26 Speaking-trumpet.

Upon this principle alſo it is that the ſpeaking trumpet is formed. For the ſound, in paſſing through the long and narrow part of the tube, is continually reflected from its curved ſide into the axis, and by that means is prevented from ſpreading till at its exit from the tube, whereby the ſtrength of the ſound is greatly increaſed. To the augmentation of the ſound, the condenſation of the air in the tube (by n° 19.) likewiſe contributes.

Fig. 4.

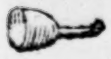
But to illuſtrate this more particularly: Let ABC be the tube, BD the axis, and B the mouth-piece for conveying the voice to the tube. Then it is evident, when a perſon ſpeaks at B in the trumpet, the whole force of his voice is ſpent upon the air contained in the tube, which will be agitated through the whole length of the tube; and, by various reflections from the ſide of the tube to the axis, the air along the middle part of the tube will be greatly condenſed, and its *momentum* proportionably increaſed, ſo that when it comes to agitate the air at the orifice of the tube AC, its force will be as much greater than what it would have been without the tube, as the ſurface of a ſphere, whoſe radius is equal to the length of the tube, is greater than the ſurface of the ſegment of ſuch a ſphere whoſe baſe is the orifice of the tube. For a perſon ſpeaking at B, without the tube, will have the force of his voice ſpent in exciting concentric ſuperficies of air all around the point B; and when thoſe ſuperficies or pulſes of air are diffuſed as far as D every way, it is plain the force of the voice will there be diffuſed through the whole ſuperficies of a ſphere whoſe radius is BD; but in the trumpet it will be ſo confined, that at its exit it will be diffuſed through ſo much of that ſpherical ſurface of air as correſponds to the orifice of the tube. But ſince the force is given, its intenſity will be always inverſely as the number of particles it has to move; and therefore in the tube it will be to that without, as the ſuperficies of ſuch a ſphere to the area of the large end of the tube nearly.—To make this matter yet plainer by calculation: Let BD=5 feet, then will the diameter of the ſphere DE=10 feet, the ſquare of which is 100, which multiplied by 0,7854, gives 78,54 ſquare feet for the area of a great circle BHEFC; and therefore four times that area, *viz.* 4×78,54=314,16=ſquare feet in the ſuperficies of the aërial ſphere. If now the diameter AC of the end of a trumpet be one foot, its area will be 0,7854; but, 7855 : 314,16 :: 1 : 400; therefore the air at the diſtance of BD will be agitated, by means of the trumpet, with a force 400 times greater than by the voice alone.——It muſt, however, be obſerved, that the more ſonorous and audible the voice is made by this means, the leſs articulate or diſtinct it is: juſt as light, to which ſound bears in many things a pretty near reſemblance, the more it is diffuſed, the leſs will it diſtinguiſh the objects whereon it falls; and the more it is condenſed, the brighter and more diſtinct will the objects it is thrown on always appear.



For

(E) A cylindric or elliptic arch will anſwer ſtill better than one that is circular.

2d 26 Auricular Tube.



For a contrary reaſon, the auricular tube, here repreſented, aſſiſts ſuch as are hard of hearing, when not occaſioned by the humours becoming inſpiſſated by cold, &c. and the obſtructions conſequent thereon: in which caſe, this machine can be of little ſervice; waſhing out the wax does much better. But when the organ itſelf is by age enfeebled and decayed, that is, when the acouſtic as well as other nerves have loſt their delicacy, this tube may be of real uſe and ſervice in rendering ſounds more diſtinct and audible.—This machine then ſeems to be juſt the reverſe of the ſtentorophonic tube, or the ſpeaking-trumpet juſt mentioned; as the uſe of that is to diſſipate, this is intended to collect, the rays of ſound. With regard to the ſtructure of it, the baſe is beſt made in form of the parabolic curve, finiſhing at top with a ſmall bent tube, that it may more conveniently be applied to the ear. It does thus in ſome meaſure reſemble the auditory duct, or the inner ear itſelf, which is alſo ſomething conical, having the baſe outward, and the apex next the head; that ſo a larger quantity of the moved air may be collected, received, and thereby tranſmitted to the point of the auditory nerve, which muſt be ſhaken to produce hearing and give this kind of perception. So that this contrivance is in effect no more than the baſe of the ear enlarged, and therefore capable of intercepting more of the rays of ſound than the ear alone, and that in proportion to its baſe; and theſe being gradually contracted into the ſmaller end, are thence thrown upon the tympanum, and affect the inner ear according to the force and quantity of the impreſſion received. The ſmoothneſs of theſe machines is no ſmall advantage to the conveyance of ſounds through them; for by experiment we know, that theſe always glide with moſt eaſe, and move the fartheſt, over ſmooth ſurfaces, where there is nothing to obſtruct and divert their progreſs, or to occaſion a rebound.

27 Echoes.

An echo is a reflection of ſound ſtriking againſt ſome object, as an image is reflected in a glaſs: but it has been diſputed what are the proper qualities in a body for thus reflecting ſounds. It is in general known, that caverns, grottoes, mountains, and ruined buildings, return this image of ſound. Image we may call it, for in every reſpect it reſembles the image of a viſible object reflected from a poliſhed ſurface. Our figures are often repreſented in a mirrour, without ſeeing them ourſelves, while thoſe ſtanding on one ſide are alone ſenſible of the reflection. To be capable of ſeeing the reflected image of ourſelves, we muſt be directly in a line with the image. Juſt ſo is it in an echo; we muſt ſtand in the line in which the ſound is reflected, or the repetition will be loſt to us, while it may, at the ſame time, be diſtinctly heard by others who ſtand at a ſmall diſtance to one ſide of us. We have heard of a very extraordinary echo, at a ruined fortreſs near Louvain, in Flanders. If a perſon ſung, he only heard his own voice, without any repetition: on the contrary, thoſe who ſtood at ſome diſtance, heard the echo but not the voice; but then they heard it with ſurpriſing variations, ſometimes louder, ſometimes ſofter, now more near, then more diſtant. There is an account in the memoirs of the French academy, of a ſimilar echo near Rouen.

As (by n° 20) the angle of reflected ſound is equal to that of its incidence, if we know the point from which any ſound proceeds, and the place from which it is reflected, we may eaſily find the point in which its echo will be heard. To hear the echo of one ſyllable, we muſt be at the diſtance of 120 feet from the reflecting ſurface; for two ſyllables, 240 feet; for three ſyllables, 360 feet, *&c.* For when we ſpeak diſtinctly, we ſcarce pronounce more than three ſyllables, or three and a half, in a ſecond; and as (by n° 13,) ſound goes 1142 feet in a ſecond, if the diſtance between the ſpeaker and the reflecting ſurface were leſs than 360 feet, the firſt ſyllable would be returned before the laſt was pronounced (F), and therefore the echo could not be diſtinctly heard. The echo in Woodſtock Park is ſaid to return 17 ſyllables in the day, and 20 in the night; for then the air being colder and denſer, (by n° 19) the ſtrength of the ſound muſt be greater. From hence we may determine, nearly, the diſtance of an object that is inacceſſible; for if an echo of 10 ſyllables be reflected from the ſide of a church or tower, it follows, from what has been ſaid, that the object muſt be 1200 feet diſtant.

The ſame ſound may have ſeveral echoes, if there be ſeveral reflecting ſurfaces ſo diſpoſed as to make it reverberate to the ſame point. Thus a violin, or other inſtrument, when ſounded in a room where there are ſeveral arches of the ſame form, will ſound like a number of violins of the ſame ſize playing in concert: or if the arches be of different forms, there will ſeem to be different inſtruments playing the ſame tune.

We ſhall diſmiſs this article with a few inventions founded on ſome of the preceding principles, which may amuſe a number of our readers.

Entertaining Experiments and Contrivances.

28 I. The Co verſive S tue. Plate II fig. 5.

Place a concave mirror of about two feet diameter, as A B (G), in a perpendicular direction. The focus of this mirror may be at 15 or 18 inches diſtance from its ſurface. At the diſtance of about five or ſix feet let there be a partition, in which there is an opening E F, equal to the ſize of the mirror; againſt this opening muſt be placed a picture, painted in water-colours, on a thin cloth, that the ſound may eaſily paſs through it (H).

Behind the partition, at the diſtance of two or three feet, place another mirror G H, of the ſame ſize as the former,

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(F) According to n° 13, the diſtance ſhould be 380 feet; for the firſt ſyllable muſt go as far as is equal to the time the two laſt ſyllables are pronouncing, that is, two-thirds of a ſecond; therefore the diſtance ſhould be equal to two-thirds of 1142 feet, or 760⅔, that is, 380⅓ going and coming. But as ſome time muſt be allowed for the reflecting ſurface to be made to vibrate by the impinging ſound, the firſt diſtance, 360 feet, will be very near the truth.

(G) Both the mirrors here uſed may be of tin or gilt paſteboard, this experiment not requiring ſuch as are very accurate.

(H) The more effectually to conceal the cauſe of this illuſion, the mirror AB may be fixed in the wainſcot, and a gauze or any other thin covering thrown over it, as that will not in the leaſt prevent the ſound from being reflected. An experiment of this kind may be performed in a field or garden, between two hedges, in one of which the mirror AB may be placed, and in the other an opening artfully contrived.

former, and let it be diametrically oppoſite to it.

At the point C let there be placed the figure of a man ſeated on a pedeſtal, and let his ear be placed exactly in the focus of the firſt mirror: his lower jaw muſt be made to open by a wire, and ſhut by a ſpring; and there may be another wire to move the eyes: theſe wires muſt paſs through the figure, go under the floor, and come up behind the partition.

Let a perſon, properly inſtructed, be placed behind the partition near the mirror. You then propoſe to any one to ſpeak ſoftly to the ſtatue, by putting his mouth to the ear of it, aſſuring him that it will anſwer inſtantly. You then give the ſignal to the perſon behind the partition, who, by placing his ear to the focus I, of the mirror G H, will hear diſtinctly what the other ſaid; and, moving the jaw and eyes of the ſtatue by the wires, will return an anſwer directly, which will in like manner be diſtinctly heard by the firſt ſpeaker.

Remark. This experiment appears to be taken from the Century of Inventions of the Marquis of Worceſter; whoſe deſigns, at the time they were publiſhed, were treated with ridicule and neglect as being impracticable, but are now known to be generally, if not univerſally, practicable. The words of the Marquis are theſe: "How to make a brazen or ſtone head in the midſt of a great field or garden, ſo artificial and natural, that though a man ſpeak ever ſo ſoftly, and even whiſper into the ear thereof, it will preſently open its mouth, and reſolve the queſtion in French, Latin, Welſh, Iriſh or Engliſh, in good terms, uttering it out of its mouth, and then ſhut it until the next queſtion be aſked."—The two following, of a ſimilar nature, appear to have been inventions of Kircher, by means of which (as he informs us *) he uſed to "utter feigned and ludicrous conſultations, with a view to ſhew the fallacy and impoſture of ancient oracles."

II. Let there be two heads of plaſter of Paris, placed on pedeſtals, on the oppoſite ſides of a room. There muſt be a tin tub of a inch diameter, that muſt paſs from the ear of one head, through the pedeſtal, under the floor, and go up to the mouth of the other. Obſerve, that the end of the tube which is next the ear of the one head, ſhould be conſiderably larger than that end which comes to the mouth of the other. Let the whole be ſo diſpoſed that there may not be the leaſt ſuſpicion of a communication.

Now, when a perſon ſpeaks, quite low, into the ear of one buſt, the ſound is reverberated thro' the length of the tube, and will be diſtinctly heard by any one who ſhall place his ear to the mouth of the other. It is not neceſſary that the tube ſhould come to the lips of the buſt.—If there be two tubes, one going to the ear, and the other to the mouth, of each head, two perſons may converſe together, by applying their mouth and ear reciprocally to the mouth and ear of the buſts; and at the ſame time other perſons that ſtand in the middle of the chamber, between the heads, will not hear any part of their converſation.

III. Place a buſt on a pedeſtal in the corner of a room, and let there be two tubes, as in the foregoing amuſement, one of which muſt go from the mouth and the other from the ear of the buſt, through the pedeſtal, and the floor, to an under apartment. There may be likewiſe wires that go from the under jaw and the eyes of the buſt, by which they may be eaſily moved.

A perſon being placed in the under room, and at a ſignal given applying his ear to one of the tubes, will hear any queſtion that is aſked, and immediately reply; moving at the ſame time, by means of the wires, the mouth and the eyes of the buſt, as if the reply came from it.

31 A Solar Sonata.

IV. In a large caſe, ſuch as is uſed for dials and ſpring-clocks, the front of which, or at leaſt the lower part of it, muſt be of glaſs, covered on the inſide with gauze, let there be placed a barrel-organ, which, when wound up, is prevented from playing, by a catch that takes a toothed wheel at the end of the barrel. To one end of this catch there muſt be joined a wire, at the end of which there is a flat circle of cork, of the ſame dimenſion with the inſide of a glaſs tube, in which it is to riſe and fall. This tube muſt communicate with a reſervoir that goes acroſs the front part of the bottom of the caſe, which is to be filled with ſpirits, ſuch as is uſed in thermometers, but not coloured, that it may be the better concealed by the gauze.

This caſe being placed in the ſun, the ſpirits will be rarefied by the heat; and, riſing in the tube, will lift up the catch or trigger, and ſet the organ in play: which it will continue to do as long as it is kept in the ſun; for the ſpirits cannot run out of the tube, that part of the catch to which the circle is fixed being prevented from riſing beyond a certain point by a check placed over it.

When the machine is placed againſt the ſide of a room on which the ſun ſhines ſtrong, it may conſtantly remain in the ſame place, if you incloſe it in a ſecond caſe, made of thick wood, and placed at a little diſtance from the other. When you want it to perform, it will be only neceſſary to throw open the door of the outer caſe, and expoſe it to the ſun.

But if the machine be moveable, it will perform in all ſeaſons by being placed before the fire; and in the winter it will more readily ſtop when removed into the cold.

A machine of this ſort is ſaid to have been invented by Cornelius Dreble, in the laſt century. What the conſtruction of that was, we know not; it might very likely be more complex, but could ſcarce anſwer the intention more readily.

32 Automatous Harpſichord.

V. Under the keys of a common harpſichord let there be fixed a barrel, ſomething like that in a chamber organ, with ſtops or pins correſponding to the tunes you would have it play. Theſe ſtops muſt be moveable, ſo that the tunes may be varied at pleaſure. From each of the keys let there go a wire perpendicular down: the ends of theſe wires muſt be turned up for about one-fourth of an inch. Behind theſe wires let there be an iron bar, to prevent them from going too far back. Now, as the barrel turns round, its pins take the ends of the wires, which pull down the keys, and play the harpſichord. The barrel and wires are to be all incloſed in a caſe.

In the chimney of the ſame room where the harpſichord ſtands, or at leaſt in one adjacent, there muſt be a ſmoke jack *, from whence comes down a wire, or cord, that, paſſing behind the wainſcot adjoining the chimney, goes under the floor, and up one of the legs of the harpſichord, into the caſe, and round a ſmall wheel fixed on the axis of that firſt mentioned. There ſhould be pullies at different diſtances, behind the wainſcot and under the floor, to facilitate the motion of the chord.

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* See *Mechanics*, n° 72.

This machinery may be applied to any other keyed inſtrument, as well as to chimes, and to many other purpoſes where a regular continued motion is required.

An inſtrument of this ſort may be conſidered as a perpetual motion, according to the vulgar acceptation of the term; for it will never ceaſe going till the fire be extinguiſhed, or ſome parts of the machinery be worn out.

33 A Ventoſal Symphony. Plate III. fig. 6.

VI. At the top of a ſummer-houſe, or other building, let there be fixed a vane AB, on which is the pinion C, that takes the toothed wheel D, fixed on the axis EF, which at its other end carries the wheel G, that takes the pinion H. All theſe wheels and pinions are to be between the roof and the cieling of the building. The pinion H is fixed to the perpendicular axis IK, which goes down very near the wall of the room, and may be covered after the ſame manner as are bell-wires. At the lower end of the axis IK there is a ſmall pinion L, that takes the wheel M, fixed on the axis of the great wheel NO. In this wheel there muſt be placed a number of ſtops, correſponding to the tunes it is to play. Theſe ſtops are to be moveable, that the tunes may be altered at pleaſure. Againſt this wheel there muſt hang twelve ſmall bells, anſwering to the notes of the gamut. Therefore, as the wheel turns round, the ſtops ſtriking againſt the bells, play the ſeveral tunes. There ſhould be a fly to the great wheel, to regulate its motion when the wind is ſtrong. The wheel NO, and the bells, are to be incloſed in a caſe.

There may be ſeveral ſets of bells, one of which may anſwer to the tenor, another to the treble, and a third to the baſs; or they may play different tunes, according to the ſize of the wheel. As the bells are ſmall, if they are of ſilver, their tone will be the more pleaſing.

Inſtead of bells, glaſſes may be here uſed, ſo diſpoſed as to move freely at the ſtroke of the ſtops. This machinery may likewiſe be applied to a barrel-organ; and to many other uſes.

ACQS, a town at the foot of the Pyrenæan mountains, in the government of Foix in France. It takes its name from the hot waters in theſe parts. E. long. 1. 40. lat. 43. 0.

ACQUA-CHE-TAVELLA, a celebrated fountain of Italy, in Calabria Citerior, a province of Naples. It is near the mouth of the river Crata, and the ruins commonly called *Sibari Rovinata*. It has been ſaid to beautify thoſe who waſhed in it.

AQUAPENDENTE, a pretty large town of Italy, in the territory of the church, and patrimony of St Peter, with a biſhop's ſee. It is ſeated on a mountain, near the river Paglia, ten miles W. of Orvieto, and 57 N. by W. of Rome. E. long. 11. 53. lat. 42. 43.

ACQUARIA, a ſmall town of Italy, in Frigana, a diſtrict of Modena, which is remarkable for its medicinal waters. It is twelve miles ſouth of the city of Modena. E. long. 11. 17. lat. 44. 24.

ACQUEST, or Acquist, in law, ſignifies goods got by purchaſe or donation. See Conquest.

ACQUI, a town of Italy, in the duchy of Montſerrat, with a biſhop's ſee, and commodious baths. It was taken by the Spaniards in 1745, and retaken by the Piedmonteſe in 1746; but after this, it was taken again and diſmantled by the French, who afterwards forſook it. It is ſeated on the river Bormio, 25 miles N. W. of Genoa, and 30 S. of Caſal. E. long. 8. 30. lat. 44. 40.

ACQUISITION, in general, denotes the obtaining or procuring ſomething. Among lawyers, it is uſed for the right or title to an eſtate got by purchaſe or donation.

ACQUITTAL, a diſcharge, deliverance, or ſetting of a perſon free from the guilt or ſuſpicion of an offence.

ACQUITTANCE, a releaſe or diſcharge in writing for a ſum of money, witneſſing that the party has paid the ſaid ſum.—No man is obliged to pay a ſum of money if the demandant refuſes to give an acquittance, which is a full diſcharge, and bars all actions, *&c.* An acquittance given by a ſervant for a ſum of money received for the uſe of his maſter, ſhall be a good diſcharge for that ſum, provided the ſervant uſed to receive his maſter's rents, debts, *&c.*

ACRA, a town of Africa, on the coaſt of Guinea, where the Engliſh, Dutch, and Danes, have ſtrong forts, and each fort its particular village. W. long. 0. 2. lat. 5. 0.

Acra, (Joſephus); one of the hills of Jeruſalem, on which ſtood the lower town, which was the Old Jeruſalem; to which was afterwards added Zion, or the city of David. Probably called *Acra*, from the fortreſs which Antiochus built there, in order to annoy the temple, and which Simon Maccabæus took and razed to the ground.

Acra Japygia, (Pliny); *Salentina*, (Ptolemy); now *Capo di San Maria di Leuca*; a promontory in the kingdom of Naples, to the ſouth-eaſt of Otranto, where formerly was a town, now lying in ruins, on the Ionian ſea, over againſt the Montes Acroceraunii of Epirus.

Acræ, in the ancient geography, a town of Sicily, whoſe inhabitants were called *Acrenſes*. It ſtood to the ſouth of Syracuſe at the diſtance of 24 miles, near the place now called the monaſtery of *Santa Maria d'Arcia*, on an eminence, as appears from Silius Italicus. The Syracuſans were the founders of it, according to Thucydides, 70 years after the building of Syracuſe, or 665 before Chriſt. Hence the epithet *Acræus*.

ACRAGAS, or Agragas, (anc. geogr.) ſo called by the Greeks, and ſometimes by the Romans, (Virgil); but more generally *Agrigentum* by the latter; a town of Sicily. In Greek medals the inhabitants are called ΑΚΡΙΓΑΝΤΙΝΟΙ, and *Agrigentini* by Cicero. The town ſtood upon a mountain, at the confluence of the Acragas and Hypſa, near the port called Εμποριον by Ptolemy, but Επινειον, or the Dock, by Strabo; and in the time of the latter, ſcarce a trace of all that ſide remained. In the year before Chriſt 584, the people of Gela built Acragas, 108 years after building their own city. It took its name from the river running by it; and being but two miles from, enjoyed all the conveniencies that could come by, the ſea. It was a place of great ſtrength, ſtanding on the top of a very ſteep rock, and

waſhed

Plate III.

Fig. 7. Adonis Appennina

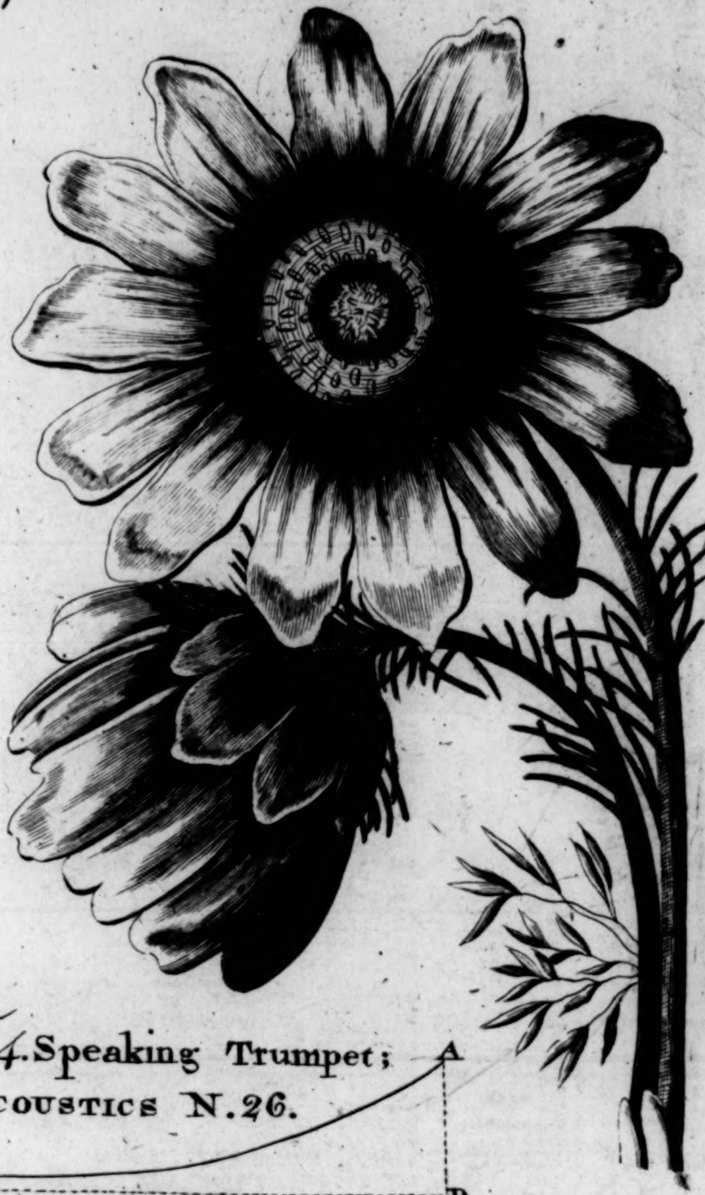

Fig. 1. Vibration; Acoustics N. 6.

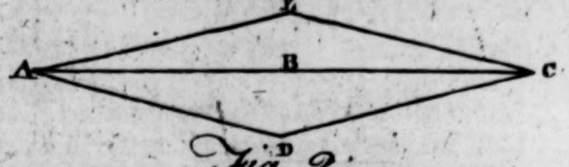

Fig. 2. Eolian Lyre; Acoustics N. 10.

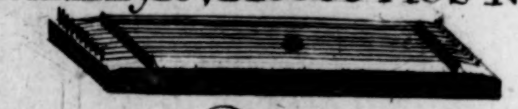

Fig. 3. Whiſpering; Gallery; Acoustics N25.

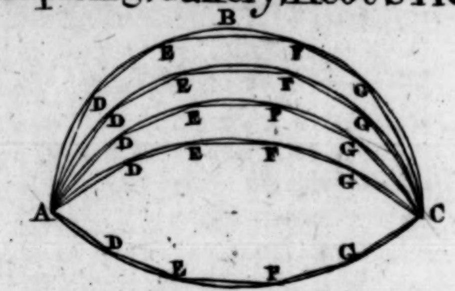

Fig. 5. Converſive Statue; Acoustics N. 28.

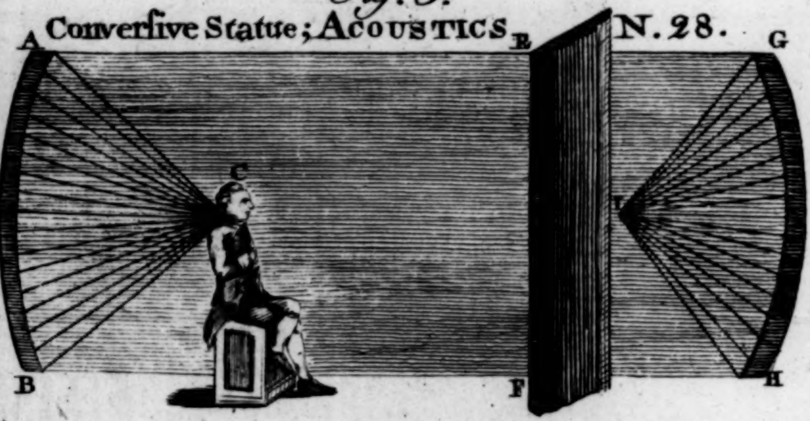

Fig. 4. Speaking Trumpet; Acoustics N. 26.

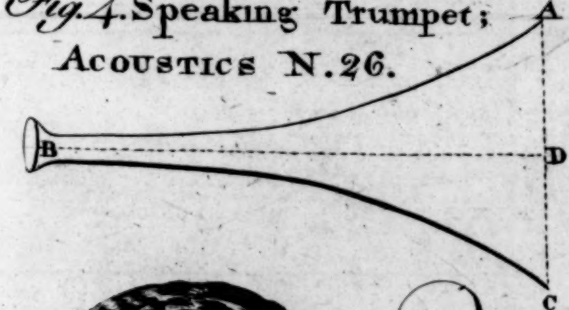

Fig. 6. Ventoſal Symphony; Acoustics N. 33.

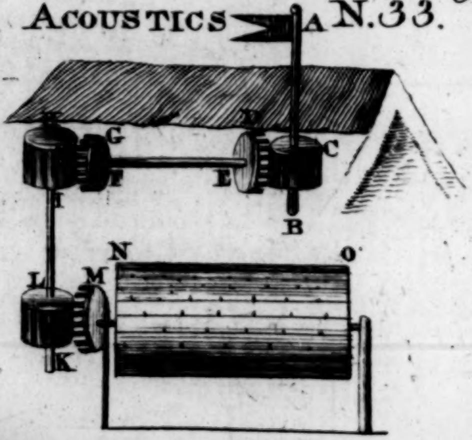
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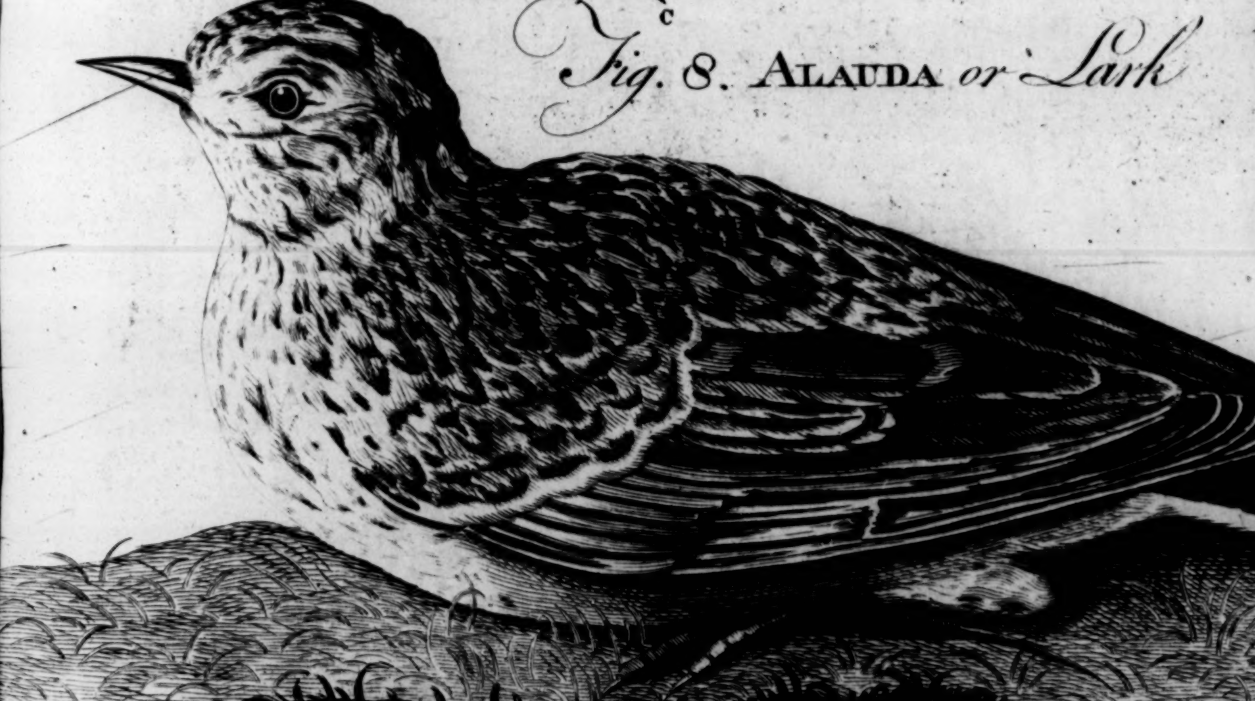
Fig. 8. Alauda *or Lark*



A. Bell Sculp.

3 MA 53

waſhed on the ſouth ſide by the river Acragas, now called *Fiume di Gergenti*, and on the ſouth-weſt by the Hypſa, with a citadel to the ſouth-eaſt, externally ſurrounded by a deep gulf, which made it inacceſſible but on the ſide next the town. It was famous for the tyrant Phalaris and his brazen bull. They were a people luxurious in their tables, and magnificent in their dwellings; of whom Empedocles, in Diogenes Laertius, ſays, that they lived to-day as if they were to die to-morrow, and built as if they were to live for ever. The country round the city was laid out in vine and olive yards, in the produce of which they carried on a great and profitable commerce with Carthage. E. long. 13. 30. lat. 37. 20.

ACRASIA, among phyſicians, implies the predominancy of one quality above another, either with regard to artificial mixtures, or the humours of the human body. The word is Greek, and compounded of α, priv. and κεροννυμι to *mix*; q. d. not mixed in a juſt proportion.

ACRATH, (anc. geog.) a place in Mauritania Tingitana, (Ptolemy;) now ſuppoſed to be *Velez de Gomara*; a fortified town in the kingdom of Fez, with a citadel and commodious harbour on the Mediterranean, ſcarce a mile diſtant from Penon de Velez, a Spaniſh fort. W. long. 5. lat. 34. 45.

ACRE, or Acra, a ſea-port town in Syria. It was formerly called *Ptolemais*, and is a biſhop's ſee. It was very famous in the time of the cruſadoes, and underwent ſeveral ſieges both by the Chriſtians and Saracens. It is now an inconſiderable town, being entirely ſupported by its harbour, which is frequented by ſhips of ſeveral nations. It is 20 miles S. of Tyre, and 37 N. of Jeruſalem. E. long. 39. 25. lat. 32. 40.

Acre, in the Mogul's dominions, the ſame with lack, and ſignifies the ſum of 100,000 rupees; the rupee is of the value of the French crown of 3 livres, or 30 ſols of Holland; an 100 lacks of rupees make a couron in Indoſtan, or 10,000,000 rupees: the pound Sterling is about eight rupees; according to which proportion, a lack of rupees amounts to 12,500 pounds Sterling.

Acre, a meaſure of land uſed in ſeveral provinces of France, particularly Normandy. It is larger or leſs according to the different places; but commonly contains 160 perches.

The Acre *of woods in France*, conſiſts of four roods, called *vergees*; the rood is 40 perches, the perch 24 feet, the foot 12 inches, the inch 12 lines.

Acre, the univerſal meaſure of land in Britain. An acre in England contains four ſquare roods, a rood 40 perches or poles of $16\frac{1}{2}$ feet each by ſtatute. Yet this meaſure does not prevail in all parts of England, as the length of the pole varies in different counties, and is called *cuſtomary meaſure*, the difference running from the $16\frac{1}{2}$ feet to 28. The acre is alſo divided into 10 ſquare chains, of 22 yards each, that is 4840 ſquare yards. An acre in Scotland contains 4 ſquare roods; one ſquare rood is 40 ſquare falls; one ſquare fall, 36 ſquare ells; one ſquare ell, nine ſquare feet and 73 ſquare inches; one ſquare foot, 144 ſquare inches. The Scots acre is alſo divided into 10 ſquare chains; the meaſuring chain ſhould be 24 ells in length, divided into 100 links, each link $8\frac{928}{1000}$ inches; and ſo one ſquare chain will contain 10,000 ſquare links. The Engliſh ſtatute-acre is about three roods and ſix falls ſtandard meaſure of Scotland.

The word (formed from the Saxon *acher*, or the German *aker*, a field), did not originally ſignify a determined quantity of land, but any open ground, eſpecially a wide champaign; and, in this antique ſenſe, it ſeems to be preſerved in the names of places, as Caſtle-acre, Weſt-acre, &c.

ACRIBEIA, a term purely Greek, literally denoting an exquiſite or delicate accuracy; ſometimes uſed in our language for want of a word of equal ſignification.

ACRID, a name for any thing that is of a ſharp or pungent taſte.

Acrids, in the Materia Medica. See there, n° 25, *&c.*

ACRIDOPHAGI, in the ancient geography; an Ethiopian people, repreſented as inhabiting near the deſerts, and to have fed on locuſts. This latter circumſtance their name imports; the word being compounded of the Greek ακρις *locuſt*, and φαρω to *eat*. We have the following account of them by Diodorus Siculus *. Their ſtature was lower than that of other men; they were meagre, and extremely black. In the ſpring, high weſt winds drove from the deſart to their quarter locuſts of an extraordinary ſize, and remarkable for the ſqualid colour of their wings. So great was the number of theſe inſects, that they were the only ſuſtenance of the barbarians, who took them in the following manner: At the diſtance of ſome ſtadia from their habitations there was a wide and deep valley. They filled this valley with wood and wild herbs, with which their country abounded. When the cloud of locuſts appeared, which were driven on by the wind, they ſet fire to the fuel which they had collected. The ſmoke which aroſe from this immenſe fire was ſo thick, that the locuſts, in croſſing the valley, were ſtifled by it, and fell in heaps on the ground. The paſſage of the locuſts being thus intercepted for many days, they made a large proviſion of thoſe inſects. As their country produced great quantities of ſalt, they ſalted them, to render them more palatable, and to make them keep till the next ſeaſon. This peculiar ſupply was their ſole food: they had neither herds nor flocks. They were unacquainted with fiſhing; for they lived at a diſtance from the ſea. They were very active, and ran with great ſwiftneſs. But their life was not of long duration; it exceeded not forty years. The cloſe of their life was extremely miſerable; for in their old-age, winged lice of different, but all of ugly forms, bred in their bodies. This malady, which began in the breaſt and belly, ſoon ſpread through the whole frame. The patient at firſt felt an itching; and the agreeable ſenſation produced by his ſcratching of himſelf, preceded a moſt deplorable calamity. For when thoſe lice, which had bred in his body, forced their way out, they cauſed effuſions of corrupt blood, with excruciating pains in the ſkin. The unhappy man, with lamentable cries, was induſtrious himſelf to make paſſages for them with his nails. In ſhort, theſe lice iſſued forth ſucceſſively from the wounds made by the hands of the patient, as from a veſſel full of holes, and in ſuch numbers that it was impoſſible to exterminate them.—Whether this extraordinary and dreadful diſtemper was occaſioned by the food of the inhabitants of this country, or by a peſtilential quality of their climate, it is difficult to determine. Indeed, as to the credibility of the whole account, we muſt leave the reader to judge.—But though the circumſtances of theſe people ſhould be deemed fabulous, yet may the *acridophagia* be true. It is well known, that to this day the inhabitants of Ethiopia, Arabia, &c. frequently uſe locuſts as food. The reader will not be diſpleaſed if we lay before him the reſult of Dr Haſſelquiſt's inquiries as to this particular, who travelled in Syria and Egypt ſo late as the year 1752. This ingenious gentleman, who travelled with a view to improve natural hiſtory, informs us, that he aſked Franks, and many other people who had lived long in theſe countries, whether they had ever heard that the inhabitants of Arabia and Ethiopia, *&c.* uſed locuſts as food. They anſwered that they had. He likewiſe aſked the ſame queſtion of Armenians, Cophtes, and Syrians, who lived in Arabia, and had travelled in Syria and near the Red-ſea; ſome of whom ſaid they heard of ſuch a practice, and others that they had often ſeen the people eat theſe inſects. He at laſt obtained complete ſatisfaction on this head from a learned ſheck at Cairo, who had lived ſix years in Mecca. This gentleman told him, in preſence of M. le Grand the principal French interpreter at Cairo, and others, that a famine frequently rages at Mecca when there is a ſcarcity of corn in Egypt, which obliges the inhabitants to live upon coarſer food than ordinary: That when corn is ſcarce, the Arabians grind the locuſts in hand-mills, or ſtone-mortars, and bake them into cakes, and uſe theſe cakes in place of bread: That he has frequently ſeen locuſts uſed by the Arabians, even when there was no ſcarcity of corn; but then they boil them, ſtew them with butter, and make them into a kind of fricaſſee, which he ſays is not diſagreeably taſted, for he had ſometimes taſted theſe locuſt-fricaſſees out of curioſity. From this account, we may ſee the folly of that diſpute among divines about the nature of St John's food in the wilderneſs: ſome maintaining the original word to ſignify the fruits of certain trees; others, a kind of birds, *&c.*: but thoſe who adhered to the literal meaning of the text were at leaſt the moſt orthodox, although their arguments were perhaps not ſo ſtrong as they might have been, had they had an opportunity of quoting ſuch an author as Haſſelquiſt.

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* Lib. iii. & xxxix. Alſo Strabo, lib. xvi.

ACRIMONY, that quality in bodies which renders them acrid to the taſte.

Morbific ACRIMONY. See MEDICINE, n° 127,—132, and 263.

ACRISIUS, king of Argos, (fab. hiſt.) being told by the oracle he that ſhould be killed by his grandchild, ſhut up his only daughter Danae in a brazen tower: but Jupiter coming down in a golden ſhower, begot Perſeus upon her: after Perſius had ſlain the Gorgons, he carried Meduſa's head to Argos; which Acriſius ſeeing, was turned into a ſtatue.

ACRITAS, (anc. geogr.) a promontory of Meſſenia, near Methone, (Ptolemy); running into the ſea, and forming the beginning of the bay of Meſſene. Now called *Capo di Gallo*, between Methone to the weſt, and Corone to the eaſt, where the Sinus Coronæus begins.

ACRIVIOLA. See TROPÆOLUM.

ACROAMATIC, or ACROATIC, in general, denotes a thing ſublime, profound, or abſtruſe.

ACROAMATICI, a denomination given the diſciples or followers of Ariſtotle, &c. who were admitted into the ſecrets of the inner or acroamatic philoſophy.

ACROATIC. Ariſtotle's lectures to his diſciples were of two kinds, *exoteric* and *acroatic*. The acroatic were thoſe, to which only his own diſciples and intimate friends were admitted; whereas the exoteric were public and open to all. But there are other differences. The acroatic were ſet apart for the higher and more abſtruſe ſubjects; the exoteric were employed in rhetorical and civil ſpeculations. Again, the acroatics were more ſubtile and exact, evidence and demonſtration being here aimed at; the exoterics chiefly aimed at the probable and plauſible. The former were the ſubject of the mornings exerciſes in the Lyceum, the latter of the evenings. Add, that the exoterics were publiſhed: whereas the acroatics were kept ſecret; being either entirely concealed; or if they were publiſhed, it was in ſuch obſcure terms, that few but his own diſciples would be the wiſer for them. Hence, when Alexander complained of his preceptor for publiſhing his acroatics, and thus revealing what ſhould have been reſerved to his diſciples, Ariſtotle anſwered, that they were made public and not public; for that none who had not heard them explained by the author *viva voce*, would underſtand them.

ACROATHOUM, or ACROTHOUM, (anc. geogr.) a town ſituated on the top of mount Athos, where the inhabitants, according to Mela, were longer lived by half than in any other country: called by the modern Greeks, Αγιον ορος; by the Italians, *La Cima di Monte Santo*.

ACROCERAUNIA, or MONTES CERAUNII, (anc. geogr.) mountains running out into the ſea, (ſo called from their being often thunder-ſtruck); ſeparating the Ionian ſea from the Adriatic; where Illyria ends and Epirus begins, (Horace): now called *Monti della Chimera*.

ACROCORINTHUS, (anc. geogr.) a high and ſteep hill, hanging over the city of Corinth, which was taken within the walls, as an acropolis, or citadel. On its top ſtood a temple of Venus; and lower down iſſued the fountain Pyrene, yielding not a plentiful, but a clear ſtream of water, (Pliny.)

ACROMION, in anatomy, the upper part of the ſcapula. See ANATOMY, n° 45, 46.

ACROMONOGRAMMATICUM, in poetry, a kind of poem, wherein every ſubſequent verſe begins with the letter wherewith the immediately preceding one terminated.

ACRON, a celebrated phyſician of Agrigentum, who firſt thought of lighting large fires, and purifying the air with perfumes, to put a ſtop to the peſtilence that ravaged Athens, and which was attended with ſucceſs. He lived about four hundred and ſeventy three years before the Chriſtian æra.

ACRON, a territory on the gold-coaſt of Guinea, in Africa, bordering on the Fantynean country. The Dutch have a fort here, called Fort Patience; and under it is a village, inhabited only by fiſhermen. The other inhabitants are addicted to huſbandry, and ſell their corn to other countries. There is plenty of game, which is very commodious for the Dutch factory. The people are very ignorant, and go naked like the reſt of the negroes. This is called Little Acron; for Great

Acron is farther inland, and is a kind of a republic.

ACRONICAL, Achronycal, or Achronical, in aſtronomy, is a term applied to the riſing of a ſtar, when the ſun is ſet in the evening; but has been promiſcuouſly uſed to expreſs a ſtar's riſing at ſunſet, or ſetting at ſunriſe.

ACROPOLIS, (anc. geogr.) the citadel, and one of the diviſions, of Athens; called *Polis*, becauſe conſtituting the firſt and original city; and the *Upper* Polis, to diſtinguiſh it from the Lower, which was afterwards built round it in a large open plain, the Acropolis ſtanding on a rock or eminence in the heart of this plain; and hence its name: (Pauſanias). To the north it had a wall, built by the Pelaſgi, and therefore called *Pelaſgic;* and to the ſouth a wall, by Cymon the ſon of Miltiades, out of the Perſian ſpoils, many ages after the building of the north wall, (Plutarch). It had nine gates, and was therefore called *Enneapylon;* yet but one principal gate or entrance, the aſcent to which was by a flight of ſteps of white marble, built by Pericles with great magnificence, (Plutarch).

ACROPOLITA (George), one of the writers of the Byzantine hiſtory, was born at Conſtantinople, in the year 1220, and brought up at the court of the emperor John Ducas at Nice. He was employed in the moſt important affairs of the empire; being ſent ambaſſador to Lariſſa, to eſtabliſh a peace with Michael of Epirus; and was conſtituted judge to try Michael Comnenus, ſuſpected of engaging in a conſpiracy. Theodorus Laſcaris, the ſon of John, whom he had taught logic, appointed him governor of all the weſtern provinces in his empire. In 1255, he was taken priſoner in a war with Michael Angelus; but gaining his liberty in 1260, by means of the emperor Palæologus, he was ſent by him ambaſſador to Conſtantine prince of Bulgaria; and was employed in ſeveral other negociations. He wrote, A Continuation of the Greek Hiſtory, from the taking of Conſtantinople by the Latins, till it was recovered by Michael Palæologus in 1261, which makes part of the Byzantine hiſtory; A Treatiſe concerning Faith, Virtue, and the Soul; An Expoſition upon the Sermons of St Gregory Nazianzen; and other pieces. Gregory Cyprian, patriarch of Conſtantinople, in his encomium upon him, prefixed to Acropolita's hiſtory, is perhaps ſomewhat extravagant in his praiſe, when he ſays he was equal to Ariſtotle in philoſophy, and to Plato in the knowledge of divine things and Attic eloquence.

ACROSPIRE, a vulgar term for what botaniſts call the *plume*. See Plants, n° 5.

ACROSPIRED, in malt-making, is the grain's ſhooting both at the root and blade end.

ACROSTIC, in poetry, a kind of poetical compoſition diſpoſed in ſuch a manner, that the initial letters of the verſes form the name of ſome perſon, kingdom, place, motto, &c. The word is compounded of the Greek ακρος *extremity*, and στιχος *verſe*. The acroſtic is conſidered by the critics as a ſpecies of falſe wit, and is therefore very little regarded by the moderns.

ACROSTICUM, or Rustyback, in botany, a genus of the cryptogamia filices, of which there are 30 ſpecies, but only three of them natives of Britain, *viz.* the ſeptentrionale, or horned fern, which grows on walls or clifts of rocks; the ilvenſe, or hairy fern, growing in clifts of rocks; and the thelypteris, or marſh-fern, in turfy bogs.

ACROSTOLIUM, in ancient naval architecture, the extreme part of the ornament uſed on the prows of their ſhips, which was ſometimes in the ſhape of a buckler, helmet, animal, &c.; but more frequently circular, or ſpiral. It was uſual to tear them from the prows of vanquiſhed veſſels, and fix them to the conquerors, as a ſignal of victory.

ACROTELEUTIC, among eccleſiaſtic writers, an appellation given to any thing added to the end of a pſalm; as the Gloria Patri, or Doxology.

ACROTERIA, in architecture, ſmall pedeſtals, uſually without baſes, anciently placed at the middle or two extremes of pediments or frontiſpieces, ſerving to ſupport the ſtatues, &c. It alſo ſignifies the figures placed as ornaments on the tops of churches, and the ſharp pinnacles that ſtand in ranges about flat buildings with rails and balluſters.

Among ancient phyſicians, it ſignified the larger extremities of the body, as the head, hands, and feet. It has alſo been uſed for the tips of the fingers, and ſometimes for the eminences or proceſſes of bones.

ACROTHYMION, from ακρος *extreme*, and θυμος *thyme*. A ſort of wart deſcribed by Celſus, as hard, rough, with a narrow baſis, and broad top; the top is of the colour of thyme, it eaſily ſplits and bleeds. This tumour is alſo called *thymus*.

ACSOR, a town in the river Nile in Egypt, famed for its earthen ware.

ACT, in general, denotes the exertion of power; and differs from power, as the effect from the cauſe.

Act, in logic, is particularly underſtood of an operation of the human mind. Thus to diſcern and examine, are acts of the underſtanding; to judge and affirm, are acts of the will. There are voluntary and ſpontaneous acts; the former are produced by the operation of the ſoul, the latter without its privity or participation.

Act, in the univerſities, ſignifies a theſis maintained in public by a candidate for a degree, or to ſhew the capacity and proficiency of a ſtudent. The candidates for a degree of bachelor and maſter of arts are to hold philoſophical Acts; and thoſe for bachelor of divinity, theological Acts, &c. At Oxford, the time when maſters or doctors complete their degrees is alſo called the *act;* which is held with great ſolemnity. At Cambridge, they call it the *commencement*.

Act, among lawyers, is an inſtrument in writing for declaring or juſtifying the truth of any thing. In which ſenſe, records, decrees, ſentences, reports, certificates, &c. are called *acts*.

Acts, alſo denote the deliberations and reſolutions of an aſſembly, ſenate, or convention; as acts of parliament, &c. Likewiſe matters of fact tranſmitted to poſterity in certain authentic books and memoirs.

Acts *of the ſenate, (Acta Senatus)*, among the Romans, were minutes of what paſſed and was debated in the ſenate-houſe. Theſe were alſo called *Commentarii*, and by a Greek name υπομνηματα. They had their origin in the conſulſhip of Julius Cæſar, who ordered them both to be kept and publiſhed. The keeping them was continued under Auguſtus, but the publication was abrogated. Afterwards all writings, relating to the decrees or ſentences of the judges, or what paſſed and was done before them, or by their authority, in any cauſe, were alſo called by the name *Acta:* In which ſenſe we read of civil acts, criminal acts, intervenient acts; *acta civilia, criminalia, intervenientia, &c.*

Acts *of the people, (Acta Populi),* among the Romans, were journals or regiſters of the daily occurrences; as aſſemblies, trials, executions, buildings, births, marriages, deaths, &c. of illuſtrious perſons, and the like. Theſe were otherwiſe called *Acta Publica,* and *Acta Diurna,* or ſimply *Acta.* The *Acta* differed from Annals, in that only the greater and more important matters were in the latter, and thoſe of leſs note were in the former. Their origin is attributed to Julius Cæſar, who firſt ordered the keeping and making public the acts of the people. Some trace them higher, to Servius Tullius; who, to diſcover the number of perſons born, dead, and alive, ordered that the next of kin, upon a birth, ſhould put a certain piece of money into the treaſury of Juno Lucina; upon a death, into that of Venus Libitina: the like was alſo to be done upon aſſuming the toga virilis, &c. Under Marcus Antoninus, this was carried further: perſons were obliged to notify the births of their children, with their names, and ſurnames, the day, conſul, and whether legitimate or ſpurious, to the præfects of the *Ærarium Saturni,* to be entered in the public acts; though before this time the births of perſons of quality appear to have thus been regiſtred.

Public Acts. The knowledge of public acts forms part of a peculiar ſcience, called the *diplomatic* *, of great importance to an hiſtorian, ſtateſman, chronologer, and even critic. The preſervation of them was the firſt occaſion of erecting libraries. The ſtyle of acts is generally barbarous Latin. Authors are divided as to the rules of judging of their genuineneſs, and even whether there be any certain rules at all. F. Germon will have the greater part of the acts of former ages to be ſpurious. Fontanini aſſerts, that the number of forged acts now extant is very ſmall. It is certain there were ſevere puniſhments inflicted on the forgers and falſifiers of acts.—The chief of the Engliſh acts, or public records, are publiſhed by Rymer, under the title of *Fœdera,* and continued by Saunderſon; an extract whereof has been given in French by Rapin, and tranſlated into Engliſh under the title of *Acta Regia.* Great commendations have been given this work: alſo ſome exceptions made to it; as that there are many ſpurious acts, as well as errors, in it; ſome have even charged it with falſifications.—The public acts of France fell into the hands of the Engliſh after the battle of Poitiers, and are commonly ſaid to have been carried by them out of the country. But the tradition is not ſupported by any ſufficient teſtimony.

Acts *of the Apoſtles,* one of the ſacred books of the New Teſtament, containing the hiſtory of the infant-church, during the ſpace of 29 or 30 years, from the aſcenſion of our Lord to the year of Chriſt 63.---It was wrote by St Luke; and addreſſed to Theophilus, the perſon to whom the evangeliſt had before dedicated his goſpel. We here find the accompliſhment of ſeveral of the promiſes made by our Saviour; his aſcenſion; the deſcent of the Holy Ghoſt; the firſt preaching of the apoſtles, and the miracles whereby their doctrines were confirmed; an admirable picture of the manners of the primitive Chriſtians; and, in ſhort, every thing that paſſed in the church till the diſperſion of the apoſtles, who ſeparated themſelves in order to propagate the goſpel throughout the world. From the period of that ſeparation, St Luke quits the hiſtory of the other apoſtles, who were then at too great a diſtance from him, and confines himſelf more particularly to that of St Paul, who had choſen him for the companion of his labours. He follows that apoſtle in all his miſſions, and even to Rome itſelf; for it appears that the Acts were publiſhed in the ſecond year of St Paul's reſidence in that city, or the 36th year of the Chriſtian æra, and in the 9th or 10th year of Nero's reign. The ſtyle of this work, which was originally compoſed in Greek, is much purer than that of the other canonical writers; and it is obſervable, that St Luke, who was much better acquainted with the Greek than with the Hebrew language, always, in his quotations from the Old Teſtament, makes uſe of the Septuagint verſion. The council of Laodicea places the Acts of the Apoſtles among the canonical books, and all the churches have acknowledged it as ſuch without any controverſy.

There were ſeveral *Spurious* Acts of the Apostles; particularly, I. *Acts,* ſuppoſed to be written by Abdias *, the pretended biſhop of Babylon, who gave out that he was ordained biſhop by the apoſtles themſelves when they were upon their journey into Perſia. II. *The Acts of St Peter:* this book came originally from the ſchool of the Ebionites. III. *The Acts of St Paul,* which is entirely loſt. Euſebius, who had ſeen it, pronounces it of no authority. IV. *The Acts of St John the Evangeliſt;* a book made uſe by the Encratites, Manichæans, and Priſcillianiſts. V. *The Acts of St Andrew;* received by the Manichæans, Encratites, and Apotactics. VI. *The Acts of St Thomas the apoſtle;* received particularly by the Manichæans. VII. *The Acts of St Philip.* This book the Gnoſtics made uſe of. VIII. *The Acts of St Matthias.* Some have imagined, that the Jews for a long time had concealed the original acts of the life and death of St Matthias, written in Hebrew; and that a monk of the abbey of St Matthias at Treves, having got them out of their hands, procured them to be tranſlated into Latin, and publiſhed them. But the critics will not allow them to be authentic. See Canon.

Acts *of Pilate;* a relation ſent by Pilate to the emperor Tiberius, concerning Jeſus Chriſt, his death, reſurrection, aſcenſion, and the crimes of which he was convicted before him *. It was a cuſtom among the Romans, that the proconſuls and governors of provinces ſhould draw up acts, or memoirs, of what happened in the courſe of their government, and ſend them to the emperor and ſenate. The heretics corrupted theſe acts, at leaſt forged others in imitation of them; and, in the reign of the emperor Maximin, the Gentiles, to throw an odium on the Chriſtian name, ſpread about ſpurious Acts of Pilate; which the emperor, by a ſolemn edict, ordered to be ſent into all the provinces of the empire, and enjoined the ſchool-maſters to teach and explain them to their ſcholars, and make them learn them by heart. Theſe acts, both the genuine and the ſpurious, are loſt. There is indeed extant, in the Pſeudo-Hegeſippus, a letter from Pilate to the emperor Claudius, concerning Jeſus Chriſt †. But it diſcovers itſelf at firſt ſight not to be authentic.

Act *of Faith, Auto da Fe,* in the Romiſh church,

* See *Diplomatics.*

* See Abd

* Euſeb *Hiſt. Eccl* lib. ii. cap. and ix. 5.

† Cave Hiſ *Literar.* S *Apoſtol.*

Act of faith.

is a ſolemn day held by the inquiſition, for the puniſhment of heretics, and the abſolution of the innocent accuſed *. They uſually contrive the *Auto* to fall on ſome great feſtival, that the execution may paſs with the more awe and regard; at leaſt it is always on a Sunday.

The Auto da Fe may be called the laſt act of the inquiſitorial tragedy; it is a kind of goal-delivery, appointed as oft as a competent number of priſoners in the inquiſition are convicted of hereſy, either by their own voluntary, or extorted confeſſion, or on the evidence of certain witneſſes. The proceſs is thus: in the morning, they are brought into a great hall, where they have certain habits put on, which they are to wear in the proceſſion. The proceſſion is led up by dominican friars; after which come the penitents, ſome with ſan-benitoes, and ſome without, according to the nature of their crimes; being all in black coats without ſleeves, and bare-footed, with a wax candle in their hands. Theſe are followed by the penitents who have narrowly eſcaped being burnt, who over their black coats have flames painted with their points turned downwards, *Feugo revolto*. Next come the negative, and relapſed, who are to be burnt, having flames on their habits pointing upwards. After theſe come ſuch as profeſs doctrines contrary to the faith of Rome, who, beſides flames pointing upwards, have their picture painted on their breaſts, with dogs, ſerpents, and devils, all open-mouthed, about it. Each priſoner is attended with a familiar of the inquiſition; and thoſe to be burnt have alſo a Jeſuit on each hand, who are continually preaching to them to abjure. After the priſoners, comes a troop of familiars on horſeback; and after them the inquiſitors, and other officers of the court, on mules; laſt of all, the inquiſitor-general on a white horſe, led by two men with black hats and green hat-bands. A ſcaffold is erected in the *Terriero de Paio*, big enough for two or three thouſand people; at one end of which are the priſoners, at the other the inquiſitors. After a ſermon made up of encomiums of the inquiſition, and invectives againſt heretics, a prieſt aſcends a deſk near the middle of the ſcaffold, and having taken the abjuration of the penitents, recites the final ſentence of thoſe who are to be put to death; and delivers them to the ſecular arm, earneſtly beſeeching at the ſame time the ſecular power not to touch their blood or put their lives in danger. The priſoners being thus in the hands of the civil magiſtrate, are preſently loaded with chains, and carried firſt to the ſecular goal, and from thence in an hour or two brought before the civil judge, who, after aſking in what religion they intend to die, pronounces ſentence, on ſuch as declare they die in the communion of the church of Rome, that they ſhall be firſt ſtrangled, and then burnt to aſhes; on ſuch as die in any other faith, that they be burnt alive. Both are immediately carried to the Ribera, the place of execution; where there are as many ſtakes ſet up as there are priſoners to be burnt, with a quantity of dry furz about them. The ſtakes of the profeſſed, that is, ſuch as perſiſt in their hereſy, are about four yards high, having a ſmall board towards the top for the priſoner to be ſeated on. The negative and relapſed being firſt ſtrangled and burnt, the profeſſed mount their ſtakes by a ladder; and the Jeſuits, after ſeveral repeated exhortations to be reconciled to the church, part with them, telling them they leave them to the devil, who is ſtanding at their elbow to receive their ſouls, and carry them with him into the flames of hell. On this a great ſhout is raiſed; and the cry is, Let the dogs *beards be made;* which is done by thruſting flaming furzes faſtened to long poles againſt their faces, till their faces are burnt to a coal, which is accompanied with the loudeſt acclamations of joy. At laſt, fire is ſet to the furz at the bottom of the ſtake, over which the profeſſed are chained ſo high, that the top of the flame ſeldom reaches higher than the ſeat they ſit on, ſo that they rather ſeem roaſted than burnt. There cannot be a more lamentable ſpectacle; the ſufferers continually cry out, while they are able, *Miſericordia per amor de Dios:* yet it is beheld by all ſexes, and ages, with tranſports of joy and ſatiſfaction.

Act, in dramatic poetry, ſignifies a certain diviſion, or part, of a play, deſigned to give ſome reſpite both to the actors and ſpectators. The Romans were the firſt who divided their theatrical pieces into acts; for no ſuch diviſions appear in the works of the firſt dramatic poets. Their pieces indeed conſiſted of ſeveral parts or diviſions, which they called *protaſis*, *epitaſis*, *cataſtaſis*, and *cataſtrophe;* but theſe diviſions were not marked by any real interruptions on the theatre. Nor does Ariſtotle mention any thing of acts in his Art of Poetry. But, in the time of Horace, all regular and finiſhed pieces were divided into five acts.

> *Neuve minor, neu ſit quinto productior actu*
> *Fabula, quæ poſci vult & ſpectata reponi.*

The firſt act, according to ſome critics, beſides introducing upon the ſtage the principal characters of the play, ought to propoſe the argument or ſubject of the piece; the ſecond, to exhibit this to the audience, by carrying the fable into execution; the third, to raiſe obſtacles and difficulties: the fouth to remove theſe, or raiſe new ones in the attempt; and the fifth, to conclude the piece, by introducing ſome accident that may unravel the whole affair. This diviſion, however, is not eſſentially neceſſary; but may be varied according to the humour of the author, or the nature of the ſubject. See **Poetry**, Part I. chap. ii.

Act *of grace*. See **Grace**.

Act *of Parliament* is a poſitive law, conſiſting of two parts, the words of the act, and its true ſenſe and meaning; which being joined, make the law. The words of acts of parliament ſhould be taken in a lawful ſenſe. Caſes of the ſame nature are within the intention, though without the letter, of the act; and ſome acts extend by equity to things not mentioned therein.

ACTÆA, **Aconitum Racemosum**, **Herb Cristopher**, or **Bane-berries**; a genus of the monogynia order, belonging to the polyandria claſs of plants, of which there are four

Species. 1. The ſpicata, or common herb-chriſtopher, is a native in ſeveral parts of Britain. It grows to the height of about two feet and an half; the footſtalks of the leaves ariſe from the root; theſe divide into three ſmaller foot-ſtalks, each of which are again divided into three, and theſe have each three lobes; ſo that each leaf is compoſed of 27 lobes or ſmaller leaves. The flowers grow in ramous ſpikes, and are of a pure white; they grow upon a ſlender, jointed, and furrowed ſtem; appear in May; and are ſucceeded by black, ſhining, pulpy berries, about the ſize of peas, which ripen in the autumn. This plant is a powerful repel-

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* See Inquiſition.

lent, and the root has been uſed internally in ſome nervous caſes, but muſt be adminiſtered with caution. The berries are highly poiſonous. It is ſaid toads reſort to this plant, on account of its fetid ſmell. Sheep and goats eat it; cows, horſes, and ſwine, refuſe it. 2. The alba, or American herb-chriſtopher, is a native of North America. The leaves of this ſpecies are ſomewhat like the former, but not ſo deeply indented in the edges. The flowers grow in a more compact ſpike, and the berries are very white and tranſparent when ripe; the roots are compoſed of thick knobs. This ſpecies has been uſed as an emetic, and ſometimes called ipecacoanha. 3. The racemoſa, or American black or wild ſnake-root, is likewiſe a native of North America. It has large compound leaves, r[illegible]ediately from the root, and branched after th[illegible]nner as the firſt, which grow more than [illegible]ugh. The flower-ſtem riſes to the height of [illegible]r or five feet; and carries a long ſpike of white flowers reflexed at the top. Theſe appear in June or the beginning of July, but the ſeeds do not come to maturity in Britain.—The root of this plant is greatly uſed by phyſicians in North America, in many diſorders; and is ſuppoſed to be an antidote againſt poiſon, or the biting of a rattle-ſnake. 4. The cimicifuga, is a native of Siberia; the leaves reſemble thoſe of the feathered columbine; the ſtalks riſe little more than a foot high, ſupporting panicles of white flowers, which appear in May. This ſpecies is rare in Britain.

Culture. The firſt ſpecies hath a perennial root, but the ſtalks annually decay. It may be propagated either by ſeeds, or parting the roots, which ſhould be tranſplanted in autumn. The ſeeds ſhould be ſown ſoon after they are ripe, or they will lie a whole year in the ground before they vegetate. They ſhould be ſown in a ſhady border; and as all the plants do not come up at the ſame time, the border ſhould not be diſturbed till the following autumn, when they ſhould be tranſplanted into a ſhady border, where they may be allowed to remain and flower.—The ſecond ſpecies may be propagated in the ſame manner; only the plants ſhould be allowed three feet every way, an account of their wide-ſpreading leaves. This ſpecies delights in a light moiſt ſoil, and a ſhady ſituation.—The third is uſually propagated by ſeeds ſent annually from North America: it thrives in the ſame kind of ſoil as the former; and is very hardy, requiring no other culture than the common flowering ſhrubs. The plants ſhould not be often removed, for that will prevent their flowering ſtrong.—The fourth requires a moiſt loamy ſoil, and ſhady ſituation. It may be propagated in the ſame manner as the others.

ACTÆON, in fabulous hiſtory, the ſon of Ariſtæus and Autonoe; a great hunter. He was turned by Diana into a ſtag, for looking on her while bathing; and died by his own dogs.

ACTE, Actæa, or Atthis, ancient names of Attica. Pliny extends it to the iſthmus of Corinth, ſo as to include Megaris. Others make this laſt a diſtinct diſtrict, becauſe Megara was always the rival and enemy of the Athenians. If ſo, then Attica was bounded on the weſt by Megara; on the north by Bœotia, ſeparated from it by high mountains, thro' which there was a difficult paſſage; on the ſouth by the Saronic bay, with the Egean ſea on the eaſt. It was called *Acte* from its maritime ſituation; hence *Actica* and *Attica*, and the epithets *Actæus* and *Atticus*, Ovid. Hence alſo *Actias* for *Athenienſis*, Virgil.

ACTIAN Games, in Roman antiquity, were ſolemn games inſtituted by Auguſtus, in memory of his victory over Marc Anthony at Actium, held every fifth year, and celebrated in honour of Apollo, ſince called *Actius*. Hence *Actian* Years, an æra commencing from the battle of Actium, called the *Æra of Auguſtus*.

ACTION, in a general ſenſe, implies nearly the ſame thing with act *.—Grammarians, however, obſerve ſome diſtinction between *action* and *act;* the former being generally reſtricted to the common or ordinary tranſactions, whereas the latter is uſed to expreſs thoſe which are remarkable. Thus, we ſay it is a good *action* to comfort the unhappy; it is a generous *act* to deprive ourſelves of what is neceſſary, for their ſake. The wiſe man propoſes to himſelf an honeſt end in all his *actions;* a prince ought to mark every day of his life with ſome *act* of greatneſs. The abbé Girard makes a further diſtinction between the words *action* and *act*. The former, according to him, has more relation to the power that acts than the latter; whereas the latter has more relation to the effect produced than the former: and hence the one is properly the attribute of the other. Thus we may properly ſay, "Be ſure to preſerve a "preſence of mind in all your actions; and take care "that they are all acts of equity."

Action, in mechanics, implies either the effort which a body or power makes againſt another body or power, or the effect itſelf of that effort.

As it is neceſſary in works of this kind to have a particular regard to the common language of mechanics and philoſophers, we have given this double definition: but the proper ſignification of the term is the motion which a body really produces, or tends to produce, in another; that is, ſuch is the motion it would have produced, had nothing hindered its effect.

All power is nothing more than a body actually in motion, or which tends to move itſelf; that is, a body which would move itſelf if nothing oppoſed it. The action therefore of a body is rendered evident to us by its motion only; and conſequently we muſt not fix any other idea to the word action, than that of actual motion, or a ſimple tendency to motion. The famous queſtion relating to *vis viva*, and *vis mortua*, owes, in all probability, its exiſtence to an inadequate idea of the word action; for had Leibnitz and his followers obſerved, that the only preciſe and diſtinct idea we can give to the word force or action, reduces it to its effect, that is, to the motion it actually produces or tends to produce, they would never have made that curious diſtinction.

Quantity of Action, a name given by M. de Maupertuis, in the Memoirs of the Pariſian Academy of Sciences for 1744, and thoſe of Berlin for 1746, to the product of the maſs of a body by the ſpace which it runs through, and by its celerity. He lays it down as a general law, "that, in the changes made in the ſtate "of a body, the quantity of action neceſſary to pro- "duce ſuch change is the leaſt poſſible." This principle he applies to the inveſtigation of the laws of refraction, of equilibrium, &c. and even to the ways of acting employed by the Supreme Being. In this manner M. de Maupertuis attempts to connect the metaphyſics,

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* See

phyſics of final cauſes with the fundamental truths of mechanics, to ſhew the dependence of the colliſion of both elaſtic and hard bodies upon one and the ſame law, which before had always been referred to ſeparate laws; and to reduce the laws of motion, and thoſe of equilibrium, to one and the ſame principle.

Action, in ethics, denotes the external ſigns or expreſſions of the ſentiments of a moral agent *.

e *Moral*
loſophy,
s, &c.

Action, in poetry, the ſame with ſubject or fable. Critics generally diſtinguiſh two kinds, the principal and the incidental. The principal action is what is generally called the *fable*; and the incidental an *epiſode* *.

e *Poetry*,
I. ch. ii.

Action, in oratory, is the outward deportment of the orator, or the accommodation of his countenance, voice, and geſture, to the ſubject of which he is treating. See Oratory, Part IV.

Action, in a theatrical ſenſe. See Declamation, Art. IV.

Action *for the Pulpit*. See Declamation, Art. I.

Action, in painting and ſculpture, is the attitude or poſition of the ſeveral parts of the face, body, and limbs of ſuch figures as are repreſented, and whereby they ſeem to be really actuated by paſſions. Thus we ſay, the action of ſuch a figure finely expreſſes the paſſions with which it is agitated: we alſo uſe the ſame expreſſion with regard to animals.

Action, among phyſicians, is applied to the functions of the body, whether vital, animal, or natural.

The *vital* functions, or actions, are thoſe which are abſolutely neceſſary to life, and without which there is no life, as the action of the heart, lungs, and arteries. On the action and reaction of the ſolids and fluids on each other, depend the vital functions. The pulſe and reſpiration are the external ſigns of life. Vital diſeaſes are all thoſe which hinder the influx of the venous blood into the cavities of the heart, and the expulſion of the arterial blood from the ſame.—The *natural* functions are thoſe which are inſtrumental in repairing the ſeveral loſſes which the body ſuſtains; for life is deſtructive of itſelf, its very offices occaſioning a perpetual waſte. The manducation of food, the deglutition and digeſtion thereof, alſo the ſeparation and diſtribution of the chyle and excrementitious parts, &c. are under the head of natural functions, as by theſe our aliment is converted into our nature. They are neceſſary to the continuance of our bodies.—The *animal* functions are thoſe which we perform at will, as muſcular motion, and all the voluntary actions of the body: they are thoſe which conſtitute the ſenſes of touch, taſte, ſmell, ſight, hearing; perception, reaſoning, imagination, memory, judgment, affections of the mind. Without any, or all of them, a man may live, but not ſo comfortably as with them *.

Medi-
Part I.
ſiol.)
i. iv. v.
Anat.
6, &c.
&c.
&c.

Action, in commerce, is a term uſed abroad for a certain part or ſhare of a public company's capital ſtock. Thus, if a company has 400,000 livres capital ſtock, this may be divided into 400 actions, each conſiſting of 1000 livres. Hence a man is ſaid to have two, four, &c. actions, according as he has the property of two, four, &c. 1000 livres capital ſtock. The tranſferring of actions abroad is performed much in the ſame manner as ſtocks are with us. See Stocks.

Action, in law, is a demand made before a judge for obtaining what we are legally entitled to demand, and is more commonly known by the name of law-ſuit or proceſs †.

e *Law*,
xvii. 1,
ii. 4.
1, 2.
xxxiii,
ghout.

ACTIONARY, or Actioniſt, a proprietor of ſtock in a trading company.

ACTIONS, among merchants, ſometimes ſignify moveable effects; and we ſay the merchant's creditors have ſeized on all his actions, when we mean that they have taken poſſeſſion of all his active debts.

ACTIVE, denotes ſomething that communicates action or motion to another; in which acceptation it ſtands oppoſed to paſſive.

Active, in grammar, is applied to ſuch words as expreſs action; and is therefore oppoſed to paſſive. The active performs the action, as the paſſive receives it *.

* See *Grammar*, nº 49.

Active *Principles*, in chemiſtry, ſuch as are ſuppoſed to act without any aſſiſtance from others; as mercury, ſulphur, &c.

ACTIVITY, in general, denotes the power of acting, or the active faculty. See Active.

Sphere of Activity, the whole ſpace in which the virtue, power, or influence, of any object, is exerted.

ACTIUM, (anc. geogr.) a town ſituated on the coaſt of Acarnania, in itſelf inconſiderable, but famous for a temple of Apollo, a ſafe harbour, and an adjoining promontory of the ſame name, in the mouth of the Sinus Ambracius, over againſt Nicopolis, on the other ſide of the bay: it afterwards became more famous on account of Auguſtus's victory over Antony and Cleopatra; and for quinquennial games inſtituted there, called *Actia*, or *Ludi Actiaci*. Hence the epithet *Actius*, given to Apollo, (Virgil.) *Actiaca æra*, a computation of time from the battle of Actium. The promontory is now called *Capo di Figalo*.

ACTIUS, in mythology, a ſurname of Apollo, from Actium, where he was worſhipped.

ACTON, a town near London, where is a well that affords a purging water, which is noted for the pungency of its ſalt. This water is whitiſh, to the taſte it is ſweetiſh, with a mixture of the ſame bitter which is in the Epſom water. The ſalt of this water is not quite ſo ſoft as that of Epſom, and is more calcareous than it, being more of the nature of the ſalt of lime: for a quantity of the Acton water being boiled high, on being mixed with a ſolution of ſublimate in pure water, threw down a yellow ſediment. The ſalt of the Acton water is more nitrous than that of Epſom; it ſtrikes a deep red, or purple, with the tincture of logwood in brandy, as is uſual with nitrous ſalts; it does not precipitate ſilver out of the ſpirit of nitre, as common ſalt does: ℔ iſs of this water yields 48 grains of ſalt.

ACTOR, in general, ſignifies a perſon who acts or performs ſomething.

Actor, in the drama, is a perſon who repreſents ſome part or character upon the theatre. The drama conſiſted originally of nothing more than a ſimple chorus, who ſung hymns in honour of Bacchus; ſo that the primitive actors were only ſingers and muſicians. Theſpis was the firſt that, in order to eaſe this unformed chorus, introduced a declaimer, who repeated ſome heroic or comic adventure. Æchylus, finding a ſingle perſon tireſome, attempted to introduce a ſecond, and changed the ancient recitals into dialogues. He alſo dreſſed his actors in a more majeſtic manner, and introduced the conthurnus or buſkin *. Sophocles added a third, in order to repreſent the various incidents in a more natural manner: and here the Greeks ſtopped, at leaſt we do not find in any of their tragedies above

* See *Æſchylus*.

three perſons in the ſame ſcene: perhaps they looked upon it as a rule of the dramatic poem never to admit more than three ſpeakers at a time on the ſtage; a rule which Horace has expreſſed in the following verſe:

Nec quarta loqui perſona laboret.

This however did not prevent their increaſing the number of actors in comedy. Before the opening of a play, they named their actors in full theatre, together with the parts they were to perform. The ancient actors were maſked, and obliged to raiſe their voice extremely, in order to make themſelves heard by the innumerable crowd of people who filled the amphitheatres: they were accompanied with a player on the flute, who played a prelude, gave them the tone, and played while they declaimed. Actors were highly honoured at Athens; and deſpiſed at Rome, where they were not only denied all rank among the citizens, but even when any citizen appeared upon the ſtage, he was expelled his tribe, and deprived of the right of ſuffrage by cenſors. Cicero, indeed, eſteems the talents of Roſcius; but he values his virtues ſtill more: virtues which diſtinguiſhed him ſo remarkably above all others of his profeſſion, that they ſeemed to have excluded him from the theatre. The French have, in this reſpect, adopted the ideas of the Romans; and the Engliſh thoſe of the Greeks.

Actor, the name of ſeveral perſons in fabulous hiſtory. One *Actor* among the Aurunci is deſcribed by Virgil, as an hero of the firſt rank. *Æn.* xii.

ACTORUM tabulæ, in antiquity, were tables inſtituted by Servius Tullius, in which the births of children were regiſtered. They were kept in the treaſury of Saturnus.

ACTRESS, a woman who performs a part upon the ſtage. Women actors were unknown to the ancients, among whom men always performed the female character; and hence one reaſon for the uſe of maſks among them.

ACTUAL, ſomething that is real and effective, or that exiſts truly and abſolutely. Thus philoſophers uſe the terms *actual* heat, *actual* cold, &c. in oppoſition to *virtual* or *potential*. Hence, among phyſicians, a red-hot iron, or fire, is called an *actual* cautery; in diſtinction from cauteries, or cauſtics, that have the power of producing the ſame effect upon the animal ſolids as actual fire; theſe laſt are called *potential* cauteries. Boiling water is actually hot; brandy, producing heat in the body, is potentially hot, though of itſelf cold.

Actual *Sin*, that which is committed by the perſon himſelf, in oppoſition to original ſin, or that which he contracted from being a child of Adam.

ACTUARIÆ naves, a kind of ſhips among the Romans, chiefly deſigned for ſwift ſailing.

ACTUARIUS, a celebrated Greek phyſician, of the 13th century, and the firſt Greek author who has treated of mild purgatives, ſuch as caſſia, manna, ſena, &c. His works were printed in one volume folio, by Henry Stephens, in 1567.

Actuarius, or Actarius, a notary or officer appointed to write the acts or proceedings of a court, or the like. In the Eaſtern Empire, the actuarii were properly officers who kept the military accounts, received the corn from the *ſuſceptores* or ſtore-keepers, and delivered it to the ſoldiers.

ACTUATE, to bring into act, to put a thing in motion, or to ſtir up a perſon to action.

ACTUS, in ancient architecture, a meaſure in length equal to 120 Roman feet. In ancient agriculture, the word ſignified the length of one furrow, or the diſtance a plough goes before it turns.

Actus *Minimus*, was a quantity of land 120 feet in length, and four in breadth.

Actus *Major*, or Actus *Quadratus*, a piece of ground in a ſquare form, whoſe ſide was equal to 120 feet, equal to half the jugerum.

Actus *Intervicenalis*, a ſpace of ground four feet in breadth, left between the lands as a path or way.

ACULEATE, or Aculeati, a term applied to any plant or animal armed with prickles.

ACULEI, the prickles of animals or of plants.

ACULER, in the menage, is uſed for the motion of a horſe, when, in working upon volts, he does not go far enough forward at every time or motion, ſo that his ſhoulders embrace or take in too little ground, and his croupe comes too near the center of the volt. Horſes are naturally inclined to this fault in making demi-volts.

ACUMINA, in antiquity, a kind of military omen, moſt generally ſuppoſed to have been taken from the points or edges of darts, ſwords, or other weapons.

ACUPUNCTURE, the name of a ſurgical operation among the Chineſe and Japaneſe, which is performed by pricking the part affected with a ſilver needle. They employ this operation in head-achs, lethargies, convulſions, colics, &c.

ACUNA (Chriſtophero de), a Spaniſh Jeſuit, born at Burgos. He was admitted into the ſociety in 1612, being then but 15 years of age. After having devoted ſome years to ſtudy, he went to America, where he aſſiſted in making converts in Chili and Peru. In 1640, he returned to Spain, and gave the king an account how far he had ſucceeded in the commiſſion he had received to make diſcoveries on the river of the Amazons; and the year following he publiſhed a deſcription of this river, at Madrid. Acuna was ſent to Rome, as procurator of his province. He returned to Spain with the title of Qualificator of the Inquiſition; but ſoon after embarked again for the Weſt Indies, and was at Lima in 1675, when father Southwell publiſhed at Rome the Bibliotheque of the Jeſuit writers. Acuna's work is intitled, *Nuevo deſcubrimento del gran rio de las Amazonas; i. e.* "A new diſcovery of the great river of the Amazons." He was ten months together upon this river, having had inſtructions to inquire into every thing with the greateſt exactneſs, that his majeſty might thereby be enabled to render the navigation more eaſy and commodious. He went aboard a ſhip at Quito with Peter Texeira, who had already been ſo far up the river, and was therefore thought a proper perſon to accompany him in this expedition. They embarked in February 1639, but did not arrive at Para till the December following. It is thought that the revolutions of Portugal, by which the Spaniards loſt all Braſil, and the colony of Para at the mouth of the river of the Amazons, were the cauſe that the relation of this Jeſuit was ſuppreſſed; for as it could not be of any advantage to the Spaniards, they were afraid it might prove of great ſervice to the Portugeſe. The copies of this work became extremely ſcarce, ſo that the publiſhers of the French tranſlation at Paris aſſerted, that there was not one copy of the original extant, excepting one in the poſſeſſion of the tranſlator, and, perhaps, that in the Vatican library. M. de Gomberville was the author of this tranſlation: it was publiſhed after his death, with a long diſſertation. An account of the original may be ſeen in the Paris Journal, in that of Leipſic, and in Chevereau's Hiſtory of the World.

ACUS, in ichthyology, the trivial name of a ſpecies of ſyngnathus. See Syngnathus.

ACUTE, an epithet applied to ſuch things as terminate in a ſharp point or edge. And in this ſenſe it ſtands oppoſed to obtuſe.

Acute *Angle*, in geometry, is that which is leſs than a right angle.

Acute-angled *Triangle*, is a triangle whoſe three angles are all acute.

Acute-angled *Cone* is, according to the ancients, a right cone, whoſe axis makes an acute angle with its ſide.

Acute, in muſic, is applied to a ſound or tone that is ſharp or high, in compariſon of ſome other tone. In this ſenſe, *acute* ſtands oppoſed to *grave*.

Acute *Accent*. See Accent.

Acute *Diſeaſes*, ſuch as come ſuddenly to a criſis. This term is uſed for all diſeaſes which do not fall under the head of chronic diſeaſes.

AD, a Latin prepoſition, originally ſignifying *to*, and frequently uſed in compoſition both with and without the *d*, to expreſs the relation of one thing to another.

Ad *Beſtias*, in antiquity, is the puniſhment of criminals condemned to be thrown to wild beaſts.

Ad *Hominem*, in logic, a kind of argument drawn from the principles or prejudices of thoſe with whom we argue.

Ad *Ludos*, in antiquity, a ſentence upon criminals among the Romans, whereby they were condemned to entertain the people by fighting either with wild beaſts, or with one another, and thus executing juſtice upon themſelves.

Ad *Metalla*, in antiquity, the puniſhment of ſuch criminals as were condemned to the mines, among the Romans; and therefore called *Metallici*.

Ad *Valorem*, a term chiefly uſed in ſpeaking of the duties or cuſtoms paid for certain goods: The duties on ſome articles are paid by the number, weight, meaſure, tale, *&c.* and others are paid *ad valorem*, that is, according to their value.

ADAGE, a proverb, or ſhort ſentence, containing ſome wiſe obſervation or popular ſaying. Eraſmus has made a very large and valuable collection of the Greek and Roman adages; and Mr Ray has done the ſame with regard to the Engliſh. We have alſo Kelly's collection of Scotch Proverbs.

ADAGIO, in muſic, an Italian adverb, ſignifying *ſoftly*, *leiſurely*; and is uſed to denote the ſloweſt of all times, except the grave.

ADAM, the firſt of the human race, was formed by the Almighty on the ſixth day of the creation. His body was made of the duſt of the earth; after which, God animated or gave it life, and Adam then became a rational creature.—His heavenly Parent did not leave his offspring in a deſtitute ſtate to ſhift for himſelf; but planted a garden, in which he cauſed to grow not only every tree that was proper for producing food, but likewiſe ſuch as were agreeable to the eye, or merely ornamental. In this garden were aſſembled all the brute creation; and, by their Maker, cauſed to paſs before Adam, who gave all of them names, which were judged proper by the Deity himſelf.—In this review, Adam found none for a companion to himſelf. This ſolitary ſtate was ſeen by the Deity to be attended with ſome degree of unhappineſs; and therefore he threw Adam into a deep ſleep, in which ſtate he took a rib from his ſide, and healing up the wound, formed a woman of the rib he had taken out. On Adam's awaking, the woman was brought to him; and he immediately knew her to be one of his own ſpecies, called her his bone and his fleſh, giving her the name of *woman* becauſe ſhe was taken out of man.

The firſt pair being thus created, God gave them authority over the inferior creation, commanding them to ſubdue the earth, alſo to increaſe and multiply, and fill it. They were informed of the proper food for the beaſts and for them; the graſs, or green herbs, being appointed for beaſts; and fruits, or ſeeds, for man. Their proper employment alſo was aſſigned them; namely, *to dreſs the garden, and to keep it*.

Though Adam was thus highly favoured and inſtructed by his Maker, there was a ſingle tree, which grew in the middle of the garden, of the fruit of which they were not allowed to eat; being told, that they ſhould ſurely die in the day they eat of it. This tree was named, The tree of the knowledge of good and evil. This prohibition, however, they ſoon broke through. The woman having entered into converſation with *the ſerpent*, was by him perſuaded, that by eating of the tree ſhe ſhould become as wiſe as God himſelf; and accordingly, being invited by the beauty of the fruit, and its deſirable property of imparting wiſdom, ſhe plucked the fruit, and eat it; giving her huſband of it at the ſame time, who did likewiſe eat.

Before this tranſgreſſion of the divine command, Adam and his wife had no occaſion for clothes, neither had they any ſenſe of ſhame; but immediately on eating the forbidden fruit, they were aſhamed of being naked, and made aprons of fig-leaves for themſelves. On hearing the voice of God in the garden, they were terrified, and hid themſelves: but being queſtioned by the Deity, they confeſſed what they had done, and received ſentence accordingly; the man being condemned to labour; the woman to ſubjection to her huſband, and to pain in childbearing. They were now driven out of the garden, and their acceſs to it prevented by a terrible apparition. They had clothes given them by the Deity made of the ſkins of beaſts. In this ſtate Adam had ſeveral children; the names of only three of whom we are acquainted with, *viz.* Cain, Abel, and Seth. He died at the age of 930 years.

Theſe are all the particulars concerning Adam's life, that we have on divine authority: but a vaſt multitude of others are added by the Jews, Mahometans, and Papiſts; all of which muſt be at beſt conjectural; moſt of them, indeed, appear downright falſehoods or abſurdities. Mr Bayle, however, and the authors of the General Dictionary, have beeen at great pains in collecting them, and the account ſpreads over many folio pages; but our readers curioſity, it is preſumed, will be ſufficiently gratified by the few which are here ſubjoined.

According to the Talmudiſts, when Adam was created, his body was of immenſe magnitude. When he ſinned, his ſtature was reduced to an hundred ells, according to ſome; to nine hundred cubits, according to others; who think this was done at the requeſt of the angels, who were afraid of ſo gigantic a creature. In the iſland of Ceylon is a mountain, called the *Peak* or mountain of Adam, from its being, according to the tradition of the country, the reſidence of our firſt parent. Here the print of his footſteps, above two palms in length, are ſtill pointed out.

Many reveries have been formed concerning the perſonal beauty of Adam. That he was a handſome well-ſhaped man, is probable; but ſome writers, not content with this, affirm, that God, intending to create man, clothed Himſelf with a perfectly beautiful human body, making this his model in the formation of the body of Adam.

Nor has the imagination been leſs indulged concerning the formation of the human ſpecies male and female.—It would be endleſs to recount all the whimſies that have been wrote on this ſubject; but as Mrs Bourignon has made a conſiderable figure in the *religious*, or rather *ſuperſtitious* world, we cannot help inſerting ſome of her opinions concerning the firſt man, which are peculiarly marvellous. According to the *revelations* of this lady, Adam before his fall poſſeſſed in himſelf the principles of both ſexes, and the virtue or power of producing his like, without the concurrent aſſiſtance of woman. The diviſion into two ſexes, ſhe imagined †, was a conſequence of man's ſin; and now, ſhe obſerves, mankind are become ſo many *monſters in nature*, being much leſs perfect in this reſpect than plants or trees, who are capable of producing their like alone, and without pain or miſery. She even imagined ‡, that, being in an ecſtaſy, ſhe ſaw the figure of Adam before he fell, with the manner how, by himſelf, he was capable of procreating other men. "God," ſays ſhe, "repreſented to my mind the beauty of the firſt world, and the manner how he had drawn it from the chaos: every thing was bright, tranſparent, and darted forth light and ineffable glory. The body of Adam was purer and more tranſparent than cryſtal, and vaſtly fleet; through this body were ſeen veſſels and rivulets of light, which penetrated from the inward to the outward parts, through all his pores. In ſome veſſels ran fluids of all kinds and colours, vaſtly bright, and quite diaphanous. The moſt raviſhing harmony aroſe from every motion; and nothing reſiſted, or could annoy, him. His ſtature was taller than the preſent race of men; his hair was ſhort, curled, and of a colour inclining to black; his upper lip covered with ſhort hair: and inſtead of the beſtial parts which modeſty will not allow us to name, he was faſhioned as our bodies ſhall be in the life eternal, which I know not whether I dare reveal. In that *region* * his noſe was formed after the manner of a *face*, which diffuſed the moſt delicious fragrancy and perfumes; whence alſo men were to iſſue, all whoſe principles were inherent in him; there being in his belly a veſſel, where little eggs were formed; and a ſecond veſſel filled with a fluid, which impregnated thoſe eggs: and when man heated himſelf in the love of God, the deſire he had that other creatures ſhould exiſt beſides himſelf, to praiſe and love God, cauſed the fluid abovementioned (by means of the fire of the love of God) to drop on one or more of theſe eggs, with inexpreſſible delight; which being thus impregnated, iſſued, ſome time after, out of man, by this canal *, in the ſhape of an egg, whence a perfect man was hatched by inſenſible degrees. Woman was formed by taking out of Adam's ſides the veſſels that contained the eggs; which ſhe ſtill poſſeſſes, as is diſcovered by anatomiſts."

† Preface to a book entitled, *Le nouveau ciel et la nouvelle terre*, Amſt. 1679.

‡ *Vie continue de Madem. Bourignon*, p. 315.

* *Viz.* of the beſtial parts, (we ſuppoſe.)

* *i. e.* the *naſal* canal, ſituated a above deſcribed.

Many others have believed, that Adam at his firſt creation was both male and female: others, that he had two bodies joining together at the ſhoulders, and their faces looking oppoſite ways like thoſe of Janus. Hence, ſay theſe, when God created Eve, he had no more to do than to ſeparate the two bodies from one another *. Of all others, however, the opinion of Paracelſus ſeems the moſt ridiculous ||. *Negabat primos parentes ante lapſum habuiſſe partes generationi hominis neceſſarias; credebat poſtea acceſſiſſe, ut ſtrumam gutturi.*

* See *Androgyn*

|| Paracelſ *apud* Voſſ um *de philo ſophia*, c. i p. 71.

Extravagant things are aſſerted concerning Adam's knowledge. It is very probable that he was inſtructed by the Deity how to accompliſh the work appointed him, *viz.* to dreſs the garden, and keep it from being deſtroyed by the brute creatures; and it is alſo probable that he had likewiſe every piece of knowledge communicated to him that was either neceſſary or pleaſing: but that he was acquainted with geometry, mathematics, rhetoric, poetry, painting, ſculpture, *&c.* is too ridiculous to be credited by any ſober perſon. Some rabbies, indeed, have contented themſelves with equalling Adam's knowledge to that of Moſes and Solomon; while others, again, have maintained that he excelled the angels themſelves. Several Chriſtians ſeem to be little behind theſe Jews in the degree of knowledge they aſcribed to Adam; nothing being hid from him, according to them, except contingent events relating to futurity. One writer indeed (Pinedo) excepts politics; but a Carthuſian friar, having exhauſted, in favour of Ariſtotle, every image and compariſon he could think of, at laſt aſſerted that Ariſtotle's knowledge was as extenſive as that of *Adam*.—In conſequence of this ſurpriſing knowledge with which Adam was endued, he is ſuppoſed to have been a conſiderable author. The Jews pretend that he wrote a book on the creation, and another on the Deity. Some rabbies aſcribe the 92d pſalm to Adam; and in ſome manuſcripts the Chaldee title of this pſalm expreſsly declares that this is the ſong of praiſe which the firſt man repeated for the ſabbath-day.

Various conjectures have been formed concerning the place where man was firſt created, and where the garden of Eden was ſituated; but none of theſe have any ſolid foundation. The Jews tell us, that Eden was ſeparated from the reſt of the world by the ocean; and that Adam, being baniſhed therefrom, walked acroſs the ſea, which he found every way fordable, by reaſon of his enormous ſtature *. The Arabians imagined paradiſe to have been in the air, and that our firſt parents were thrown down from it on their tranſgreſſion, as Vulcan is ſaid to have been thrown down headlong from heaven by Jupiter.

* This juſt the p ture of Orion o Polyphem of the poe *Æneid.* iii. 665, 664. x. 763.

Strange ſtories are told concerning Adam's children. That he had none in the ſtate of innocence, is certain from ſcripture; that his marriage with Eve was not conſummated till after the fall, cannot be proved from thence. Some imagine, that, for many years after the fall, Adam denied himſelf the connubial joys by way of penance; others, that he cohabited with another woman.

man. The Mahometans tell us, that our firſt parents having been thrown headlong from the celeſtial paradiſe, Adam fell upon the iſle of Serendib, or Ceylon, in the Eaſt Indies; and Eve on Iodda, a port of the Red Sea, not far from Mecca. After a ſeparation of upwards of 200 years, they met in Ceylon, where they multiplied: according to ſome Eve had twenty, according to others only eight, deliveries; bringing forth at each time twins, a male and a female, who afterwards married. The Rabbins, imagine that Eve brought forth Cain and Abel at a birth; that Adam wept for Abel an hundred years in the valley of tears near Hebron, during which time he did not cohabit with his wife; and that this ſeparation would probably have continued longer, had it not been forbid by the angel Gabriel. The inhabitants of Ceylon affirm, that the ſalt lake on the mountain of Colembo conſiſts wholly of the tears which Eve for one hundred years together ſhed becauſe of Abel's death.

Some of the Arabians tell us, that Adam was buried near Mecca on mount Abukobeis; others, that Noah, having laid his body in the ark, cauſed it to be carried after the deluge to Jeruſalem by Melchiſedek the ſon of Shem: of this opinion are the Eaſtern Chriſtians; but the Perſians affirm that he was interred in the iſle of Serendib, where his corps was guarded by lions at the time the giants warred upon one another.—St Jerom imagined that Adam was buried at Hebron; others, on mount Calvary. Some are of opinion that he died on the very ſpot where Jeruſalem was afterwards built; and was buried on the place where Chriſt ſuffered, that ſo his bones might be ſprinkled with the Saviour's blood!!!

Adam (Melchior) lived in the 17th century. He was born in the territory of Grotkaw in Sileſia, and educated in the college of Brieg, where the dukes of that name, to the utmoſt of their power, encouraged learning and the reformed religion as profeſſed by Calvin. Here he became a firm Proteſtant, and was enabled to purſue his ſtudies by the liberality of a perſon of quality, who had left ſeveral exhibitions for young ſtudents. He was appointed rector of a college at Heidelberg, where he publiſhed his firſt volume of illuſtrious men in the year 1615. This volume, which conſiſted of philoſophers, poets, writers on polite literature, and hiſtorians, &c. was followed by three others; that which treated of divines was printed in 1619; that of the lawyers came next; and, finally, that of the phyſicians: the two laſt were publiſhed in 1620. All the learned men, whoſe lives are contained in theſe four volumes, lived in the 16th, or beginning of the 17th century, and are either Germans or Flemings; but he publiſhed in 1618 the lives of twenty divines of other countries in a ſeparate volume. All his divines are Proteſtants. The Lutherans were not pleaſed with him, for they thought him partial; nor will they allow his work to be a proper ſtandard, whereby to judge of the learning of Germany. He wrote other works beſides his lives, and died in 1622.

Adam's *Apple*. See Aurantium.

Adam's *Needle*. See Yucca.

Adam's *Peak*, a high mountain of the Eaſt Indies, in the iſland of Ceylon, on the top of which they believe the firſt man was created. See Adam.

Adam or **Adom**, a town in the Peræa, or on the other ſide the Jordan, over-againſt Jericho, where the Jordan began to be dried up on the paſſage of the Iſraelites; (Joſhua.)

ADAMA, or **Admah**, one of the towns that were involved in the deſtruction of Sodom; (Moſes).

ADAMANT, a name ſometimes given to the diamond*. It is likewiſe applied to the ſcoriæ of gold, the magnet, &c.

ADAMIC earth, a name given to common red clay, alluding to that ſpecies of earth of which the firſt man is ſuppoſed to have been made.

ADAMITES, in eccleſiaſtical hiſtory, the name of a ſect of ancient heretics, ſuppoſed to have been a branch of the Baſilidians and Carpocratians.

Epiphanius tells us, that they were called Adamites from their pretending to be re-eſtabliſhed in the ſtate of innocence, and to be ſuch as Adam was at the moment of his creation, whence they ought to imitate him in his nakedneſs. They deteſted marriage; maintaining, that the conjugal union would never have taken place upon earth had ſin been unknown; and that the privilege of enjoying women in common, was one of the rights which flowed from their eſtabliſhment in original purity.

This obſcure and deteſtable ſect did not at firſt laſt long; but it was revived in the twelfth century by one Tandamus, ſince known by the name of *Tanchelin*, who propagated his errors at Antwerp, in the reign of the emperor Henry V. He maintained, that there ought to be no diſtinction between prieſts and laymen, and that fornication and adultery were meritorious actions. Tanchelin had a great number of followers, and was conſtantly attended by 3000 of theſe profligates in arms. His ſect did not however continue long after his death: but another appeared under the name of *Turlupins*, in Savoy and Dauphiny, where they committed the moſt brutal actions in open day.

About the beginning of the fifteenth century, one Picard, a native of Flanders, ſpread theſe errors in Germany and Bohemia, particularly in the army of the famous Ziſca, notwithſtanding the ſevere diſcipline he maintained. Picard pretended that he was ſent into the world as a new Adam, to re-eſtabliſh the law of nature; and which, according to him, conſiſted in expoſing every part of the body, and having all the women in common. This ſect found alſo ſome partizans in Poland, Holland, and England: they aſſembled in the night; and it is aſſerted, that one of the fundamental maxims of their ſociety was contained in the following verſe:

Jura, perjura, ſecretum prodere noli.

ADAMSHIDE, a diſtrict of the circle of Raſtenburg, belonging to the king of Pruſſia, which, with Dombroſken, was bought, in 1737, for 42,000 dollars.

ADAMSON (Patrick), a Scottiſh prelate, archbiſhop of St Andrews. He was born in the year 1536, in the town of Perth, where he received the rudiments of his education; and afterwards ſtudied Philoſophy, and took his degree of maſter of arts at the univerſity of St Andrews. In the year 1566, he ſet out for Paris, as tutor to a young gentleman. In the month of June of the ſame year, Mary queen of Scots being delivered of a ſon, afterwards James VI. of Scotland, and Firſt of England, Mr Adamſon wrote a Latin poem on the occaſion. This proof of his loyalty involved him

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* See *Diamond*.

Adamſon (Patrick.)

him in ſome difficulties, having been confined in France for ſix months; nor would he have got off eaſily, had not queen Mary, and ſome of the principal nobility, intereſted themſelves in his behalf. As ſoon as he recovered his liberty, he retired with his pupil to Bourges. He was in this city during the maſſacre at Paris; and the ſame bloody perſecuting ſpirit prevailing among the catholics at Bourges, as at the metropolis, he lived concealed for ſeven months in a public houſe, the maſter of which, upwards of ſeventy years of age, was thrown from the top thereof, and had his brains daſhed out, for his charity to heretics. Whilſt Mr Adamſon lay thus in his ſepulchre, as he called it, he wrote his Latin poetical verſion of the Book of Job, and his Tragedy of Herod in the ſame language. In the year 1573, he returned to Scotland; and, having entered into holy orders, became miniſter of Paiſley. In the year 1575, he was appointed one of the commiſſioners, by the general aſſembly, to ſettle the juriſdiction and policy of the church; and the following year he was named, with Mr David Lindſay, to report their proceedings to the earl of Mortoun, then regent. About this time, the earl made him one of his chaplains; and, on the death of biſhop Douglas, promoted him to the archiepiſcopal ſee of St Andrews, a dignity which brought upon him great trouble and uneaſineſs: for now the clamour of the Preſbyterian party roſe very high againſt him, and many inconſiſtent abſurd ſtories were propagated concerning him. Soon after his promotion, he publiſhed his catechiſm in Latin verſe, a work highly approved even by his enemies; but, nevertheleſs, they ſtill continued to perſecute him with great violence. In 1578, he ſubmitted himſelf to the general aſſembly, which procured him peace but for a very little time; for, the year following, they brought freſh accuſations againſt him. In the year 1582, being attacked with a grievous diſeaſe, in which the phyſicians could give him no relief, he happened to take a ſimple medicine from an old woman, which did him ſervice. The woman, whoſe name was Aliſon Pearſon, was thereupon charged with witchcraft, and commited to priſon, but eſcaped out of her confinement; however, about four years afterwards, ſhe was again found and burnt for a witch. In 1583, king James came to St Andrews; and the archbiſhop, being much recovered, preached before him, and diſputed with Mr. Andrew Melvil, in preſence of his majeſty, with great reputation, which drew upon him freſh calumny and perſecution. The king, however, was ſo well pleaſed with him, that he ſent him embaſſador to queen Eliſabeth, at whoſe court he reſided for ſome years. His conduct, during his embaſſy, has been variouſly reported by different authors. Two things he principally laboured, *viz.* the recommending the king his maſter to the nobility and gentry of England, and the procuring ſome ſupport for the epiſcopal party in Scotland. By his eloquent preaching, he drew after him ſuch crowds of people, and raiſed in their minds ſuch a high idea of the young king his maſter, that queen Elizabeth forbad him to enter the pulpit during his ſtay in her dominions. In 1584, he was recalled, and ſat in the parliament held in Auguſt at Edinburgh. The Preſbyterian party was ſtill very violent againſt the archbiſhop. A provincial ſynod was held at St Andrews in April 1586: the archbiſhop was here accuſed and excommunicated: he appealed to the king and the States, but this availed him little; for the mob being excited againſt him, he durſt ſcarce appear in public. At the next general aſſembly, a paper being produced, containing the archbiſhop's ſubmiſſion, he was abſolved from the excommunication. In 1588, freſh accuſations were brought againſt him. The year following, he publiſhed the Lamentations of the prophet Jeremiah in Latin verſe; which he dedicated to the king, complaining of his hard uſage. In the latter end of the ſame year, he publiſhed a tranſlation of the Apocalypſe, in Latin verſe; and a copy of Latin verſes, addreſſed alſo to his majeſty, when he was in great diſtreſs. The king, however, was ſo far from giving him aſſiſtance, that he granted the revenue of his ſee to the duke of Lennox; ſo that the remaining part of this prelate's life was very wretched, he having hardly ſubſiſtence for his family. He died in 1591.

ADANA, a town of Aſia, in Natolia, and in the province of Carmania. It is ſeated on the river Choquen; on the banks of which ſtands a ſtrong little caſtle built on a rock. It has great numbers of beautiful fountains brought from the river by means of water-works. Over the river there is a ſtately bridge of fifteen arches, which leads to the water-works. The climate is very pleaſant and healthy, and the winter mild and ſerene: but the ſummer is ſo hot as to oblige the principal inhabitants to retire into the neighbouring mountains, where they ſpend ſix months among ſhady trees and grottoes, in a moſt delicious manner. The adjacent country is rich and fertile, and produces melons, cucumbers, pomegranates, pulſe, and herbs of all ſorts, all the year round; beſides corn, wine, and fruits in their proper ſeaſon. It is thirty miles eaſt of Tarſus, on the road to Aleppo. E. long. 35. 42. N. lat. 38. 10.

ADANSONIA, Ethiopian Sour-gourd, or Monkies-bread; a genus of the monodelphia order, belonging to the polyandria claſs of plants. It has its name from one Mr Adanſon, a French ſurgeon, who brought a curious collection of plants and ſeeds from Senegal in Africa.

Species. We know but of one ſpecies belonging to this genus at preſent. It is a native of Africa and South America. The leaves of the young plants are entire, of an ablong form, about four or five inches long, and almoſt three broad towards the top, having ſeveral veins running from the middle rib; they are of a lucid green colour. As the plants advance in height, the leaves alter, and are divided into three parts, and afterwards into five lobes, which ſpread out in the ſhape of an hand. The fruit is almoſt as large as a man's head, the ſhell woody and cloſe, having a greeniſh downy coat; it is divided into 10, 12, or 14 cells within, which contain a good number of kidney-ſhaped ſeeds, as large as the tip of a man's little finger; theſe are cloſely ſurrounded with a mealy pulp of an acid taſte. ——According to Mr Adanſon's account, theſe trees grow in plains of barren moveable ſand, which being continually ſhifted by the wind, admit of no tracts whereby the traveller can be guided over them. The ſize of the trunks, roots, and branches, is very ſurpriſing, their circumference being ſometimes 65 or 70 feet, but their height only from 8 to 12. Theſe trunks were divided into many horizontal branches, which touched the ground at their extremities; theſe were from 45 to 55 feet long, and ſo large in circumference that each branch was equal to a monſtrous tree in Europe; and where the water of a neighbouring river had waſhed away the earth ſo as to leave the roots of one of theſe trees bare and open to ſight, they meaſured 110 feet in length, without including thoſe parts which remained covered with ſand.

Culture. This tree is propagated from ſeeds, which are brought from the countries where they grow naturally. Being natives only of hot climates, the plants will not thrive in the open air in Britain, even in ſummer. The ſeeds are therefore to be ſown in pots, and plunged into a hot-bed, where the plants will appear in about ſix weeks, and in a ſhort time after be fit to tranſplant. They muſt then be planted each in a ſeparate pot, in light ſandy earth, and plunged into a hot-bed, ſhading them until they have taken root: after which they ſhould have freſh air admitted every day in warm weather; but muſt be ſparingly watered, as being apt to rot. They grow quickly for two or three years, but afterwards make little progreſs; the lower part of the ſtem then begins to ſwell, and put out lateral branches, inclining to a horizontal poſition, and covered with a light grey bark.——Some of this kind of plants were raiſed from ſeeds obtained from Grand Cairo by Dr William Sherard, in 1724, and were grown to the height of 18 feet; but were all deſtroyed by the ſevere froſt in 1740; after which they were unknown in Britain till the return of Mr Adanſon to Paris in 1754.

ADAPTERS, or ADOPTERS. See CHEMISTRY, n° 80.

ADAR, the name of a Hebrew month, anſwering to the end of February and beginning of March, the 12th of their ſacred, and 6th of their civil year. On the 7th day of it, the Jews keep a feaſt for the death of Moſes; on the 13th, they have the faſt of Eaſter; and on the 14th, they celebrate the feaſt of Purim, for their deliverance from Haman's conſpiracy.—As the lunar year, which the Jews followed in their calculations, is ſhorter than the ſolar, by about 11 days, which at the end of three years make a month, they then intercalate a 13th month, which they call *Veader*, or the *ſecond Adar*.

ADARCE, a kind of concreted ſalts found on reeds and other vegetables, and applied by the ancients as a remedy in ſeveral cutaneous diſeaſes.

ADARCON, in Jewiſh antiquity, a gold coin mentioned in ſcripture, worth about 15 s. ſterling.

ADARME, in commerce, a ſmall weight in Spain, which is alſo uſed at Buenos-Aires, and in all Spaniſh America. It is the 16th part of an ounce, which at Paris is called the *demi-gros*. But the Spaniſh ounce is ſeven *per cent.* lighter than that of Paris. Stephens renders it in Engliſh by a *dram*.

ADATAIS, ADATSI, or ADATYS, in commerce, a muſlin or cotton-cloth, very fine and clear, of which the piece is ten French ells long, and three quarters broad. It comes from the Eaſt-Indies; and the fineſt is made at Bengal.

ADCRESCENTES, among the Romans, denoted a kind of ſoldiery, entered in the army, but not yet put on duty; from theſe the ſtanding forces were recruited. See ACCENSI.

ADDA, in geography, a river of Switzerland and Italy, which riſes in mount Braulio, in the country of the Griſons, and, paſſing through the Valteline, traverſes the lake Como and the Milaneſe, and falls into the Po, near Cremona.

ADDEPHAGIA, in medicine, a term uſed by ſome phyſicians, for gluttony, or a voracious appetite.

ADDER, in zoology, a vulgar name for the VIPER; which ſee.

ADDERS-TONGUE. See OPHIOGLOSSUM; and MATERIA MEDICA, n° 504.

ADDER-WORT, or SNAKEWEED. See BISTORTA; and MATERIA MEDICA, n° 170.

ADDEXTRATORES, in the court of Rome, the pope's mitre-bearers, ſo called, according to Ducange, becauſe they walk at the pope's right-hand when he rides to viſit the churches.

ADDICE, or ADZE, a kind of crooked ax uſed by ſhip-wrights, carpenters, coopers, &c.

ADDICTI, in antiquity, a kind of ſlaves, among the Romans, adjudged to ſerve ſome creditor whom they could not otherwiſe ſatiſfy, and whoſe ſlaves they became till they could pay or work out the debt.

ADDICTION, among the Romans, was the making over goods to another, either by ſale, or by legal ſentence; the goods ſo delivered were called *bona addicta*. Debtors were ſometimes delivered over in the ſame manner; and thence called *ſervi addicti*.

ADDICTIO IN DIEM, among the Romans, the adjudging a thing to a perſon for a certain price, unleſs by ſuch a day the owner, or ſome other, give more for it.

ADDISON (Lancelot), ſon of Lancelot Addiſon a clergyman, was born at Mouldiſmeaburne, in the pariſh of Croſby Ravenſworth in Weſtmoreland, in the year 1632. He was educated at Queen's College, Oxford; and at the Reſtoration of king Charles II. accepted of the chaplainſhip of the garriſon of Dunkirk: but that fortreſs being delivered up to the French in 1662, he returned to England, and was ſoon after made chaplain to the garriſon of Tangier; where he continued ſeven years, and was greatly eſteemed. In 1670, he returned to England, and was made chaplain in ordinary to the king; but his chaplainſhip of Tangier being taken from him on account of his abſence, he found himſelf ſtraitened in his circumſtances, when he ſeaſonably obtained the rectory of Milſton, in Wiltſhire, worth about 120l. per annum. He afterwards became a prebendary of Sarum; took his degree of doctor of divinity at Oxford; and in 1683 was made dean of Litchfield, and the next year archdeacon of Coventry. His life was exemplary; his converſation pleaſing, and greatly inſtructive; and his behaviour as a gentleman, a clergyman, and a neighbour, did honour to the place of his reſidence. He wrote, 1. A Short Narrative of the Revolutions of the Kingdoms of Fez and Morocco: 2. The preſent Hiſtory of the Jews: 3. A Diſcourſe on Catechiſing: 4. A Modeſt Plea for the Clergy: 5. An Introduction to the Sacrament: 6. The firſt State of Mahometiſm: and ſeveral other pieces. This worthy divine died on the 20th of April 1703 and left three ſons: Joſeph, the ſubject of the next article; Gulſton, who died while governor of Fort St George; Lancelot, maſter of arts, and fellow of Magdalen College in Oxford; and one daughter, firſt married to Dr Sartre prebendary of Weſtminiſter, and afterwards to Daniel Combes, Eſq.

ADDISON (Joſeph), one of the brighteſt geniuſes that this or any other country has produced, was the

Addiſon.

ſon of dean Addiſon, the ſubject of the laſt article. He was born at Milſton, near Ambreſbury, in Wiltſhire, on the 11th of May 1672; and not being thought likely to live, was baptized the ſame day. He received the firſt rudiments of his education at the place of his nativity, under the reverend Mr Naiſh; but was ſoon removed to Saliſbury, under the care of Mr Taylor; and from thence to the charter-houſe, where he commenced his acquaintance with Sir Richard Steele. About fifteen, he was entered at Queen's College, Oxford, where he applied very cloſely to the ſtudy of claſſical learning, in which he made a ſurpriſing proficiency. In the year 1687, Dr Lancaſter, dean of Magdalen College, having, by chance, ſeen a Latin poem of Mr Addiſon's, was ſo pleaſed with it, that he immediately got him elected into that houſe, where he took up his degrees of bachelor and maſter of arts. His Latin pieces, in the courſe of a few years, were exceedingly admired in both univerſities; nor were they leſs eſteemed abroad, particularly by the celebrated Boileau, who is reported to have ſaid, that he would not have written againſt Perrault, had he before ſeen ſuch excellent pieces by a modern hand. He publiſhed nothing in Engliſh before the twenty-ſecond year of his age; when there appeared a ſhort copy of verſes written by him, and addreſſed to Mr Dryden, which procured him great reputation from the beſt judges. This was ſoon followed by a tranſlation of the Fourth Georgic of Virgil, (omitting the ſtory of Ariſtæus), much commended by Mr Dryden. He wrote alſo the Eſſay on the Georgics, prefixed to Mr Dryden's tranſlation. There are ſeveral other pieces written by him about this time; amongſt the reſt, one dated the 3d of April 1694, addreſſed to H. S. that is, Dr Sacheverel, who became afterwards ſo famous, and with whom Mr Addiſon lived once in the greateſt friendſhip; but their intimacy was ſome time after broken off by their diſagreement in political principles. In the year 1695, he wrote a poem to king William on one of his campaigns, addreſſed to Sir John Somers, lord keeper of the great ſeal. This gentleman received it with great pleaſure, took the author into the number of his friends, and beſtowed on him many marks of his favour. Mr. Addiſon had been cloſely preſſed, while at the univerſity, to enter into holy orders; and had once reſolved upon it: but his great modeſty, his natural diffidence, and an uncommonly delicate ſenſe of the importance of the ſacred function, made him afterwards alter his reſolution; and having expreſſed an inclination to travel, he was encouraged thereto by his patron above-mentioned, who, by his intereſt, procured him from the crown a penſion of L. 300 *per annum* to ſupport him in his travels. He accordingly made a tour to Italy in the year 1699; and, in 1701, he wrote a poetical epiſtle from Italy to the earl of Halifax, which has been univerſally eſteemed as a moſt excellent performance. It was tranſlated into Italian verſe by the abbot Antonio Maria Salvini, Greek profeſſor at Florence. In the year 1705, he publiſhed an account of his travels, dedicated to lord Somers; which, though at firſt but indifferently received, yet in a little time met with its deſerved applauſe. In the year 1702, he was about to return to England, when he received advice of his being appointed to attend prince Eugene, who then commanded for the emperor in Italy: but the death of king William happening ſoon after, put an end to this affair as well as his penſion; and he remained for a conſiderable time unemployed. But an unexpected incident at once raiſed him, and gave him an opportunity of exerting his fine talents to advantage: for in the year 1704, the lord-treaſurer Godolphin happened to complain to lord Halifax, that the duke of Marlborough's victory at Blenheim had not been celebrated in verſe in the manner it deſerved; and intimated, that he would take it kindly, if his lordſhip, who was the known patron of the poets, would name a gentleman capable of doing juſtice to ſo elevated a ſubject. Lord Halifax replied, ſomewhat haſtily, that he did know ſuch a perſon, but would not mention him; adding, that long had he ſeen, with indignation, men of no merit maintained in luxury at the public expence, whilſt thoſe of real worth and modeſty were ſuffered to languiſh in obſcurity. The treaſurer anſwered very coolly, that he was ſorry there ſhould be occaſion for ſuch an obſervation, but that he would do his endeavour to wipe off ſuch reproaches for the future; and he engaged his honour, that whoever his lordſhip named, as a perſon capable of celebrating this victory, ſhould meet with a ſuitable recompence. Lord Halifax thereupon named Mr Addiſon; inſiſting, however, that the treaſurer himſelf ſhould ſend to him; which he promiſed. Accordingly he prevailed on Mr Boyle (afterwards lord Carlton) then chancellor of the exchequer, to make the propoſal to Mr Addiſon; which he did in ſo polite a manner, that our author readily undertook the taſk. The lord-treaſurer had a ſight of the piece, when it was carried no farther than the celebrated ſimile of the angel; and was ſo pleaſed with it, that he immediately appointed Mr Addiſon a commiſſioner of appeals, vacant by the promotion of Mr Locke, choſen one of the lords commiſſioners for trade. The Campaign is addreſſed to the duke of Marlborough; it gives a ſhort view of the military tranſactions in 1704, and contains a noble deſcription of the two great actions at Schellemberg and Blenheim. The poem will be admired as long as the victory is remembered. In 1705, he attended lord Halifax to Hanover; and the enſuing year was appointed under-ſecretary to Sir Charles Hedges ſecretary of ſtate; in which office he acquitted himſelf ſo well, that the earl of Sunderland, who ſucceeded Sir Charles in December, continued Mr Addiſon in his employment. A taſte for operas beginning at this time to prevail in England, and many perſons having ſolicited Mr Addiſon to write one, he complied with their requeſt, and compoſed his Roſamond. This however, whether from the defect of the muſic, for which our language is ſaid by ſome to be very improper, or from the prejudices in favour of the Italian taſte, did not ſucceed upon the ſtage; but the poetry of it has, and always will be, juſtly admired. About this time, Sir Richard Steele compoſed his comedy of the Tender Huſband, to which Mr Addiſon wrote a prologue. Sir Richard ſurpriſed him with a dedication of this play, and acquainted the public, that he was indebted to him for ſome of the moſt excellent ſtrokes in the performance. The marquis of Wharton, being appointed lord lieutenant of Ireland in 1709, took Mr Addiſon with him as his ſecretary. Her majeſty alſo made him keeper of the records of Ireland, and, as a farther mark of her favour, conſiderably augmented the ſalary annexed to that place. Whilſt he was in this kingdom, the Tatler was firſt publiſhed; and he diſcovered his friend Sir Richard Steele to be the author, by an obſervation on Virgil, which he had communicated to him. He afterwards aſſiſted conſiderably in carrying on this paper, which the author acknowledges. The Tatler being laid down, the Spectator was ſet on foot, and Mr Addiſon furniſhed great part of the moſt admired papers; thoſe which he wrote are diſtinguiſhed by one of the letters of the muſe, C, L, I, O. The Spectator made its firſt appearance in March 1711, and was brought to a concluſion in September 1712. He had likewiſe a conſiderable ſhare in the Guardian, another paper in the ſame taſte, which entertained the town in 1713 and 1714. His celebrated Cato appeared in 1713. He formed the deſign of a tragedy upon this ſubject when he was very young, and wrote it when on his travels: he retouched it in England, without any intention of bringing it on the ſtage; but his friends being perſuaded it would ſerve the cauſe of liberty, he was prevailed on by their ſolicitations, and it was accordingly exhibited on the theatre with a prologue by Mr Pope, and an epilogue by Dr Garth. It was received with the moſt uncommon applauſe, having run thirty-five nights without interruption; and all parties, however divided, agreed in giving this play the commendation it deſerved. It was no leſs eſteemed abroad, having been tranſlated into French, Italian, and German; and it was acted at Leghorn, and ſeveral other places, with vaſt applauſe. The Jeſuits at St Omers made a Latin verſion of it, and the ſtudents acted it with great magnificence. Her majeſty queen Anne ſignified an inclination of having the play dedicated to her; but the author having propoſed to dedicate it elſewhere, to avoid giving offence, publiſhed it without a dedication. He had formed a deſign of writing another tragedy upon the death of Socrates; but this he never carried into execution. He intended alſo to have compoſed an Engliſh dictionary upon the plan of the Italian (Della Cruſca); but, upon the death of the queen, being appointed ſecretary to the lords juſtices, he had not leiſure to carry on ſuch a work. When the earl of Sunderland was appointed lord lieutenant of Ireland, Mr Addiſon was again made ſecretary for the affairs of that kingdom; and, upon the earl's being removed from the lieutenancy, he was choſen one of the lords of trade. In 1715, he began the Freeholder, a political paper, which was much admired, and proved of great uſe at that juncture. He publiſhed alſo, about this time, verſes to Sir Godfrey Kneller upon the king's picture, and ſome to the princeſs of Wales with the tragedy of Cato. In April 1717, his majeſty king George appointed our author one of his principal ſecretaries of ſtate; but the fatigue of his employment having brought upon him an aſthmatic diſorder, with which he had been before afflicted, he reſigned his office, and retired from buſineſs. In his retirement, he applied himſelf to a religious work *, which he had begun long before; part of which, ſcarce finiſhed, has been printed in his works. He intended alſo to have given an Engliſh paraphraſe of ſome of David's pſalms; but a long and painful relapſe cut ſhort all his deſigns, and carried off this great man on the 17th of June 1719, in the 54th year of his age. He died at Holland-houſe, near Kenſington, leaving behind him one daughter by the counteſs of Warwick, to whom he was married in 1716. After his diſeaſe, Mr Tickel, by the author's inſtructions, publiſhed his works in four volumes in 4to. In this edition, there are ſeveral pieces hitherto unmentioned, viz. The Diſſertation on Medals; which, though not publiſhed till after his death, yet he had collected the materials, and began to put them in order, at Vienna, in 1702. A pamphlet, entitled, The preſent State of the War, and the Neceſſity of an Augmentation, conſidered. The late Trial and Conviction of Count Tariff. The Whig Examiner came out on the 14th of September 1716: there were five of theſe papers attributed to Mr Addiſon, and they are the ſevereſt pieces he ever wrote. The Drummer, or the Haunted Houſe, a comedy not taken notice of in this edition, was publiſhed afterwards as Mr Addiſon's, by Sir Richard Steele. He is ſaid alſo to have been the author of a performance entitled *Diſſertatio de inſignioribus Romanorum Poetis*, and of a Diſcourſe on Ancient and Modern Learning.

ADDITAMENT, ſomething added to another. Thus phyſicians call the ingredients added to a medicine already compounded, *additaments*.

ADDITION, is the joining together or uniting two or more things, or augmenting a thing by the acceſſion of others thereto.

ADDITION, in ARITHMETIC, ALGEBRA, *&c.* ſee theſe articles.

ADDITION, in muſic, a dot marked on the right ſide of a note, ſignifying, that it is to be ſounded or lengthened half as much more as it would have been without ſuch mark.

ADDITIONS, in heraldry, ſome things added to a coat of arms, as marks of honour; and therefore directly oppoſite to abatements. Among additions we reckon BORDURE, QUARTER, CANTON, GYRON, PILE, *&c.* See theſe articles.

ADDRESS, a term often uſed to expreſs the ſkill and propriety with which an affair is conducted.

Games of ADDRESS. See GAMES.

An ADDRESS, in a particular acceptation, is a congratulation, petition, or remonſtrance, preſented to a ſuperior, eſpecially to the king.

ADDUCENT MUSCLES, or ADDUCTORS, in anatomy, thoſe muſcles which pull one part of the body towards another.

ADEL, a kingdom on the eaſtern coaſt of Africa, which reaches as far as the ſtraits of Babelmandel, which unites the Red Sea to the ſea of Arabia. This country produces corn, and feeds a great number of cattle. The inhabitants drive a trade in gold, ſilver, ivory, oil, frankincenſe, a ſort of pepper, and other merchandizes of Arabia and the Indies. The king was formerly a vaſſal to the grand negus of Abyſſinia: but being Mahometans, and the Abyſſinians a ſort of Chriſtians, they could not agree; and in 1535 came to an open rupture, when the Adelines threw off the yoke, ſeeking protection from the Grand Signior. The principal places are, Adela, ſeated in the centre of the country, and is the town where the king reſides: Zeila, near the Arabian Sea, is a rich town, and has a good trade: Barbora, near the ſea-coaſt, is an ancient trading town. It rains very ſeldom in this country.

* Evidences of the Xian religion.

ADELIA, a genus of the monadelphia order, belonging to the diœcia claſs of plants. Of this genus there are three ſpecies; the *bernardia*, the *ricinella*, and *acidoton*, for which we have no proper names in Engliſh. They are natives of Jamaica, and are akin to the ricenus or croton, and may be propagated in hot-beds from ſeeds procured from Jamaica; but they have little beauty, and are therefore ſeldom cultivated.

ADELME, or Aldhelm, ſon to Kenred, nephew to Ina, king of the Weſt-Saxons; after having been educated abroad, was abbot of Malmſbury 30 years. He was the firſt Engliſhman who wrote in Latin, the firſt who brought poetry into England, and the firſt biſhop of Sherburn. He lived in great eſteem till his death, which happened in 709. He was canonzied, and many miracles were told of him. He is mentioned with great honour by Camden and Bayle, and his life was written by William of Malmſbury.

ADELPHIANI, in church-hiſtory, a ſect of ancient heretics, who faſted always on Sundays.

ADEMPTION, in the civil law, implies the revocation of a grant, donation, or the like.

ADEN, formerly a rich and conſiderable town of Arabia the Happy. It is ſeated by the ſea-ſide, a little eaſtward of the ſtraits of Babelmandel.

ADENANTHERA, bastard flower-fence, a genus of the monogynia order, belonging to the decandria claſs of plants. Only one ſpecies of this plant is known in Britain: but there is a variety, with ſcarlet ſeeds; which, however, is rare, and grows very ſlowly. It is a native of India, and riſes to a conſiderable height. It is as large as the tamarind tree; ſpreads its branches wide on every ſide, and makes a fine ſhade; for which reaſon, it is frequently planted by the inhabitants in their gardens or near their habitations. The leaves of this tree are doubly winged, the flowers of a yellow colour, and diſpoſed in a long bunch. Theſe are ſucceeded by long twiſted membranaceous pods, incloſing ſeveral hard compreſſed ſeeds, of a beautiful ſcarlet, or ſhining black, colour. This plant muſt be raiſed in a hot-bed, and kept during winter in a ſtove.

ADENBURG, or Aldenburg, a town of Weſtphalia, and in the duchy of Burg, ſubject to the Elector Palatine. It is 12 miles N. E. of Cologne, and 17 W. of Bonn; E. long. 7.25. lat. 51. 2.

ADENOGRAPHY, that part of anatomy which treats of the glandular parts *.

ADENOIDES, glandulous, or of a glandular form; an epithet applied to the proſtatæ †.

* See *Anatomy*, n° 391, &c.

† *Ibid.* n° 371.

ADENOLOGY, the ſame with Adenography.

ADENOS, a kind of cotton, otherwiſe called *marine cotton*. It comes from Aleppo by the way of Marſeilles, where it pays 20 *per cent.* duty.

ADEONA, in mythology, the name of a goddeſs invoked by the Romans when they ſet out upon a journey.

ADEPHAGIA, in mythology, the goddeſs of gluttony, to whom the Sicilians paid religious worſhip.

ADEPS, in anatomy, the fat found in the abdomen. It alſo ſignifies animal fat of any kind *.

* *Ib.* n° 82.

ADEPTS, a term among alchemiſts for thoſe who pretended to have found the panacea or philoſophers-ſtone. See Chemistry, n° 5, 6.

ADEQUATE, ſomething equal to or exactly correſponding with another.

Adequate *Idea*, ſignifies a diſtinct or perfect conception of all the equalities of any object.

ABERBIJAN, a province of Perſia, bounded on the N. by Armenia Proper, on the S. by Irac-Agemi, on the E. by Ghilan, and on the W. by Curdiſtan. The principal town is Tauris; from 42. to 48. long. from 36. to 39. lat.

ADERNO, a ſmall place in the Val di Demona in the kingdom of Sicily: E. long. 15. 25. lat. 28. 5. The ancient Adranum: See Adranum.

ADESSENARIANS, Adessenarii, in church-hiſtory, a ſect of Chriſtians, who hold the real preſence of Chriſt's body in the euchariſt, though not by way of tranſubſtantiation. They differ conſiderably as to this preſence; ſome holding that the body of Chriſt is in the bread; others, that it is about the bread; and others that it is under the bread.

ADFILIATION, a Gothic cuſtom, whereby the children of a former marriage are put upon the ſame footing with thoſe of the ſecond. This is alſo called *unio prolium*, and ſtill retained in ſome parts of Germany.

AD FINES, (Antonine), a town of Swiſſerland, ſuppoſed to be the modern *Pfin*, in the north of the diſtrict of Turgow, on the rivulet Thur, not far from the borders of Suabia, about half-way between Conſtance and Frauenfield. So called, becauſe when Cecinna, general of the emperor Vitellius, with the auxiliary Rhetians, defeated the Helvetii, the former extended their borders thus far, their territory ending here; and, in time of the Romans, it was the laſt town in this quarter, and of ſome repute.

ADHA, (*Arab.*) A feſtival, which the Mahometans celebrate on the tenth day of the month *Dhoulhegiat*, which is the twelfth and laſt of their year. This month being particularly deſtined for the ceremonies which the Pilgrims obſerve at Mecca, it takes its name from thence, for the word ſignifies *the month of Pilgrimage*. On that day they ſacrifice with great ſolemnity, at Mecca, and nowhere elſe, a ſheep, which is called by the ſame name as the feſtival itſelf. The Turks commonly call this feſtival the *Great Beiram*, to diſtinguiſh it from the leſſer, which ends their faſt, and which the Chriſtians of the Levant call the *Eaſter of the Turks*. The Mahometans celebrate this feſtival, out of the city of Mecca, in a neighbouring valley; and ſometimes they ſacrifice there a camel. See Beiram.

ADHATODA, in botany. See Justicia.

Action of ADHERENCE, in Scots law; an action competent to a huſband or wife, to compel either party to adhere, in caſe of deſertion *.

* See L Part III. N° clx.

ADHESION, in a general ſenſe, implies the ſticking or adhering of two bodies together.

Adhesion, in philoſophy. See Attraction *of Coheſion*.

Adhesion, in anatomy, a term for one part ſticking to another, which in a natural ſtate are ſeparate. For the moſt part, if any of thoſe parts in the thorax or belly lie in contact, and inflame, they grow together. The lungs very frequently adhere to the pleura.

ADJACENT, an appellation given to ſuch things as are ſituated near, or adjoining to, each other.

ADIANTHUM, maiden-hair; a genus of the order of filices, belonging to the cryptogamia claſs of plants.

Species. Of this genus botanical writers enumerate

rate fifteen ſpecies; the moſt remarkable are the following. 1. The capillus veneris, or true maiden-hair, is a native of the ſouthern parts of France, from whence it is brought to Britain; though it is likewiſe ſaid to grow plentifully in Cornwall, and the Trichomanes has been almoſt univerſally ſubſtituted for it. 2. The pedatum, or American maiden-hair, is a native of Canada; and grows in ſuch quantities, that the French ſend it from thence in package for other goods, and the apothecaries at Paris uſe it for maiden-hair in the compoſitions wherein that is ordered. 3. The trapeziforme, or black American maiden-hair, is a native of Jamaica; and has ſhining black ſtalks, and leaves of an odd ſhape, which make an agreeable variety among other plants, ſo is ſometimes cultivated in gardens.

Culture. The firſt ſpecies grows naturally out of the joints of walls, and fiſſures of rocks. It ought therefore to be planted in pots filled with gravel and lime-rubbiſh; where it will thrive much better than in good earth. It muſt alſo be ſheltered under a frame during the winter.—The ſecond is to be treated in the ſame manner; but the third will not thrive in Britain, unleſs kept in a ſtove during the winter*.

ADIAPHORISTS, in church-hiſtory, a name importing lukewarmneſs, given, in the 16th century, to the moderate Lutherans, who embraced the opinions of Melancthon, whoſe diſpoſition was vaſtly more pacific than that of Luther.

ADJAZZO, Adrazzo, or Ajaccio, in geography, a handſome town and caſtle of Corſica in the Mediterranean, with a biſhop's ſee, and a good harbour. It is populous, and fertile in wine. It is 27 miles S. W. of Corte. E. long. 41. 54. lat. 38. 5.

ADJECTIVE. See Grammar, nº 50, 51.

ADIGE, a river in Italy, which taking its riſe ſouth of the lake Glace among the Alps, runs ſouth by Trent, then eaſt by Verona in the territory of Venice, and falls into the gulph of Venice, north of the mouth of the Po.

ADJOURNMENT, the putting off a court, or other meeting, till another day. There is a difference between the adjournment and the prorogation of the parliament; the former not only being for a ſhorter time, but alſo done by the houſe itſelf; whereas the latter is an act of royal authority.

ADIPOSE, a term uſed by anatomiſts for any cell, membrane, &c. that is remarkable for its fatneſs.

ADIRBEITSAN, in geogr. a province of Perſia, in Aſia, and part of the ancient Media. It is bounded on the N. by the province of Shirvan, on the S. by Irac-Agemi and Curdiſtan, on the E. by Gilan and the Caſpian ſea, and on the W. by Turcomania.

ADIT, the paſſage to, or entrance of, any thing; as the adit of a mine, &c.

ADJUDICATION, implies the act of adjudging, or determining, a cauſe in favour of ſome perſon.

Adjudication, in Scots law, the name of that action by which a creditor attaches the heritable eſtate of his debtor, or his debtor's heir, in order to appropriate it to himſelf, either in payment or ſecurity of his debt; or, that action by which the holder of an heritable right, labouring under any defect in point of form, may ſupply that defect*.

ADJUNCT, among philoſophers, ſignifies ſomething added to another, without being any neceſſary part of it. Thus water abſorbed by cloth or a ſpunge, is an adjunct, but no neceſſary part of either of theſe ſubſtances.

Adjunct, in metaphyſics, ſome quality belonging to either the body or mind, whether natural or acquired. Thus thinking is an adjunct of the mind, and growth an adjunct of the body.

Adjunct, in muſic; a word which is employed to denominate the connection or relation between the principal mode and the modes of its two-fifths, which, from the intervals that conſtitute the relation between them and it, are called its *adjuncts*.

Adjunct is alſo uſed to ſignify a colleague, or ſome perſon aſſociated with another as an aſſiſtant.

Adjunct *Gods*, or **Adjuncts** *of the Gods*, among the Romans, were a kind of inferior deities, added as aſſiſtants to the principal ones, to eaſe them in their functions. Thus, to Mars was adjoined Bellona and Nemeſis; to Neptune, Salacia; to Vulcan, the Cabiri; to the Good Genius, the Lares; to the Evil, the Lemures, &c.

Adjuncts, in rhetoric and grammar, ſignify certain words or things added to others, to amplify or augment the force of the diſcourſe.

Adjuncts, or **Adjoints**, in the royal academy of ſciences at Paris, denote a claſs of members, attached to the purſuit of particular ſciences. The claſs of *Adjuncts* was created in 1716, in lieu of the *Eleves*: they are twelve in number; two for geometry, two for mechanics, two for aſtronomy, two for anatomy, two for chemiſtry, and two for botany. The *Eleves* not taken into this eſtabliſhment were admitted on the foot of ſupernumerary *Adjuncts**.

ADJUTANT, in the military art, is an officer whoſe buſineſs it is to aſſiſt the major. Each battalion of foot and regiment of horſe has an adjutant, who receives the orders every night from the brigade-major; which, after carrying them to the colonel, he delivers out to the ſerjeants. When detachments are to be made, he gives the number to be furniſhed by each company or troop, and aſſigns the hour and place of rendezvous. He alſo places the guards; receives, and diſtributes the ammunition to the companies, &c.; and, by the major's orders, regulates the prices of bread, beer, and other proviſions. The word is ſometimes uſed by the French for an *aid-du-camp*.

Adjutants-*general*, among the Jeſuits, a ſelect number of fathers, reſiding with the general of the order, each of whom has a province or country aſſigned him, as England, Holland, &c. and their buſineſs is to inform the father-general of ſtate-occurrences in ſuch countries. To this end they have their correſpondents delegated, emiſſaries, viſitors, regents, provincials, &c.

ADJUTORIUM, a term uſed by phyſicians for any medicine in a preſcription but the capital one.

ADLE-EGGS, ſuch as have not received an impregnation from the ſemen of the cock.

ADLOCUTION, Adlocutio, in antiquity, is chiefly underſtood of ſpeeches made by Roman generals to their armies, to encourage them before a battle. We frequently find theſe adlocutions expreſſed on medals by the abbreviature Adlocut. Coh.—The general is ſometimes repreſented as ſeated on a tribunal, often on a bank or mount of turf, with the cohorts ranged orderly round him, in *manipuli* and *turmæ*. The uſual formula in adlocutions was, *Fortis eſſet ac fidus*.

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* See alſo Materia Medica, nº 73.

* See Law, Part III. nº clxxii. 6, &c.

* See Academy, Nº V. par. 8. et ſeq.

ADMINICLE, a term uſed, chiefly in old law-books, to imply an aid, help, aſſiſtance, or ſupport. The word is Latin, *adminiculum;* and derived from *adminiculor*, to prop, or ſupport.

ADMINICLES, in Scots law, ſignifies any writing or deed referred to by a party, in an action of law, for proving his allegations.

ADMINICULATOR, an ancient officer of the church, whoſe buſineſs it was to attend to and defend the cauſe of the widows, orphans, and others deſtitute of help.

ADMINISTRATION, in general, the government, direction, or management of affairs, and particularly the exerciſe of diſtributive juſtice; among eccleſiaſtics, it is often uſed to expreſs the giving or diſpenſing the ſacraments, &c.

ADMINISTRATION, is alſo the name given by the Spaniards in Peru to the ſtaple magazine, or warehouſe, eſtabliſhed at Callao, a ſmall town on the S. Sea, which is the port of Lima, the capital of that part of South America, and particularly of Peru. The foreign ſhips, which have leave to trade along that coaſt, are obliged to unload here, paying 13 *per cent.* of the price they ſell for, if the cargo be entire, and even 16 *per cent.* if otherwiſe; beſides which, they pay 3 *per* 1000, duty, for conſulſhip and ſome other ſmall royal rights and claims.

ADMINISTRATOR, in law. See there, N° xciv. 3, 7, 8. and clxi. 6.

ADMINISTRATOR, is ſometimes uſed for the preſident of a province; for a perſon appointed to receive, manage, and diſtribute, the revenues of an hoſpital or religious houſe; for a prince who enjoys the revenues of a ſecularized biſhopric; and for the regent of a kingdom, during a minority of the prince, or a vacancy of the throne.

ADMIRABILIS SAL, the ſame with Glauber's ſalt. See CHEMISTRY, n° 124.

ADMIRAL, a great officer, or magiſtrate, who has the government of a navy, and the hearing of all maritime cauſes.

Authors are divided with regard to the origin and denomination of this important officer, whom we find eſtabliſhed in moſt kingdoms that border on the ſea. But the moſt probable opinion is that of Sir Henry Spelman, who thinks, that both the name and dignity were derived from the Saracens, and, by reaſon of the holy wars, brought amongſt us; for *admiral*, in the Arabian language, ſignifies a prince, or chief ruler, and was the ordinary title of the governors of cities, provinces, &c. and therefore they called the commander of the navy by that name, as a name of dignity and honour. And indeed there are no inſtances of admirals in this part of Europe before the year 1284, when Philip of France, who had attended St Lewis in the wars againſt the Saracens, created an admiral. Du Cange aſſures us, that the Sicilians were the firſt, and the Genoeſe the next, who gave the denomination of Admiral to the commanders of their naval armaments; and that they took it from the Saracen or Arabic *Emir*, a general name for every commanding officer. As for the exact time when the word was introduced among us, it is uncertain; ſome think it was in the reign of Edward I. Sir Henry Spelman is of opinion that it was firſt uſed in the reign of Henry III. becauſe neither the laws of Oleron made in 1266, nor Bracton, who wrote about that time, make any mention of it; and that the term *admiral* was not uſed in a charter in the eighth of Henry III. wherein he granted this office to Richard de Lacey, by theſe words *Maritimam Angliæ;* but in the 56th year of the ſame reign, not only the hiſtorians, but the charters themſelves, very frequently uſe the word *admiral*.

Anciently there were generally three or four admirals appointed in the Engliſh ſeas, all of them holding the office *durante bene placito;* and each of them having particular limits under their charge and government; as admirals of the fleet of ſhips, from the mouth of the Thames northward, ſouthward, or weſtward. Beſides theſe, there were admirals of the Cinque Ports, as in the reign of Edward III. when one Willian Latimer was ſtyled *admiralis quinque portuum;* and we ſometimes find that one perſon has been admiral of the fleets to the ſouthward, northward, and weſtward: but the title of *admiralis Angliæ* was not frequent till the reign of Henry IV. when the king's brother had that title given him, which in all commiſſions afterwards was granted to the ſucceeding admirals. It may be obſerved, that there was a title above that of admiral of England, which was, *locum-tenens regis ſuper mare*, the king's lieutenant-general of the ſea; this title we find mentioned in the reign of Richard II.—Before the uſe of the word *admiral* was known, the title of *cuſtos maris* was made uſe of.

Lord High **ADMIRAL** *of England*, in ſome ancient records called *capitanus maritimarum*, an officer of great antiquity and truſt, as appears by the laws of Oleron, ſo denominated from the place they were made at by Richard I. The firſt title of Admiral of England, expreſsly conferred upon a ſubject, was given by patent of Richard II. to Richard Fitz-Allen, junr. earl of Arundel and Surrey; for thoſe who before enjoyed this office were ſimply termed admirals, though their juriſdiction ſeems as large, eſpecially in the reign of Edward III. when the court of admiralty was firſt erected.

This great officer has the management of all maritime affairs, and the government of the royal navy, with power of deciſion in all maritimes caſes, both civil and criminal: he judges of all things done upon or beyond the ſea, in any part of the world: upon the ſea-coaſts, in all ports and havens, and upon all rivers below the firſt bridge from the ſea. By him, vice-admirals, rear-admirals, and all ſea-captains, are commiſſioned; all deputies for particular coaſts, and coroners to view dead bodies found on the ſea-coaſts, or at ſea: he alſo appoints the judges for his court of admiralty, and may impriſon, releaſe, &c. All ports and havens are *infra corpus comitatus*, and the admiral hath no juriſdiction of any thing done in them. Between high and low water-mark, the common-law and the high-admiral have juriſdiction by turns, one upon the water, and the other upon the land.

The lord-admiral has power, not only over the ſeamen ſerving in his ſhips of war, but over all other ſeamen, to arreſt them for the ſervice of the ſtate; and, if any of them run away, without leave of the admiral, he hath power to make a record thereof, and certify the ſame to the ſheriffs, mayors, bailiffs, &c. who ſhall cauſe them to be apprehended and impriſoned.

To the lord high-admiral belong all penalties and amercements of all tranſgreſſions at ſea, on the ſea-ſhore, in ports and havens, and all rivers below the firſt bridge from the ſea; the goods of pirates and felons condemned or enſlaved, ſea-wrecks, goods floating on the ſea, or caſt on the ſhore (not granted to lords of manors adjoining to the ſea), and a ſhare of lawful prizes; alſo all great fiſhes, commonly called royal fiſhes, except whales and ſturgeons: to which add, a ſalary of 7000*l.* a-year.

In ſhort, this is ſo great an office, in point of truſt, honour, and profit, that it has been uſually given to princes of the blood, or the moſt eminent perſons among the nobility. We have had no high admiral for ſome years; the office being put in commiſſion, or under the adminiſtration of the lords commiſſioners of the admiralty, who by ſtatute have the ſame power and authority as the lord high-admiral.

High ADMIRAL *in Scotland*, a judge inveſted with ſupreme juriſdiction in all maritime caſes within that part of Britain.

ADMIRAL, alſo implies the commander in chief of any ſingle fleet or ſquadron; or, in general, any flag-officer whatever. The commander of a fleet carries his flag at the main-top-maſt head.

Vice ADMIRAL, is the commander of the ſecond ſquadron, and carries his flag at the fore-top-maſt head.

Rear ADMIRAL, is the commander of the third ſquadron, and carries his flag at the mizzen-top-maſt head.

Vice ADMIRAL, is alſo an officer appointed by the lords commiſſioners of the admiralty. There are ſeveral of theſe officers eſtabliſhed in different parts of Great Britain, with judges and marſhals under them, for executing juriſdiction within their reſpective limits. Their decrees, however, are not final, an appeal lying to the court of admiralty in London.

ADMIRAL is alſo an appellation given to the moſt conſiderable ſhip of a fleet of merchant-men, or of the veſſels employed in the cod-fiſhery of Newfoundland. This laſt has the privilege of chuſing what place he pleaſes on the ſhore to dry his fiſh; gives proper orders, and appoints the fiſhing-places to thoſe who come after him; and as long as the fiſhing-ſeaſon continues, he carries a flag on his main-maſt.

ADMIRAL, in zoology, the Engliſh name of a ſpecies of the voluta, a ſhell-fiſh belonging to the order of vermes teſtacea. See VOLUTA.

ADMIRALTY properly ſignifies the office of lord high-admiral, whether diſcharged by one ſingle perſon, or by joint commiſſioners called lords of the admiralty.

Court of ADMIRALTY, is a ſovereign court, held by the lord high-admiral, or lords of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal.—All crimes committed on the high-ſeas, or on great rivers below the firſt bridge next the ſea, are cognizable in this court only, and before which they muſt be tried by judge and jury. But in civil caſes the mode is different, the deciſions being all made according to the civil law. From the ſentences of the admiralty-judge an appeal always lay, in ordinary courſe, to the king in chancery, as may be collected from ſtatute 25 Hen. VIII. c. 19. which directs the appeal from the archbiſhop's courts to be determined by perſons named in the king's commiſſion, "like as in caſe of appeal from the admiral-court." But this is alſo expreſsly declared by ſtatute 8 Eliz. c. 5. which enacts, that upon an appeal made to the chancery, the ſentence definitive of the delegates appointed by commiſſion ſhall be final.

Appeals from the vice-admiralty courts in America, and our other plantations and ſettlements, may be brought before the courts of admiralty in England, as being a branch of the admiral's juriſdiction, tho' they may alſo be brought before the king in council. But in caſe of prize-veſſels, taken in time of war, in any part of the world, and condemned in any courts of admiralty or vice-admiralty as lawful prize, the appeal lies to certain *commiſſioners of appeals* conſiſting chiefly of the privy council, and not to judges delegates. And this by virtue of divers treaties with foreign nations, by which particular courts are eſtabliſhed in all the maritime countries of Europe for the deciſion of this queſtion, Whether lawful prize or not: for this being a queſtion between ſubjects of different ſtates, it belongs entirely to the law of nations, and not to the municipal laws of either country, to determine it.

Court of ADMIRALTY in Scotland. See LAW, Part III. N° clvii. 15.

ADMIRATION, in general, denotes ſurpriſe, wonder, or aſtoniſhment, at any extraordinary event. Sometimes alſo it ſignifies the expreſſion of wonder. The point of admiration, in grammar, is marked thus [!].

ADMONITION, in eccleſiaſtical affairs, a part of diſcipline much uſed in the ancient church. It was the firſt act, or ſtep, towards the puniſhment or expulſion of delinquents. In caſe of private offences, it was performed according to the evangelical rule, privately: in caſe of public offence, openly, before the church. If either of thoſe ſufficed for the recovery of the fallen perſon, all further proceedings in the way of cenſure ceaſed: if they did not, recourſe was had to excommunication.

ADMONITIO *Fuſtium*, among the Romans, a military puniſhment, not unlike our whipping, only it was performed with vine-branches.

ADMORTIZATION, in the feudal cuſtoms, the reduction of the property of lands or tenements to mortmain. See MORTMAIN.

ADNATA, in anatomy, one of the coats of the eye, which is alſo called *conjunctiva* and *albuginea* *.

ADNATA, is alſo uſed for any hair, wool, or the like, which grows upon animals or vegetables.

ADNOUN, is uſed by ſome grammarians to expreſs what we more uſually call an Adjective. The word is formed by way of analogy, to adverb; in regard adjectives have much the ſame office and relation to nouns, that adverbs have to verbs. Biſhop Wilkins uſes the word *adname* in another ſenſe, *viz.* for what we otherwiſe call a prepoſition.

ADOLESCENCE, the ſtate of growing youth; or that period of a perſon's age commencing from his infancy, and terminating at his full ſtature or manhood. The word is formed of the Latin *adoleſcere*, to grow.—The ſtate of adoleſcence laſts ſo long as the fibres continue to grow, either in magnitude or firmneſs. The fibres being arrived at the degree of firmneſs and tenſion ſufficient to ſuſtain the parts, no longer yield and give way to the efforts of the nutritious matter to extend them; ſo that their farther ac-

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* See *Anatomy*, n° 406. b, 1.

cretion is ſtopped, from the very law of their nutrition.

ADOLLAM, or ODOLLAM, (anc. geogr.) a town in the tribe of Judah, to the eaſt of Eleutheropolis. David is ſaid to have hid himſelf in a cave near this town, (Bible.)

ADON, a populous village in the province of Stuhl-Weiſſemberg, belonging to Hungary. It lies in a fruitful country, towards the river Danube. Long. 19. 20. Lat. 47. 30.

ADONAI, one of the names of the Supreme Being in the ſcriptures. The proper meaning of the word is *my lords*, in the plural number; as *Adoni* is *my lord*, in the ſingular.

ADONIA, in antiquity, ſolemn feaſts in honour of Venus, and in memory of her beloved Adonis. The Adonia were obſerved with great ſolemnity by moſt nations; Greeks, Phœnicians, Lycians, Syrians, Egyptians, &c. From Syria, they are ſuppoſed to have paſſed into India. The prophet Ezekiel * is underſtood to ſpeak of them. They were ſtill obſerved at Alexandria, in the time of St Cyril; and at Antioch in that of Julian the apoſtate, who happened to enter that city during the ſolemnity, which was taken for an ill omen. The Adonia laſted two days: on the firſt of which certain images of Venus and Adonis were carried, with all the pomp and ceremonies practiſed at funerals; the women wept, tore their hair, beat their breaſts, &c. imitating the cries and lamentations of Venus for the death of her paramour. This lamentation they called Αδωνιασμος. The Syrians were not contented with weeping, but gave themſelves diſcipline, ſhaved their heads, &c. Among the Egyptians, the queen herſelf uſed to carry the image of Adonis in proceſſion. St Cyril mentions an extraordinary ceremony practiſed by the Alexandrians: A letter was written to the women of Byblus, to inform them that Adonis was found again: this letter was thrown into the ſea, which (it was pretended) did not fail punctually to convey it to Byblus in ſeven days; upon the receipt of which, the Byblian women ceaſed their mourning, ſung his praiſes, and made rejoicings as if he were raiſed to life again: Or rather, according to Meurſius, the two offices of mourning and rejoicing made two diſtinct feaſts, which were held at different times of the year, the one ſix months after the other; Adonis being ſuppoſed to paſs half the year with Proſerpine, and half with Venus.—The Egyptian Adonia are ſaid to have been held in memory of the death of Oſiris; by others, of his ſickneſs and recovery. Biſhop Patrick dates their origin from the ſlaughter of the firſt-born under Moſes.

*Ch. viii 14.

ADONIDES, in botany, a name given to botaniſts who deſcribed or made catalogues of plants cultivated in any particular place.

ADONIS, ſon to Cinyras king of Cyprus, the darling of the goddeſs Venus: being killed by a wild boar in the Idalian woods, he was turned into a flower of a blood-colour, ſuppoſed to be the Anemone. Venus was inconſolable; and no grief was ever more celebrated than this, moſt nations having perpetuated the memory of it by a train of anniverſary ceremonies *. Among Shakeſpeare's poems, is a long one on the ſubject of Venus's affection for Adonis. See MYRRHA.

*See *Adonia*.

ADONIS, in zoology. See EXCOCOETUS.

ADONIS, or BIRDS-EYE, or PHEASANTS-EYE; a genus of the polyandria order, belonging to the polygynia claſs of plants.

Species. Of this genus there are four different ſpecies enumerated; the moſt remarkable are the following. 1. The annua, or common adonis, is a native of Kent, where it is found in great plenty in the fields ſown with wheat. Its flowers are of a beautiful ſcarlet colour, and appear in the beginning of June; the ſeeds ripening in Auguſt and September. Great quantities of theſe flowers are ſold in London, under the name of Red Morocco. 2. The æſtivalis, or annual adonis, with yellow flowers, grows much taller than the firſt, has its leaves thinner ſet, and of a lighter colour. 3. The vernalis, or perennial adonis, grows naturally on the mountains of Bohemia, Pruſſia, and other parts of Germany. It flowers the latter end of March, or beginning of April; the ſtalks riſe about a foot and a half high; and when the roots are large, and have ſtood unremoved for ſome years, they will put out a great number of ſtalks from each root; on the top of each of theſe grows one large yellow flower. 4. The apennina, repreſented on Plate III. fig. 1. is a native of Siberia and the Appenines.

Culture. The firſt two ſpecies, being annual, muſt be propagated from ſeeds, which ought to be ſown in autumn, ſoon after they are ripe, or they will be in danger of not growing up that year. They thrive beſt in a light ſoil. The third and fourth ſpecies are likewiſe to be propagated from ſeeds, which muſt be ſown in autumn, or they ſeldom ſucceed. When the plants come up, they muſt be carefully kept clear from weeds; and in very dry weather their growth will be promoted by being now and then watered. They ſhould remain in the place where they are ſown till the ſecond year; and be tranſplanted thence in autumn, to the place where they are to remain.

ADOPTIANI, in church-hiſtory, a ſect of ancient heretics, followers of Felix of Urgel, and Elipand of Toledo, who, towards the end of the eighth century, advanced the notion, that Jeſus Chriſt, in his human nature, is the ſon of God, not by nature, but by adoption.

ADOPTION, an act by which any one takes another into his family, owns him for his ſon, and appoints him for his heir.—The cuſtom of adoption was very common among the ancient Romans; yet it was not practiſed, but for certain cauſes expreſſed in the laws, and with certain formalities uſual in ſuch caſes: they firſt learnt it from the Greeks, among whom it was called Υιοϑεσια. This adoption was a ſort of imitation of nature, intended for the comfort of thoſe who had no children: wherefore he that was to adopt was to have no children of his own, and to be paſt the age of getting any; nor were eunuchs allowed to adopt, as being under an actual impotency of begetting children; neither was it lawful for a young man to adopt an elder, becauſe that would have been contrary to the order of nature; nay, it was even required that the perſon who adopted ſhould be eighteen years older than his adopted ſon, that there might at leaſt appear a probability of his being the natural father.—Among the Turks, the ceremony of *adoption* is performed by obliging the perſon adopted to paſs thro' the ſhirt of the adopter. Hence, among that people, to adopt, is expreſſed by the phraſe, *to draw another through my ſhirt*. It is ſaid, that ſomething like this has alſo been obſerved among the Hebrews; where the prophet Elijah adopted Eliſha for his ſon and ſucceſſor, and communicated to him the gift of prophecy, by letting fall his cloak or mantle on him. But *adoption*, properly ſo called, does not appear to have been practiſed among the ancient Jews: Moſes ſays nothing of it in his laws; and Jacob's adoption of his two grandſons, Ephraim and Manaſſeh, is not ſo properly an adoption, as a kind of ſubſtitution, whereby thoſe two ſons of Joſeph were allotted an equal portion in Iſrael with his own ſons.

ADOPTION is alſo uſed, in theology, for a federal act of God's free grace; whereby thoſe who are regenerated by faith, are admitted into his houſehold, and entitled to a ſhare in the inheritance of the kingdom of heaven.

ADORATION, the act of rendering divine honours; or of addreſſing a being, as ſuppoſing it a god. The word is compounded of *ad*, to; and *os, oris*, mouth; and literally ſignifies, to apply the hand to the mouth; *Manum ad os admovere, q. d.* to kiſs the hand; this being, in the eaſtern countries, one of the great marks of reſpect and ſubmiſſion.—The Romans practiſed adoration at ſacrifices, and other ſolemnities; in paſſing by temples, altars, groves, &c.; at the ſight of ſtatues, images, or the like, whether of ſtone or wood, wherein any thing of divinity was ſuppoſed to reſide. Uſually there were images of the gods placed at the gates of cities, for thoſe who went in or out, to pay their reſpects to.—The ceremony of adoration among the ancient Romans was thus: The devotee having his head *covered*, applied his right hand to his lips, the fore-finger reſting on his thumb, which was erect, and thus bowing his head, turned himſelf round from left to right. The kiſs thus given was called *oſculum labratum*; for ordinarily they were afraid to touch the images of their gods themſelves with their profane lips. Sometimes, however, they would kiſs their feet, or even knees, it being held an incivility to touch their mouths; ſo that the affair paſſed at ſome diſtance. Saturn, however, and Hercules, were adored with the head *bare*; whence the worſhip of the laſt was called *inſtitutum peregrinum*, and *ritus Græcanicus*, as departing from the cuſtomary Roman method, which was to ſacrifice and adore with the face veiled, and the cloths drawn up to the ears, to prevent any interruption in the ceremony by the ſight of unlucky objects.—The Jewiſh manner of adoration was by proſtration, bowing, and kneeling.—The Chriſtians adopted the Grecian rather than the Roman method, and adored always *uncovered*. The ordinary poſture of the ancient Chriſtians was kneeling, but on Sundays ſtanding: and they had a peculiar regard to the Eaſt, to which point they ordinarily directed their prayers.

ADORATION is more particularly uſed for the act of praying, or preferring our requeſts or thankſgivings to Almighty God.

ADORATION is alſo uſed for certain extraordinary civil honours or reſpects which reſemble thoſe paid to the Deity, yet are given to men.

The Perſian manner of *Adoration*, introduced by Cyrus, was by bending the knee, and falling on the face at the prince's feet, ſtriking the earth with the forehead, and kiſſing the ground. This ceremony, which the Greeks called προσκυνειν, Conon refuſed to perform to Artaxerxes, and Caliſthenes to Alexander the Great, as reputing it impious and unlawful.

The *Adoration* performed to the Roman and Grecian emperors conſiſted in bowing or kneeling at the prince's feet, laying hold of his purple robe, and preſently withdrawing the hand and clapping it to the lips. Some attribute the origin of this practice to Conſtantius. It was only perſons of ſome rank or dignity that were entitled to the honour. Bare kneeling before the emperor to deliver a petition, was alſo called *adoration*.

The practice of *adoration* may be ſaid to be ſtill ſubſiſting in England, in the ceremony of kiſſing the king's or queen's hand, and in ſerving them at table, both being performed kneeling.

ADORATION is more particularly uſed for kiſſing one's hand in preſence of another, as a token of reverence.—The Jews adored by kiſſing their hands and bowing down their heads; whence, in their language, *kiſſing* is properly uſed for *adoration*.

ADORATION is alſo uſed among Roman writers for a high ſpecies of applauſe given to perſons, who had ſpoken or performed well in public *. We meet with adoration paid to orators, actors, muſicians, &c. The method of expreſſing it was, by riſing, putting both hands to their mouth, and then returning them towards the perſon intended to be honoured.

* See *Acclamation*.

ADORATION is alſo uſed, in the court of Rome, for the ceremony of kiſſing the pope's feet.—The introduction of adoration among the Romans is aſcribed to the low flattery of Vitellius, who, upon the return of C. Cæſar from Syria, would not approach him otherwiſe than with his head covered, turning himſelf round, and then falling on his face. Heliogabalus reſtored the practice, and Alexander Severus again prohibited it. Diocleſian redemanded it; and it was, in ſome meaſure, continued under the ſucceeding princes, even after the eſtabliſhment of Chriſtianity, as Conſtantine, Conſtantius, &c. It is particularly ſaid of Diocleſian, that he had gems faſtened to his ſhoes, that divine honours might be more willingly paid him, by kiſſing his feet. The like uſage was afterwards adopted by the popes, and is obſerved to this day. Theſe prelates finding a vehement diſpoſition in the people to fall down before them and kiſs their feet, procured crucifixes to be faſtened on their ſlippers; by which ſtratagem, the adoration intended for the pope's perſon is ſuppoſed to be transferred to Chriſt. Divers acts of this adoration we find offered even by princes to the pope.

ADORATION is alſo uſed for a method of electing a pope. The election of popes is performed two ways; by *adoration*, and by *ſcrutiny*. In election by adoration, the cardinals ruſh haſtily, as if agitated by ſome ſpirit, to the adoration of ſome one among them, to proclaim him pope. When the election is carried by ſcrutiny, they do not adore the new pope till he is placed on the altar.

Barbarous ADORATION is a term uſed, in the laws of king Canute, for that performed after the manner of the heathens who adored idols. The Romiſh church is charged with the adoration of ſaints, martyrs, images, crucifixes, relics, the virgin, and the hoſt; all which by Proteſtants are generally aggravated into idolatry, on a ſuppoſition, that the honour thus paid to them is abſolute and ſupreme, called by way of diſtinction *Latria*, which is due only to God. Roman-catholics, on the contrary, explain them, as only a relative or ſubordinate worſhip, called *Dulia* and *Hyperdulia*, which terminates ultimately in God alone. But may not the ſame be ſaid of the idol-worſhip of the heathens? The Phœnicians adored the winds, on account of the terrible effects produced by them; the ſame was adopted by moſt of the other nations, Perſians, Greeks, Romans, &c. The Perſians chiefly paid their adorations to the ſun and fire; ſome ſay alſo to rivers, the wind, *&c.* The motive of adoring the ſun was the benefits they received from that glorious luminary, which of all creatures has doubtleſs the beſt pretenſions to ſuch homage.

ADOSCULATION, a term uſed by Dr Grew, to imply a kind of impregnation, without intromiſſion; and in this manner he ſuppoſes the impregnation of plants is effected by the falling of the farina fœcundans on the piſtil.

ADOSEE, in heraldry, ſignifies two figures or bearings being placed back to back.

ADOUR, the name of a river of France, which riſes in the mountains of Bigorre, and running N. by Tarbes through Gaſcony, afterwards turns E. and, paſſing by Dax, falls into the bay of Biſcay, below Bayonne.

ADOXA, Tuberous Moschatel, or Hollow-Root; a genus of the tetragynia order; belonging to the octandria claſs of plants. This is a native of the woods in Britain, and ſeveral parts of Europe: it is a very low plant, ſeldom riſing more than four or five inches high; the leaves reſemble thoſe of bulbous fumitory; the flower-ſtalk ariſes immediately from the root, on the top of which grow four or five ſmall flowers of an herbaceous white colour, which appear in the beginning of April, and the berries ripen in May; ſoon after which, the leaves decay. The herb may be procured by tranſplanting the roots any time after the leaves decay, till winter. They muſt be planted in the ſhade, under ſhrubs; for they will not thrive if expoſed to the ſun. The leaves and flowers ſmell like muſk, from whence it has by ſome been called *muſk-crowfoot.*

AD *Pondus Omnium*, among phyſicians, an abbreviation in their preſcriptions, ſignifying that the laſt mentioned ingredient is to weigh as much as all the reſt together.

Ad *Quod Damnum*, in the Engliſh law, a writ directed to the ſheriff, commanding him to inquire into the damage which may befal from granting certain privileges to a place, as a fair, market, or the like.

ADRAMMELECH, one of the gods of the inhabitants of Sepharvaim, who were ſettled in the country of Samaria, in the room of thoſe Iſraelites who were carried beyond the Euphrates. The Sepharvaites made their children paſs through the fire, in honour of this idol and another called Anamelech. It is ſuppoſed, that Adrammelech meant the ſun, and Anamelech the moon: the firſt ſignifies *the magnificent king*; the ſecond *the gentle king*. See Anamelech.

ADRAMYTTIUM, (anc. geogr.) now *Andramiti;* a town of Myſia Major, at the foot of mount Ida, an Athenian colony, with a harbour and dock near the Caïcus. *Adramyttenus* the epithet; as, *Adramyttenus Sinus*, a part of the Egean Sea, on the coaſt of Myſia; *Adramyttenus Convenus*, ſeſſions or aſſizes. The eighth in order of the nine *Conventus Juridici* of the province of Aſia.

ADRANUM, or Hadranum, (anc. geogr.) now *Aderno*, a town of Sicily, built by the elder Dionyſius, at the foot of mount Ætna, (Diodorus Siculus), four hundred years before Chriſt. So called from the temple of Adranus, or Hadranus, a god much worſhipped by the Sicilians; with a river of the ſame name, (Stephanus,) now *Fiume d' Aderno.* The inhabitants, *Hadranitani*, and *Adranitæ.*

ADRASTIA, in antiquity, an epithet given to the goddeſs Nemeſis, or Revenge. It was taken from king Adraſtus, who firſt erected a temple to that deity.

Adrastia *Certamina*, in antiquity, a kind of Pythian games, inſtituted by Adraſtus king of Argos, in the year of the world 2700, in honour of Apollo, at Sicyon. Theſe are to be diſtinguiſhed from the Pythian games celebrated at Delphi.

ADRASTUS, king of Argos, ſon of Talaus and Lyſianiſſa, daughter of Polybius king of Sicyon, acquired great honour in the famous war of Thebes, in ſupport of Polynices his ſon-in-law, who had been excluded the ſovereignty of Thebes by Eteocles his brother, notwithſtanding their reciprocal agreement. Adraſtus, followed by Polynices and Tydeus his other ſon-in-law, by Capaneus and Hippomedon his ſiſter's ſons, by Amphiaraus his brother-in-law, and by Parthenopæus, marched againſt the city of Thebes; and this is the expedition of the Seven Worthies, which the poets have ſo often ſung. They all loſt their lives in this war, except Adraſtus, who was ſaved by his horſe called Arion. This war was revived ten years after by the ſons of thoſe deceaſed warriors, which was called the war of the Epigones, and ended with the taking of Thebes. None of them loſt their lives, except Ægialeus ſon of Adraſtus; which afflicted him ſo much, that he died of grief in Megara, as he was leading back his victorious army.

ADRAZZO, or Ajaccio. The ſame with Adjazzo.

ADRIA, or Hadria, (anc. geog.) the name of two towns in Italy. One in the country of the Veneti, on the river Tartarus, between the Padus and the Atheſis, called *Atria* by Pliny and Ptolemy, but *Adrias* by Strabo. Another on the river Vomanus, in the territory of the Piceni, (to which Antonine's Itinerary from Rome is directed,) the country of the anceſtors of the emperor Adrian. From which of theſe the Adriatic ſea is denominated, is matter of doubt. A third opinion is, that it is ſo called from Adrias the ſon of Joan, of Italian origin; (Euſtathius in Dionyſium.)

ADRIANUM (or Adriaticum) mare, (anc. geog.) now the Gulf of Venice, a large bay in the Mediterranean, between Dalmatia, Sclavonia, Greece, and Italy. It is called by the Greeks, Αδριας Κολπος; and *Adria* by the Romans, as *Arbiter Adriæ Notus*, Hor. Cicero calls it *Hadrianum Mare*; Virgil has *Hadriaticas Undas*. It is commonly called *Mare Adriaticum*, without an aſpiration; but whether it ought to have one, is a diſpute: if the appellation is from *Hadria*, the town of the Piceni, it muſt be written *Hadriaticum*, becauſe the emperor's name, who thence derives his origin, is on coins and ſtones *Hadrianus;* but if from the town in the territory of Venice, as the more ancient, and of which that of the Piceni is a colony, this will juſtify the common appellation *Adriaticum.*

ADRIAN, or Hadrian, (Publius Ælius), the Roman emperor. He was born at Rome the 24th of January, in the 76th year of Chriſt. His father left him an orphan, at ten years of age, under the guardianſhip of Trajan, and Cœlius Tatianus a Roman knight. He began to ſerve very early in the armies, having been tribune of a legion before the death of Domitian. He was the perſon choſen by the army of Lower Mœſia, to carry the news of Nerva's death to Trajan, ſucceſſor to the empire. He accompanied Trajan in moſt of his expeditions, and particularly diſtinguiſhed himſelf in the ſecond war againſt the Daci; and having before been quæſtor, as well as tribune of the people, he was now ſucceſſively prætor, governor of Pannonia, and conſul. After the ſiege of Atra in Arabia was raiſed, Trajan, who had already given him the government of Syria, left him the command of the army: and at length, when he found death approaching, it is ſaid he adopted him. Adrian, who was then in Antiochia, as ſoon as he received the news thereof, and of Trajan's death, declared himſelf emperor, on the 11th of Auguſt, 117. No ſooner had he arrrived at the imperial dignity, than he made peace with the Perſians, to whom he yielded up great part of the conqueſts of his predeceſſors; and from generoſity, or policy, he remitted the debts of the Roman people, which, according to the calculation of thoſe who have reduced them to modern money, amounted to 22,500,000 golden crowns; and he burnt all the bonds and obligations relating to thoſe debts, that the people might be under no apprehenſion of being called to an account for them afterwards. There are medals in commemoration of this fact, in which he is repreſented holding a flambeau in his hand, to ſet fire to all thoſe bonds which he had made void. He went to viſit all the provinces; and did not return to Rome till the year 118, when the ſenate decreed him a triumph, and honoured him with the title of Father of his country; but he refuſed both, and deſired that Trajan's image might triumph. No prince travelled more than Adrian; there being hardly one province in the empire which he did not viſit. In 120 he went into Gaul; from thence he went over to Britain, in order to ſubdue the Caledonians, who were making continual inroads into the provinces. Upon his arrival, they retired towards the north: he advanced however as far as York, where he was diverted from his intended conqueſt by the deſcription ſome old ſoldiers he found there, who had ſerved under Agricola, gave him of the country. In hopes, therefore, of keeping them quiet by enlarging their bounds, he delivered up to the Caledonians all the lands lying between the two Friths and the Tyne; and at the ſame time, to ſecure the Roman province from their future incurſions, built the famous wall which ſtill bears his name (A). Having thus ſettled matters in Britain, he returned to Rome, where he was honoured with the title of Reſtorer of Britain, as appears by ſome medals. He ſoon after went into Spain, to Mauritania, and at length into the Eaſt, where he quieted the commotions raiſed by the Parthians. After having viſited all the provinces of Aſia, he returned to Athens in 125, where he paſſed the winter, and was initiated in the myſteries of Eleuſinian Ceres. He went from thence to Sicily, chiefly to view mount Ætna, contemplate its phenomena, and enjoy the beautiful and extenſive proſpect afforded from its top. He returned to Rome the beginning of the year 129; and, according to ſome, he went again, the ſame year, to Africa; and, after his return from thence, to the eaſt. He was in Egypt in the year 132, reviſited Syria the year following, returned to Athens in 134, and to Rome in 135. The perſecution againſt the Chriſtians was very violent under his reign; but it was at length ſuſpended, in conſequence of the remonſtrances of Quadrat biſhop of Athens, and Ariſtides, two Chriſtian philoſophers, who preſented the emperor with ſome books in favour of the Chriſtian religion. He conquered the Jews; and, by way of inſult, erected a temple to Jupiter on Calvary, and placed a ſtatue of Adonis in the manger of Bethlehem; he cauſed alſo the images of ſwine to be engraven on the gates of Jeruſalem. At laſt he was ſeized with a dropſy, which vexed him to ſuch a degree, that he became almoſt raving mad. A great number of phyſicians were ſent for, and to the multitude of them he aſcribed his death. He died at Baiæ in the 63d year of his age, having reigned 21 years. The Latin verſes (B) he addreſſed to his ſoul have been much criticiſed and variouſly interpreted. There are ſome fragments of his Latin poems extant, and there are Greek verſes of his in the Anthology. He alſo wrote the hiſtory of

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(A) This work, though called by the Roman hiſtorians *murus*, which ſignifies a wall of ſtone, was only compoſed of earth covered with green turf. It was carried on from the Solway Frith, a little weſt of the village of Burgh on the Sands, in as direct a line as poſſible, to the river Tyne on the eaſt, at the place where the town of Newcaſtle now ſtands; ſo that it muſt have been above 60 Engliſh, and near 70 Roman miles in length. It conſiſted of four parts: 1. The principal *agger*, mound of earth, or rampart, on the brink of the ditch. 2. The ditch on the north ſide of the rampart. 3. Another rampart on the ſouth ſide of the principal one, about five paces diſtant from it. 4. A large rampart on the north ſide of the ditch.—This laſt was probably the military way to the line of forts on this work: it was ſo to thoſe formerly built by Agricola; and if it did not ſerve the ſame purpoſe in this, there muſt have been no military way attending it.—The ſouth rampart might ſerve for an inner defence in caſe the enemy ſhould beat them from any part of the principal rampart, or it might be deſigned to protect the ſoldiers from any ſudden attack of the provincial Britons.—For many ages, this work hath been in ſo ruinous a condition, that it is impoſſible to diſcover its original dimenſions with certainty. From their appearance its ſeems probable that the principal rampart was at leaſt 10 or 12 feet high, and the ſouth one not much leſs; but the north one was conſiderably lower. From the dimenſions of the ditch taken as it paſſes through a lime-ſtone quarry near Harlow hill, it appears to have been 9 feet deep, and 11 wide at the top, but ſomewhat narrower at the bottom. The north rampart was about 20 feet diſtant from the ditch.

(B) The verſes are theſe:

Animula vagula, blandula,
Hoſpes, comeſque corporis,
Quæ nunc abibis in loca
Pallidula, rigida, nudula,
Nec, ut ſoles, dabis jocos?

Thus tranſlated by Mr Pope:

Ah! fleeting ſpirit! wand'ring fire,
That long haſt warm'd my tender breaſt,
Muſt thou no more this frame inſpire?
No more a pleaſing cheerful gueſt?
Whither, ah whither art thou flying?
To what dark undiſcover'd ſhore?
Thou ſeem'ſt all trembling, ſhiv'ring, dying,
And wit and humour are no more!

his own life: to which, however, he did not chuſe to put his name; but that of Phlegon, one of his freedmen, a very learned perſon, was prefixed to it *. He had great wit, and an extenſive memory. He underſtood the ſciences perfectly well; but was very jealous of others who excelled in them. He was alſo cruel, envious, and laſcivious. Antoninus his ſucceſſor obtained his apotheoſis; and prevented the reſciſſion of his acts, which the ſenate once intended.

ADRIAN IV. (Pope), the only Engliſhman who ever had the honour of ſitting in the papal chair. His name was Nicholas Brekeſpere; and he was born at Langley, near St Alban's, in Hertfordſhire. His father having left his family, and taken the habit of the monaſtery of St Alban's, Nicholas was obliged to ſubmit to the loweſt offices in that houſe, for daily ſupport. After ſome time, he deſired to take the habit in that monaſtery, but was rejected by the abbot Richard. Upon this, he reſolved to try his fortune in another country, and accordingly went to Paris; where, though in very poor circumſtances, he appplied himſelf to his ſtudies with great aſſiduity, and made a wonderful proficiency. But having ſtill a ſtrong inclination to a religious life, he left Paris, and removed to Provence, where he became a regular clerk in the monaſtery of St Rufus. He was not immediately allowed to take the habit; but paſſed ſome time, by way of trial, in recommending himſelf to the monks by a ſtrict attention to all their commands. This behaviour, together with the beauty of his perſon, and prudent converſation, rendered him ſo acceptable to thoſe religious, that after ſome time they intreated him to take the habit of the canonical order. Here he diſtinguiſhed himſelf ſo much by his learning and ſtrict obſervance of the monaſtic diſcipline, that, upon the death of the abbot, he was choſen ſuperior of that houſe; and we are told that he rebuilt that convent. Pope Eugenius III. being appriſed of the great merit of Nicholas, and thinking he might be ſerviceable to the church in a higher ſtation, created him cardinal-biſhop of Alba in 1146. In 1148, his Holineſs ſent him legate to Denmark and Norway; where, by his fervent preaching and diligent inſtructions, he converted thoſe barbarous nations to the Chriſtian faith; and erected Upſal into an archiepiſcopal ſee. When he returned to Rome, he was received by the pope and cardinals with great marks of honour: and Pope Anaſtaſius, who ſucceeded Eugenius, happening to die at this time, Nicholas was unanimouſly choſen to the holy ſee, in November 1154, and he took the name of *Adrian*. When the news of his promotion reached England, king Henry II. ſent Robert abbot of St Alban's, and three biſhops, to Rome, to congratulate him on his election; upon which occaſion Adrian granted very conſiderable privileges to the monaſtery of St Alban's, particularly an exemption from all epiſcopal juriſdiction, excepting to the ſee of Rome. Adrian, in the beginning of his pontificate, boldly withſtood the attempts of the Roman people to recover their ancient liberty under the conſuls, and obliged thoſe magiſtrates to abdicate their authority, and leave the government of the city to the pope. In 1155, he drove the heretic Arnaud * of Breſſe, and his followers, out of Rome. The ſame year he excommunicated William king of Sicily, who ravaged the territories of the church, and abſolved that prince's ſubjects from their allegiance. About the ſame time, Frederic king of the Romans, having entered Italy with a powerful army, Adrian met him near Sutrium, and concluded a peace with him. At this interview, Frederic conſented to hold the pope's ſtirrup whilſt he mounted on horſeback. After which, his holineſs conducted that prince to Rome, and in St Peter's church placed the imperial crown on his head, to the great mortification of the Roman people, who aſſembled in a tumultuous manner, and killed ſeveral of the Imperialiſts. The next year a reconciliation was brought about between the pope and the Sicilian king, that prince taking an oath to do nothing farther to the prejudice of the church, and Adrian granting him the title of *king of the two Sicilies*. He built and fortified ſeveral caſtles, and left the papal dominions in a more flouriſhing condition than he found them. But notwithſtanding all his ſucceſs, he was extremely ſenſible of the diſquietudes attending ſo high a ſtation; and declared to his countryman John of Saliſbury, that all the former hardſhips of his life were mere amuſement to the misfortunes of the popedom; that he looked upon St Peter's chair to be the moſt uneaſy ſeat in the world; and that his crown ſeemed to be clapped burning on his head †. He died September 1. 1159, in the fourth year and tenth month of his pontificate; and was buried in St Peter's church, near the tomb of his predeceſſor Eugenius.—There are extant ſeveral letters, and ſome homilies, written by Pope Adrian.

ADRIAN, cardinal prieſt, of the title of St Chryſogonus, was a native of Cornetto in Tuſcany. Innocent VIII. ſent him nuncio into Scotland and into France; and after he had been clerk and treaſurer of the apoſtolic chamber, pope Alexander VI. whoſe ſecretary he had been, honoured him with the cardinal's hat. His life was a continued ſcene of odd alterations. He narrowly eſcaped death the day Alexander VI. poiſoned himſelf by miſtake. Afterward he drew upon himſelf the hatred of Julius II. ſo that he was obliged to go and hide himſelf in the mountains of Trent. Having been recalled by Leo X. he was ſo ungrateful, that he engaged in a conſpiracy againſt him. The pope pardoned his fault: but the cardinal, not caring to truſt to this, made his eſcape, and it could never be known exactly what was become of him. He was one of the firſt that effectually reformed the Latin ſtyle. He ſtudied Cicero with great ſucceſs, and made many excellent obſervations on the propriety of the Latin tongue. The treatiſe he compoſed *De Sermone Latino*, is a proof of this. He had begun a Latin tranſlation of the Old Teſtament. He wrote *De Vera Philoſophia*: This treatiſe was printed at Cologn 1548.

ADRIAN VI. (Pope), was born at Utrecht in 1459. His father was not able to maintain him at ſchool, but he got a place at Louvain in a college in which a certain number of ſcholars were maintained *gratis*. It is reported that he uſed to read in the night-time by the light of the lamps in the churches or ſtreets. He made a conſiderable progreſs in all the ſciences; led an exemplary life; and there never was a man leſs intriguing and forward than he was. He took his degree of doctor of divinity at Louvain; was ſoon after made canon of St Peter's, and profeſſor of divinity at Utrecht, and then dean of St Peter's and vice-chancellor of the univerſity.

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* Vide *Spartian*, in *Adriano*.

* See *Arnaud*.

† Baronius Annal. tom. xii. an. 1154.

verſity. He was obliged to leave an academical life, to be tutor to the archduke Charles. This young prince made no great progreſs under him: however, never was a tutor more conſiderably rewarded; for it was by Charles V.'s credit he was raiſed to the papal throne. Leo X. had given him the Cardinal's hat in 1517. After this pope's death, ſeveral cabals in the conclave ended in the election of Adrian, with which the people of Rome were very much diſpleaſed. He would not change his name, and in every thing he ſhewed a great diſlike for all oſtentation and ſenſual pleaſures, though ſuch an averſion had been long ago out of date. He was very partial to Charles V. and did not enjoy much tranquillity under the triple crown. He lamented much the wicked morals of the clergy, and wiſhed to eſtabliſh a reformation of manners among them. He died Sept. 14. 1523.

ADRIANI (Joanni Battiſta) was born of a patrician family at Florence, in 1511. He wrote a Hiſtory of his own Times, in Italian; which is a continuation of Guicciardini, beginning at the year 1536; to which Thuanus acknowledges himſelf greatly indebted: beſide which, he compoſed ſix funeral orations, on the emperor Charles V. and other noble perſonages; and is thought to have been the author of a long letter on ancient painters and ſculptors, prefixed to the third volume of Vaſari. He died at Florence in 1579.

ADRIANISTS, in eccleſiaſtical hiſtory, a ſect of heretics divided into two branches; the firſt were diſciples of Simon Magus, and flouriſhed about the year 34. Theodoret is the only perſon who has preſerved their name and memory; but he gives us no account of their origin. Probably this ſect, and the ſix others which ſprung from the Simonians, took their name from the particular diſciples of Simon. The ſecond were the followers of Adrian Hamſtead, the anabaptiſt; and held ſome particular errors concerning Chriſt.

ADRIANOPLE, a city of Turky in Europe, in the province of Romania, and the ſee of an archbiſhop under the patriarch of Conſtantinople. It is about ſeven or eight miles in circumference, including the old city and ſome gardens. The houſes are low, moſtly built of mud and clay, and ſome of brick: and the ſtreets are exceeding dirty. The walls and towers are in a great meaſure fallen to decay. However, there is a beautiful bazar, or market, half a mile long, called Ali Baſſa. It is a vaſt arched building, with ſix gates, and three hundred and ſixty-five well-furniſhed ſhops, kept by Turks, Armenians, and Jews, who pay five crowns a-month for each ſhop. The number of inhabitants of all nations and religions may be about a hundred thouſand: but it is dear living here, becauſe the proviſions are brought from diſtant places. The air is wholeſome, and the country very pleaſant in the ſummer time, on account of the river and ſtreams that run near and about the city; the chief of which is the Mariza. Theſe promote and preſerve the verdure of the gardens, meadows, and fields, for a conſiderable part of the year. In the winter there is plenty of game. Near the principal bazar there is another, about a mile in length, covered with boards, with holes on each ſide to let in the light. It is full of good ſhops, which contain all kinds of commodities. Sultan Selim's moſque ſtands on the ſide of a hill, in the midſt of the city; and hence this magnificent ſtructure may be ſeen on all ſides. Every thing made of gold and ſilver, jewels, piſtols, ſcimetars, &c. are ſold in another part of the city, called by travellers the *bizeſtein*, though it differs little from a bazar. This contains about two hundred ſhops, and is covered like the former: but the covering is ſupported by two rows of large pillars. The grand viſier's palace is nothing more than a convenient houſe, after the Turkiſh manner of building. The emperor's ſeraglio is a regular ſtructure, in a plain near the river Tungia. It is two miles in compaſs, and has ſeven gates, beſides thoſe of the gardens, which are ſeveral miles in circumference. The city is governed by a mullah cadi, who has an abſolute authority both in civil and criminal matters. In the time of the plague, or war, the grand ſignior ſometimes reſides here. The Turks took this city from the Greeks in 1362, and made it the capital of the empire, till Mahomet II. took Conſtantinople in 1453. E. Long. 26. 27. Lat. 41. 45.

ADSIDELLA, in antiquity, the table at which the flamens ſat during the ſacrifices.

ADSTRICTION, among phyſicians, a term uſed to denote the rigidity of any part.

ADUACA, (Antonine;) or ATUACA, contracted from *Atuacua*, (Cæſar;) anciently a large and famous city of the Tungri; now a ſmall and inconſiderable village, called *Tongeren*, in the biſhoprick of Liege, to the north-weſt of the city of Liege, in the territory of Haſpengow, on the rivulet Jecker, that ſoon after falls into the Maeſe. E. Long. 5. 22. Lat. 50. 54.

ADVANCE, in the mercantile ſtyle, denotes money paid before goods are delivered, work done, or buſineſs performed.

ADVANCED, in a general ſenſe, denotes ſomething poſted or ſituated before another. Thus,

ADVANCED *Ditch*, in fortification, is that which ſurrounds the glacis or eſplanade of a place.

ADVANCED *Guard*, or *Vanguard*, in the art of war, the firſt line or diviſion of an army, ranged or marching in order of battle; or, it is that part which is next the enemy, and marches firſt towards them.

ADVANCED *Guard*, is more particularly uſed for a ſmall party of horſe ſtationed before the main-guard.

ADVANCER, among ſportſmen, one of the ſtarts, or branches of a buck's attire, between the back antler and the palm.

ADUAR, in the Arabian and Mooriſh cuſtoms, a kind of ambulatory village, conſiſting of tents, which theſe people remove from one place to another, as ſuits their conveniency.

ADVENT, in the calendar, properly ſignifies the approach of the feaſt of the Nativity. It includes four ſundays, which begin on St Andrew's day, or on the Sunday before or after it. During advent, and to the end of the Octaves of Epiphany, the ſolemnizing of marriage is forbid without a ſpecial licence. It is appointed to employ the thoughts of Chriſtians on the firſt advent or coming of Chriſt in the fleſh, and his ſecond advent or coming to judge the world. The primitive Chriſtians practiſed great auſterity during this ſeaſon.

ADVENTITIOUS, an epithet applied to any thing that is accidental or fortuitous.

AD VENTREM *Inſpiciendum*, in law, a writ by which a woman is to be ſearched whether ſhe be with child by a former huſband, on her with-holding of lands from the next, failing iſſue of her own body.

ADVENTURE, in a general ſenſe, ſome extraordinary or accidental event. It alſo denotes a hazardous or difficult undertaking.

Bill of Adventure, among merchants, a writing ſigned by a merchant, teſtifying the goods mentioned in it to be ſhipped on board a certain veſſel belonging to another perſon, who is to run all hazards; the merchant only obliging himſelf to account to him for the produce.

ADVENTURER, in a general ſenſe, denotes one who hazards ſomething.

Adventurers, is particularly uſed for an ancient company of merchants and traders, erected for the diſcovery of lands, territories, trades, &c. unknown. The ſociety of adventurers had its riſe in Burgundy, and its firſt eſtabliſhment from John duke of Brabant in 1248, being known by the name of the *The Brotherhood of St Thomas à Becket*. It was afterwards tranſlated into England, and ſucceſſively confirmed by Edward III. and IV. Richard III. Henry IV. V. VI. and VII. who gave it the appellation of *Merchant Adventurers*.

ADVERB, in grammar. See there, n° 52.

ADVERSARIA, among the ancients, a book of accounts, not unlike our journals or day-books. It is more particularly uſed for a kind of common-place-book. See Common-place-book.

ADVERSARY, a perſon who is an enemy to or oppoſes another.

ADVERSATIVE, in grammar, a word expreſſing ſome difference between what goes before and what follows it. Thus, in the phraſe, *he is an honeſt man, but a great enthuſiaſt*, the word *but* is an adverſative conjunction.

ADVERSATOR, in antiquity, a ſervant who attended the rich in returning from ſupper, to give them notice of any obſtacles in the way, at which they might be apt to ſtumble.

ADVERTISEMENT, in a general ſenſe, denotes any information given to perſons intereſted in an affair; and is more particularly uſed for a brief account of an affair inſerted in the public papers, for the information of all concerned.

ADULE, or Adulis, (anc. geogr.) a town of Egypt built by fugitive ſlaves, diſtant from its port on the Red Sea twenty ſtadia. Pliny calls the inhabitants *Adulitae*. The epithet is either *Adulitanus*; as, *Monumentum Adulitanum*, or the pompous inſcription of the ſtatue of Ptolemy Euergetes, publiſhed by Leo Alatius at Rome in 1631, and to be found in Spon and Thevenot: Or, *Adulicus*; as *Adulicus Sinus*, a part of the Red Sea.

ADULT, an appellation given to any thing that is arrived at maturity: Thus we ſay, an adult perſon, an adult plant, &c. Among civilians, it denotes a youth between 14 and 25 years of age.

ADULTERATION, the act of debaſing, by an improper mixture, ſomething that was pure and genuine.

ADULTERY, an unlawful commerce between one married perſon and another, or between a married and unmarried perſon.

Puniſhments have been annexed to adultery in moſt ages and nations, though of different degrees of ſeverity. In many it has been capital; in others venial, and attended only with ſlight pecuniary mulcts. Some of the penalties are ſerious, and even cruel; others of a jocoſe and humorous kind. Even contrary things have been enacted as puniſhments for adultery. By ſome laws, the criminals are forbid marrying together, in caſe they became ſingle; by others, they are forbid to marry any beſides each other; by ſome, they are incapacitated from ever committing the like crime again; by others, they are glutted with it till it becomes downright nauſeous.

Among the rich Greeks, adulterers were allowed to redeem themſelves by a pecuniary fine; the woman's father, in ſuch caſes, returned the dower he had received from her huſband, which ſome think was refunded by the adulterer. Another puniſhment among thoſe people was, putting out the eyes of adulterers.

The Athenians had an extraordinary way of puniſhing adulterers, called παρατιλμος ραφανιδωσις, practiſed at leaſt on the poorer ſort who were not able to pay the fines. This was an awkward ſort of empalement, performed by thruſting one of the largeſt radiſhes up the anus of the adulterer, or, in defect thereof, a fiſh with a large head, called *mugil*, mullet. Alcæus is ſaid to have died this way, though it was doubted whether the puniſhment was reputed mortal. Juvenal and Catullus ſpeak of this cuſtom, as received alſo among the Romans, though not authorized by an expreſs law, as it was among the Greeks.

There are various conjectures concerning the ancient puniſhment of Adultery among the Romans. Some will have it to have been made capital by a law of Romulus, and again by the twelve tables. Others, that it was firſt made capital by Auguſtus; and others, not before the emperor Conſtantine. The truth is, the puniſhment in the early days was very various, much being left to the diſcretion of the huſband and parents of the adulterous wife, who exerciſed it differently, rather with the ſilence and countenance of the magiſtrate, than any formal authority from him. Thus we are told, the wife's father was allowed to kill both parties, when caught in the fact, provided he did it immediately, killed both together, and as it were with one blow. The ſame power ordinarily was not indulged the huſband, except the crime were committed with ſome mean or infamous perſon; tho', in other caſes, if his rage carried him to put them to death, he was not puniſhed as a murderer. On many occaſions, however, revenge was not carried ſo far; but mutilating, caſtrating, cutting off the ears, noſes, &c. ſerved the turn. The puniſhment allotted by the *lex Julia*, was not, as many have imagined, death; but rather baniſhment, or deportation, being interdicted fire and water: though Octavius appears, in ſeveral inſtances, to have gone beyond his his own law, and to have put adulterers to death. Under Macrinus, many were burnt at a ſtake. Conſtantine firſt by law made the crime capital. Under Conſtantius and Conſtans, adulterers were burnt, or ſewed in ſacks and thrown into the ſea. Under Leo and Marcian, the penalty was abated to perpetual baniſhment, or cutting off the noſe. Under Juſtinian, a further mitigation was granted; at leaſt in favour of the wife, who was only to be ſcourged, loſe her dower, and be ſhut up in a monaſtery: after two years, the huſband was at liberty to take her back again; if he refuſed, ſhe was ſhaven,

ven, and made a nun for life: But it ſtill remained death in the huſband. The reaſon alleged for this difference is, that the woman is the weaker veſſel. Matthæus declaims againſt the empreſs Theodora, who is ſuppoſed to have been the cauſe of this law, as well as of others procured in favour of the ſex from that emperor.

Under Theodoſius, women convicted of this crime were puniſhed after a very ſingular manner, *viz.* by a public conſtupration; being locked up in a narrow cell, and forced to admit to their embraces all the men that would offer themſelves. To this end, the gallants were to dreſs themſelves on purpoſe, having ſeveral little bells faſtened to their clothes, the tinkling of which gave notice to thoſe without of every motion. This cuſtom was again aboliſhed by the ſame prince.

In Britain, adultery is reckoned a ſpiritual offence, that is, cognizable by the ſpiritual courts. The common law takes no farther notice of it, than to allow the party grieved an action and damages. This practice is often cenſured by foreigners, as making too light of a crime, the bad conſequences of which, public as well as private, are ſo great. But perhaps this penalty, by civil action, is more wiſely calculated to prevent the frequency of the offence, which ought to be the end of all laws, than a ſeverer puniſhment. He that by a judgment of law is, according to circumſtances, ſtripped of great part of his fortune, thrown into priſon till he can pay it, or forced to fly his country, will, no doubt, in moſt caſes, own, that he pays dearly for his amuſement*.

ADVOCATE, among the Romans, a perſon who undertook the defence of cauſes. The term is ſtill kept up in all countries where the civil law obtains.

King's Advocate, is the principal crown-lawyer in Scotland. His buſineſs is to act as a public proſecutor, and to plead in all cauſes that concern the crown; but particularly in ſuch as are of a criminal nature. The office of king's advocate is not very ancient: It ſeems to have been eſtabliſhed about the beginning of the 16th century. Originally he had no power to proſecute crimes without the concurrence of a private party; but, in the year 1597, he was empowered to proſecute crimes at his own inſtance.

Faculty of Advocates, in Scotland, a reſpectable body of lawyers, who plead in all cauſes before the Courts of Seſſion, Juſticiary, and Exchequer. They are alſo intitled to plead in the houſe of peers, and other ſupreme courts in England.

In the year 1660, the faculty founded a library upon a very extenſive plan, ſuggeſted by that learned and eminent lawyer Sir George McKenzie of Roſehaugh, advocate to King Charles II. and King James VII. who enriched it with many valuable books. It has been daily increaſing ſince that time, and now contains not only the beſt collection of law-books in Europe, but a very large and ſelect collection of books on all ſubjects. Beſides, this library contains a great number of original manuſcripts, and a vaſt variety of Jewiſh, Grecian, Roman, Scots, and Engliſh coins and medals.

A candidate for the office of an advocate undergoes three ſeveral trials: The firſt is in Latin, upon the civil law and Greek and Roman antiquities; the ſecond, in Engliſh, upon the municipal law of Scotland; and, in the third, he is obliged to defend a Latin theſis, which is impugned by three members of the faculty. Immediately before putting on the gown, the candidate makes a ſhort Latin ſpeech to the lords, and then takes the oaths to the government and *de fideli*.

The faculty at preſent conſiſts of above 200 members. As an advocate or lawyer is eſteemed the genteeleſt profeſſion in Scotland, many gentlemen of fortune take the degree of advocate, without having any intention of practiſing at the bar. This circumſtance greatly increaſes their number, gives dignity to the profeſſion, and enriches their library and public fund. It is from this reſpectable body, that all vacancies on the bench are generally ſupplied.

Fiſcal Advocate, *fiſci advocatus*, in Roman antiquity; an officer of ſtate under the Roman emperors, who pleaded in all cauſes wherein the *fiſcus*, or private treaſury, was concerned.

Conſiſtorial Advocates; officers of the conſiſtory at Rome, who plead in all oppoſitions to the diſpoſal of benefices in that court: they are ten in number.

Advocate *of a City*, in the German polity, a magiſtrate appointed in the Emperor's name to adminiſter juſtice.

Bill of **ADVOCATION**, in Scots law, a writing drawn up in the form of a petition, whereby a party, in an action before an inferior court, applies to the ſupreme court, or court of Seſſion, for calling the action from the inferior court before itſelf*.

Letters of Advocation, in Scots law, the decree or warrant of the court of Seſſion upon cogniſance of the facts ſet forth in the bill, drawn up in the form of a ſummons, and paſſing under the ſignet, diſcharging the inferior judge and all others from further procedure in the cauſe, and advocating it to itſelf*.

ADVOW, in law, ſignifies the patron of a church, or he who has a right to preſent to a benefice.

Paramount **ADVOWEE**, is uſed for the king, as being the higheſt patron.

ADVOWZON, in law, is the right of patronage, or preſenting to a vacant benefice.

ADUST, among phyſicians, a term applied to the blood, *&c.* when too hot and fiery.

ADY, in natural hiſtory, a name given to the palm-tree of the iſland of St Thomas. It is a tall tree, with a thick, bare, upright ſtem, growing ſingle on its root, of a thin light timber, and full of juice. The head of this tree ſhoots into a vaſt number of branches, which being cut off, or an inciſion being made therein, afford a great quantity of ſweet juice, which fermenting ſupplies the place of wine among the Indians. The fruit of this tree is called by the Portugueſe *Caryoces* and *Carioſſe*; and by the black natives, *Abanga*. This fruit is of the ſize and ſhape of a lemon, and contains a kernel, which is good to eat. The fruit itſelf is eat roaſted, and the raw kernels are often mixed with mandioc meal. Theſe kernels are ſuppoſed very cordial. An oil is alſo prepared from this fruit, which anſwers the purpoſe of oil or butter. This oil is alſo uſed for anointing ſtiff and contracted parts of the body.

ADYTUM, in pagan antiquity, the moſt retired and ſacred place of their temples, into which none but the prieſts were allowed to enter.

ADZE, or Addice, a cutting tool of the ax kind, chiefly uſed by coopers.

ÆACEA, in Grecian antiquity, ſolemn feſtivals and games celebrated at Ægina, in honour of Æacus.

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* ee *Law*, lviii. 3. . 20. vi. 24.

* See *Law*, N° clvi. 16, 17.

* See the preceding article.

ÆACUS, the ſon of Jupiter by Ægina. When the iſle of Ægina was depopulated by a plague, his father, in compaſſion to his grief, changed all the ants upon it into men and women, who were called *Myrmidons*, from μυρμηξ, an ant. The foundation of the fable is ſaid to be, that when the country had been depopulated by pirates, who forced the few that remained to take ſhelter in caves, Æacus encouraged them to come out, and by commerce and induſtry recover what they had loſt. His character for juſtice was ſuch, that, in a time of univerſal drought, he was nominated by the Delphic oracle to intercede for Greece, and his prayer was anſwered. The Pagans alſo imagined that Æacus, on account of his impartial juſtice, was choſen by Pluto one of the three judges of the dead; and that it was his province to judge the Europeans.

ÆCHMALOTARCHA, in Jewiſh antiquity, a title given to the principal leader or governor of the Hebrew captives reſiding in Chaldea, Aſſyria, and the neighbouring countries. This magiſtrate was called by the Jews *roſch-galath*, i. e. the chief of the captivity.

ÆDES, in Roman antiquity, beſides its more ordinary ſignification of a houſe, likewiſe ſignified an inferior kind of temple, conſecrated to ſome deity.

ÆDICULA, a term uſed to denote the inner part of the temple, where the altar and ſtatue of the deity ſtood.

ÆDILATE, the office of ædile, ſometimes called *Ædility*. See the next article.

ÆDILE, *ædilis*, in Roman antiquity, a magiſtrate whoſe chief buſineſs was to ſuperintend buildings of all kinds, but more eſpecially public ones, as temples, aquæducts, bridges, &c. To the ædiles likewiſe belonged the care of the highways, public places, weights and meaſures, &c. They alſo fixed the prices of proviſions, took cognizance of debauches, puniſhed lewd women, and ſuch perſons as frequented gaming houſes. The cuſtody of the plebiſcita, or orders of the people, was likewiſe committed to them. They had the inſpection of comedies and other pieces of wit; and were obliged to exhibit magnificent games to the people, at their own expence, whereby many of them were ruined. At firſt the ædiles were only two in number, and choſen from among the common people; but theſe being unable to ſupport the expence of the public ſhews, two more were created out of the patrician order: theſe laſt took upon themſelves all the charges of the games, and were called *Ædiles Curules* or *Majores*, as the two plebeians were denominated *Minores*. Julius Cæſar, in order to eaſe theſe four, created two others, who were called *Ædiles Cereales*, as having the inſpection of all manner of grain committed to their care. There were alſo ædiles in the municipal cities, who had much the ſame authority as thoſe in Rome.

ÆDITUUS, in Roman antiquity, an officer belonging to the temple, who had the charge of the offerings, treaſure, and ſacred utenſils. The female deities had a woman officer of this kind called *Æditua*.

ÆGAGROPILA, a ball compoſed of a ſubſtance reſembling hair, generated in the ſtomach of the chamois-goat. This ball is of the ſame nature with thoſe found in cows, hogs, &c.

ÆGÆ, or **Ægæa**, (anc. geogr.) the name of *Ædeſſa*, ſo called from the following adventure: Caranus, the firſt king of Macedonia, being ordered by the oracle to ſeek out a ſettlement in Macedonia, under the conduct of a flock of goats, ſurpriſed the town of Ædeſſa, during a thick fog and rainy weather, in following the goats, that fled from the rain; which goats ever after, in all his military expeditions, he cauſed always to procede his ſtandard; and in memory of this he called Ædeſſa *Ægæa*, and his people *Ægeadæ*. And hence probably, in the prophet Daniel, the he-goat is the ſymbol of the king of Macedon.

ÆGEAN SEA, (anc. geogr.) now the *Archipelago*, a part of the Mediterranean, ſeparating Europe from Aſia and Africa; waſhing, on the one hand, Greece and Macedonia; on the other, Caria and Ionia. The origin of the name is greatly diſputed. Feſtus advances three opinions: one, that it is ſo called from the many iſlands therein, at a diſtance appearing like ſo many goats: another, becauſe Ægæa queen of the Amazons periſhed in it: a third opinion is, becauſe Ægeus, the father of Theſeus threw himſelf headlong into it.

ÆGEUS, in fabulous hiſtory, was king of Athens, and the father of Theſeus. The Athenians having baſely killed the ſon of Minos, king of Crete, for carrying away the prize from them, Minos made war upon the Athenians; and being victorious, impoſed this ſevere condition on Ægeus, that he ſhould annually ſend into Crete, ſeven of the nobleſt of the Athenian youths, choſen by lot, to be devoured by the Minotaur. On the fourth year of this tribute, the choice fell on Theſeus; or, as others ſay, he himſelf intreated to be ſent. The king, at his ſon's departure, gave orders, that as the ſhip ſailed with black ſails, it ſhould return with the ſame in caſe he periſhed; but, if he became victorious, he ſhould change them into white. When Theſus returned to Crete, after killing the Minotaur, and forgot to change the ſails in token of his victory, according to the agreement with his father; the latter, who watched the return of the veſſel, ſuppoſing by the black ſails that his ſon was dead, caſt himſelf headlong into the ſea, which afterwards obtained the name of the Ægean Sea. The Athenians decreed Ægeus divine honours; and ſacrificed to him as a marine deity, the adopted ſon of Neptune.

ÆGIAS, among phyſicians, a white ſpeck on the pupil of the eye, which occaſions a dimneſs of ſight.

ÆGIDA, (Pliny); now *Capo d'Iſtria*, the principal town in the north of the territory of Iſtria, ſituated in a little iſland, joined to the land by a bridge. In an inſcription, (Gruter,) it is called *Ægidis Inſula*. E. Long. 14. 20. Lat. 45. 50. It was afterwards called *Juſtinopolis*, after the emperor Juſtinus.

ÆGILOPS; the name of a tumour in the eye, which frequently degenerates into a fiſtula lacrymalis.

ÆGILOPS, Wild Festuc, a genus of the monœcia order, belonging to the polygamia claſs of plants, is a native of Italy and ſome other parts of Europe. The root is compoſed of a few ſhort white fibres: the plant grows to about a foot high: the ſtalk is round, hollow, jointed, and has two or three long, narrow, graſſy leaves on it, hairy at the edges: at the top of the ſtalk grows a ſhort ſpike conſiſting of two or three little rigid cluſters of flowers: the ſeeds are large; and ſomewhat like barley, but flatter.

ÆGIMURUS, (anc. geogr.) an iſland on the bay of Carthage, about thirty miles diſtant from that city, (Livy;) now the *Galetta:* This iſland being afterwards ſunk in the ſea, two of its rocks remained above water, which were called *Aræ*, and mentioned by Virgil, becauſe the Romans and Carthagians entered into an agreement or league to ſettle their mutual boundaries at theſe rocks.

ÆGINA, in fabulous hiſtory, the daughter of Æſopus, king of Bæotia, was beloved by Jupiter, who debauched her in the ſimilitude of a lambent flame, and then carried her from Epidaurus to a deſart iſland called Oenope, which afterwards obtained her own name.

ÆGINA, (anc. geogr.) now *Engia*, an iſland on the Saronic Bay, or Bay of Engia, twenty miles diſtant from the Piræeus, formerly vying with Athens for naval power, and at the ſea-fight of Salamin diſputing the palm of victory with the Athenians. It was the country and kingdom of Æacus, who called it *Ægina* from his mother's name, it being before called *Oenopia*, (Ovid.) The inhabitants were called *Æginetæ*, and *Æginenſis*. The Greeks had a common temple in Ægina. The ſoil was gleby underneath, but rocky on the ſurface; yet yielding plenty of barley. The Æginetæ applied to commerce; and were the firſt who coined money, called Νομισμα 'Αγιναιον: hence *Ægineticum æs*, formerly in great repute. The inhabitants were called *Myrmydones*, or a nation of ants, from their great application to agriculture. See ÆACUS.

ÆGINETA (Paulus), a celebrated ſurgeon of the iſland of Ægina, from whence he derived his name. According to Mr Le Clerc's calculation, he lived in the fourth century; but Abulpharagius the Arabian, who is allowed to give the beſt account of thoſe times, places him with more probability in the ſeventh. His knowledge in ſurgery was very great, and his works are deſervedly famous. Fabricius ab Aquapendente has thought fit to tranſcribe him in a great variety of places. Indeed the doctrine of Paulus Ægineta, together with that of Celſus, and Albucaſis, make up the whole text of this author. He is the firſt writer who takes notice of the cathartic quality of rhubarb; and, according to Dr Milward, is the firſt in all antiquity who deſerves the title of a man-midwife.

ÆGIPAN, in heathen mythology, a denomination given to the god Pan, becauſe he was repreſented with the horns, legs, feet, &c. of a goat.

ÆGIS, in heathen mythology, the ſhield which Jupiter preſented to Minerva, after his having covered it with the ſkin of Amalthea, the goat who ſuckled him. Afterwards Minerva fixed Meduſa's head in the middle of the ægis, which by this means obtained the power of turning all who ſaw it into ſtone.

ÆGISTHUS, ſon of Thyeſtes by his own daughter Pilopeia, who, to conceal her ſhame, expoſed him in the woods: ſome ſay he was taken up by a ſhepherd, and ſuckled by a goat, whence he was called Ægiſthus. He corrupted Clytemneſtra the wife of Agamemnon; and with her aſſiſtance ſlew her huſband, and reigned ſeven years in Mycenæ. He was, together with Clytemneſtra, ſlain by Oreſtes. Pompey uſed to call Julius Cæſar *Ægiſthus*, on account of his having corrupted his wife Mutia, whom he afterward put away, though he had three children by her.

ÆGIUCHUS, in heathen mythology, a ſurname of Jupiter, given him on account of his having been ſuckled by a goat.

ÆGIUM, (anc. geogr.) a town of Achaia Propria, five miles from the place where Helice ſtood, and famous for the council of the Acheans, which uſually met there, on account either of the dignity, or commodious ſituation of the place. It was alſo famous for the worſhip of Ομαγυριος Ζιως, *Conventional Jupiter*, and of *Panachæan Ceres*. The territory of Ægium was watered by two rivers, viz. the Phœnix and Meganitas. The epithet is *Ægienſis*. There is a coin in the cabinet of the king of Pruſſia, with the inſcription ΑΙΓΙ, and the figure of a tortoiſe, which is the ſymbol of Peloponneſus, and leaves no doubt as to the place where it was ſtruck.

ÆGLEFINUS, or HADDOCK, in ichthyology, a ſpecies of the gadus. See GADUS.

ÆGOPODIUM, SMALL WILD ANGELICA, or GOUTWORT, a genus of the digynia order, belonging to the pentandria claſs of plants, is very common under hedges, and about gardens; the leaves reſemble thoſe of Angelica, and it carries ſmall white flowers. Its roots run ſo faſt, as to render it a very troubleſome weed.

ÆGOS POTAMOS, (anc. geogr.) a river in the Thracian Cherſoneſus, falling with a ſouth-eaſt courſe into the Helleſpont, to the north of Seſtos; alſo a town, ſtation, or road for ſhips, at its mouth. Here the Athenians, under Conon, through the fault of his colleague Iſocrates, received ſo fatal a blow from the Lacædemonians under Lyſander, in a ſea-engagement, as to coſt them their liberty and their all.

ÆGYPT. See EGYPT.

ÆGYPTIACUM, in pharmacy, the name of ſeveral detergent ointments. See PHARMACY, n°992,993.

ÆGYPTILLA, in natural hiſtory, the name of a ſtone deſcribed by the ancients, and ſaid, by ſome authors, to have the remarkable quality of giving water the colour and taſte of wine. This ſeems a very imaginary virtue, as are indeed too many of thoſe in former ages attributed to ſtones. The deſcriptions left us of this remarkable foſſil tell us, that it was variegated with, or compoſed of, veins of black and white, or black and blueiſh, with ſometimes a plate or vein of whitiſh red. The authors of theſe accounts ſeem to have underſtood by this name the ſeveral ſtones of the onyx, ſardonyx, and camæa kind, all which we have at preſent common among us, but none of which poſſeſs any ſuch ſtrange properties.

ÆGYPTUS, (fab. hiſt.) was the ſon of Beleus, and brother of Danaus. See BELIDES.

ÆINATTÆ, in antiquity, a denomination given to the ſenators of Miletus, becauſe they held their deliberations on board a ſhip, and never returned to land till matters had been agreed on.

ÆLIAN (Claudius), born at Præneſte in Italy. He taught rhetoric at Rome, according to Perizonius, under the emperor Alexander Severus. He was ſirnamed Μελιγλωσσος, Honey-mouth, on account of the ſweetneſs of his ſtyle. He was likewiſe honoured with the title of Sophiſt, an appellation in his days given only to men of learning and wiſdom. He loved retirement, and devoted himſelf to ſtudy. He greatly admired and ſtudied Plato, Ariſtotle, Iſocrates, Plutarch, Homer, Anacreon, Archilochus, &c. and, though a Roman, gives the preference to the writers of the Greek nation. His two moſt celebrated works are, his Various Hiſtory, and Hiſtory of Animals. He compoſed likewiſe a book on Providence, mentioned by Euſtathius; and another on Divine Appearances, or The Declarations of Providence. There have been ſeveral editions of his Various Hiſtory.

ÆLII PONS, (anc. geogr.) one of the fortreſſes near the wall or rampart, or, in the words of the Notitia, through the line of the hither wall; built, as is thought, by Adrian*. Now Porteland, (Camden), in Northumberland, between Newcaſtle and Morpeth.

*See *Adrian*, (emperor.)

ÆLIUS PONS, now *il Ponte S. Angelo*, a ſtone-bridge at Rome, over the Tyber, which leads to the Burgo and Vatican from the city, along Adrian's mole, built by the emperor Adrian.

ÆLFRED. See Alfred.

ÆLURUS, in Egyptian mythology, the deity or god of cats; repreſented ſometimes like a cat, and ſometimes like a man with a cat's head. The Egyptians had ſo ſuperſtitious a regard for this animal, that the killing it, whether by accident or deſign, was puniſhed with death: and Diodorus relates, that, in the time of extreme famine, they choſe rather to eat one another, than touch theſe ſacred animals.

ÆMILIUS (Paulus), the ſon of Lucius Paulus, who was killed at the battle of Cannæ, was twice conſul. In his firſt conſulate he triumphed over the Ligurians; and in the ſecond ſubdued Perſeus king of Macedonia, and reduced that country to a Roman province, on which he obtained the ſurname of Macedonicus. He returned to Rome loaded with glory, and triumphed for three days. He died 168 years before Chriſt.

Æmilius (Paulus), a celebrated hiſtorian, born at Verona, who obtained ſuch reputation in Italy, that he was invited into France by the cardinal of Bourbon, in the reign of Lewis XII. in order to write the hiſtory of the kings of France in Latin, and was given a canonry in the cathedral of Paris. He was near 30 years in writing that hiſtory, which has been greatly admired; and died at Paris on the 5th of May 1529.

ÆNARIA, (anc. geogr.) an iſland on the bay of Cumæ, or over-againſt Cumæ in Italy, (Pliny.) It is alſo called *Inarime*, (Virgil); and now *Iſchia:* ſcarce three miles diſtant from the coaſt, and the promontory Miſenus to the weſt; 20 miles in compaſs; called *Pithecuſa* by the Greeks. It is one of the Oenotrides, and fenced round by very high rocks, ſo as to be inacceſſible but on one ſide; it was formerly famous for its earthen ware. See Ischia.

ÆNEAS, (fab. hiſt.) a famous Trojan prince, the ſon of Anchiſes and Venus. At the deſtruction of Troy, he bore his aged father on his back, and ſaved him from the Greeks; but being too ſolicitous about his ſon and houſehold-gods, loſt his wife Creuſa in the eſcape. Landing in Africa, he was kindly received by queen Dido: but quitting her coaſt, he arrived in Italy, where he married Lavinia the daughter of king Latinus, and defeated Turnus, to whom ſhe had been contracted. After the death of his father-in-law, he was made king of the Latins, over whom he reigned three years: but joining with the Aborigines, he was ſlain in a battle againſt the Tuſcans. Virgil has rendered the name of this prince immortal, by making him the hero of his poem.

Æneas Sylvius, (Pope). See Pius II.

ÆNEATORES, in antiquity, the muſicians in an army, including thoſe who played trumpets, horns, &c. The word is formed from *æneus*, on acount of the brazen inſtruments uſed by them.

ÆNGINA, one of the iſlands of the Archipelago. It lies in the bay of Engia, and the town of that name contains about 800 houſes and a caſtle; and near it are the ruins of a magnificent ſtructure, which was probably a temple.

ÆNIGMA, denotes any dark ſaying, wherein ſome well-known thing is concealed under obſure language. The word is Greek, Αινιγμα, formed of αινιττεσθαι, *obſcure innuere*, to hint a thing darkly, and of αινος, an obſcure ſpeech or diſcourſe. The popular name is *riddle;* from the Belgic *raeden*, or the Saxon *araethan*, to interpret. Fa. Bouhours, in the memoirs of Trevoux, defines an ænigma, A diſcourſe, or painting, including ſome hidden meaning, which is propoſed to be gueſſed.

Painted Ænigmas, are repreſentations of the works of nature, or art, concealed under human figures, drawn from hiſtory, or fable.

A Verbal Ænigma, is a witty, artful, and abſtruſe deſcription of any thing.—In a general ſenſe, every dark ſaying, every difficult queſtion, every parable, may paſs for an *ænigma*. Hence obſcure laws are called *Ænigmata Juris*. The alchemiſts are great dealers in the ænigmatic language, their proceſſes for the philoſophers ſtone being generally wrapped up in riddles: e. g. *Fac ex mare et fæmina circulum, inde quadrangulum, hinc triangulum, fac circulum, et habebis lapidem philoſophorum* —F. Meneſtrier has attempted to reduce the compoſition and reſolution of ænigmas to a kind of art, with fixed rules and principles, which he calls the philoſophy of *ænigmatic* images.

The Subject of an Ænigma, or the thing to be concealed and made a myſtery of, he juſtly obſerves, ought not to be ſuch in itſelf; but, on the contrary, common, obvious, and eaſy to be conceived. It is to be taken, either from nature, as the heavens, or ſtars; or from art, as painting, the compaſs, a mirror, or the like.

The Form of Ænigmas conſiſts in the words, which, whether they be in proſe or verſe, contain either ſome deſcription, a queſtion, or a proſopopæia. The laſt kind are the moſt pleaſing, inaſmuch as they give life and action to things which otherwiſe have them not. To make an ænigma, therefore, two things are to be pitched on, which bear ſome reſemblance to each other; as the ſun, and a monarch; or a ſhip, and a houſe: and on this reſemblance is to be raiſed a ſuperſtructure of contrarieties to amuſe and perplex. It is eaſier to find great ſubjects for ænigmas in figures than in words, inaſmuch as painting attracts the eyes and excites the attention to diſcover the ſenſe. The ſubjects of ænigmas in painting, are to be taken either from hiſtory or fable: the compoſition here is a kind of metamorphoſis, wherein, *e. g.* human figures are changed into trees, and rivers into metals. It is eſſential to ænigmas, that the hiſtory or fable, under which they are preſented, be known to every body; otherwiſe it will be two ænigmas inſtead of one; the firſt of the hiſtory or fable, the ſecond of the ſenſe in which it is to be taken. Another eſſential rule of the ænigma is, that it only admit of one ſenſe. Every ænigma which is ſuſceptive of different interpretations, all equally natural, is ſo far imperfect. What gives a kind of erudition to an ænigma, is the invention of figures in ſituations, geſtures, colours, *&c.* authorized by paſſages of the poets, the cuſtoms of artiſts in ſtatues, baſſo relievos, inſcriptions, and medals.—In foreign colleges,

The explication of Ænigmas makes a conſiderable exerciſe; and that one of the moſt difficult and amuſing, where wit and penetration have the largeſt field.—By explaining an ænigma, is meant the finding a motto correſponding to the action and perſons repreſented in a picture, taken either from hiſtory or mythology. The great art of this exerciſe conſiſts in the choice of a motto, which either by itſelf, or the circumſtances of time, place, perſon who ſpeaks, or thoſe before whom he is ſpeaking, may divert the ſpectators, and furniſh occaſion for ſtrokes of wit; alſo in ſhewing to advantage the conformities between the figure and thing figured, giving ingenious turns to the reaſons employed to ſupport what is advanced, and in artfully introducing pieces of poetry to illuſtrate the ſubject and awaken the attention of the audience.

As to the ſolution of ænigmas, it may be obſerved, that thoſe expreſſed by figures are more difficult to explain than thoſe conſiſting of words, by reaſon images may ſignify more things than words can; ſo that to fix them to a particular ſenſe, we muſt apply every ſituation, ſymbol, *&c.* and without omitting a circumſtance.—As there are few perſons in hiſtory, or mythology, but have ſome particular character of vice or virtue, we are, before all things, to attend to this *character*, in order to divine what the figure of a perſon repreſented in a painting ſignifies, and to find what agreement this may have with the ſubject whereof we would explain it. Thus, if Proteus be repreſented in a picture, it may be taken to denote *inconſtancy*, and applied either to a phyſical or moral ſubject, whoſe character is to be changeable; *e.g.* an almanack, which expreſſes the weather, the ſeaſons, heat, cold, ſtorms, and the like. The *colours* of figures may alſo help to unriddle what they mean: *white*, for inſtance, is a mark of innocence, *red* of modeſty, *green* of hope, *black* of ſorrow, &c. When figures are accompanied with *ſymbols*, they are leſs precarious; theſe being, as it were, the ſoul of ænigmas, and the key that opens the myſtery of them. Of all the kinds of ſymbols which may be met with in thoſe who have treated profeſſedly on the ſubject, the only truly ænigmatical are thoſe of Pythagoras, which, under dark proverbs, hold forth leſſons of morality; as when he ſays, *Stateram ne tranſilias*, to ſignify, Do no injuſtice.

But it muſt be added, that we meet with ſome ænigmas in hiſtory, complicated to a degree which much tranſcends all rules, and has given great perplexity to the interpreters of them. Such is that celebrated ancient one, *Ælia Lælia Criſpis*, about which many of the learned have puzzled their heads. There are two exemplars of it: one found 140 years ago, on a marble near Bolognia; the other in an antient MS. written in Gothic letters, at Milan. It is controverted between the two cities, which is to be reputed the more authentic.

The Bononian *Ænigma*.

D. M.
Ælia Lælia Criſpis,
Nec vir, nec mulier,
Nec androgyna;
Nec puella, nec juvenis,
Nec anus;
Nec caſta, nec meretrix,
Nec pudica;
Sed omnia:
Sublata
Neque fame, neque ferro,
Neque veneno;
Sed omnibus:
Nec cœlo, nec terris,
Nec aquis,
Sed ubique jacet.
Lucius Agatho Priſcius,
Nec maritus, nec amator,
Nec neceſſarius;
Neque mærens, neque gaudens,
Neque flens;
Hanc,
Nec molem, nec pyramidem,
Nec ſepulchrum,
Sed omnia,
Scit et neſcit, cui poſuerit.

That is to ſay, *To the gods manes, Ælia Lælia Criſpis, neither man, nor woman, nor hermaphrodite; neither girl, nor young woman, nor old; neither chaſte, nor a whore; but all theſe: killed neither by hunger, nor ſteel, nor poiſon; but by all theſe: reſts neither in heaven, nor on earth, nor in the waters; but every where. Lucius Agatho Priſcius, neither her huſband, nor lover, nor friend; neither ſorrowful, nor joyful, nor weeping, certain, or uncertain, to whom he rears this monument, neither erects her a temple, nor a pyramid, nor a tomb, but all theſe.* In the MS. at Milan, inſtead of *D. M.* we find *A. M. P. P. D.* and at the end the following addition:

Hoc eſt ſepulchrum intus cadaver non habens,
Hoc eſt cadaver ſepulchrum extra non habens,
Sed cadaver idem eſt & ſepulchrum.

We find near 50 ſeveral ſolutions of this ænigma advanced by learned men. Marius Michael Angelus maintains *Ælia Lælia Criſpis* to ſignify rain-water falling into the ſea. Ri. Vitus firſt explained it of Niobe turned to a ſtone, afterwards of the rational ſoul, and afterwards of the Platonic idea; Jo. Turrius, of the *materia prima*; Fr. Schottus, of an eunuch; Nic. Bernardus, of the philoſophers-ſtone, in which he is followed by Borrichius; Zach. Pontinus, of three human bodies in the ſame ſituation, and buried by three different men at the ſame time; Neſmondius, of a law-ſuit; Jo. Gaſ. Gerartius, of love; Zu. Boxhornius, of a ſhadow; P. Terronus, of muſic; Fort Licetus, of generation, friendſhip, and privation; M. Ov. Montalbanus, of hemp; Car. Cæſ. Malvaſia, of an abortive girl promiſed in marriage; Pet. Mengulus, of the rule of chaſtity, preſcribed by the founder of the military religion of St Mary; M. de Ciconia, of pope Joan; Heumannus, of Lot's wife; and laſtly, J. C. S. an anonymous writer in the Leipſic Acts, of the Chriſtian church.

ÆNIGMATOGRAPHY, or Ænigmathology, the art of reſolving or making ænigmas.

ÆOLIÆ INSULÆ, now *Iſole di Lipari*, (anc. geogr.) ſeven iſlands, ſituated between Sicily and Italy, (Strabo, Diodorus Siculus, Mela); ſo called from Æolus, who reigned there about the time of the Trojan war. The Greeks call them *Hephæſtiades;* and the Romans, *Vulcaniæ*, from their fiery eruptions. They are alſo called *Liparæorum Inſulæ*, from the principal iſland Lipara. Dionyſius Periegetes calls them Πλωται, becauſe circumnavigable.

ÆOLIC, in a general ſenſe, denotes ſomething belonging to Æolis.

Æolic *Dialect*, among grammarians, one of the five dialects of the Greek tongue, agreeing in moſt things with the Doric dialect. See Doric.

Æolic *Verſe*, in proſody, a verſe conſiſting of an iambus, or ſpondee; then of two anapeſts, ſeparated by a long ſyllable; and, laſtly, of another ſyllable. Such as, *O ſtelliferi conditor orbis*.

ÆOLIPILE, in hydraulics, is a hollow ball of metal, generally uſed in courſes of experimental philoſophy, in order to demonſtrate the poſſibility of converting water into an elaſtic ſteam or vapour by heat. The inſtrument, therefore, conſiſts of a ſlender neck, or pipe, having a narrow orifice inſerted into the ball by means of a ſhouldered ſcrew. This pipe being taken out, the ball is filled almoſt full of water, and the pipe being again ſcrewed in, the ball is placed on a pan of kindled charcoal, where it is well heated, and there iſſues from the orifice a vapour, with prodigious violence and great noiſe, which continues till all the included water is diſcharged. The ſtronger the fire is, the more elaſtic and violent will be the ſteam: but care muſt be taken that the ſmall orifice of the pipe be not, by any accident, ſtopped up; becauſe the inſtrument would in that caſe infallibly burſt in pieces, with ſuch violence as may greatly endanger the lives of the perſons near it. Another way of introducing the water is to heat the ball red-hot when empty, which will drive out almoſt all the air; and then by ſuddenly immerging it in water, the preſſure of the atmoſphere will force in the fluid, till it is nearly full. Des Cartes and others have uſed this inſtrument to account for the natural cauſe and generation of the wind: and hence it was called *Æolopila;* q. d. *pila Æoli*, the ball of Æolus or of the god of the winds.

ÆOLIS, or Æolia, (anc. geogr.) a country of the Hither Aſia, ſettled by colonies of Æolian Greeks. Taken at large, it comprehends all Troas, and the coaſt of the Helleſpont to the Propontis, becauſe in thoſe parts there were ſeveral Æolian colonies: more ſtrictly, it is ſituated between Troas to the north, and Ionia to the ſouth. The people are called *Æoles*, or *Æolii*.

ÆOLIUM MARE, (anc. geogr.) a part of the Egean ſea, waſhing Æolis; called alſo *Myſium*, from Myſia. Now called, *Golfo di Smyrna*.

ÆOLUS, in heathen mythology, the god of the winds, is ſaid to be the ſon of Jupiter by Acaſta, or Sigeſia, the daughter of Hippotus; or, according to others, the ſon of Hippotus by Meneclea, daughter of Hyllus king of Lipara. He dwelt in the iſland Strongyle, now called *Strombolo*, one of the ſeven iſlands called *Æolian* from their being under the dominion of Æolus. Others ſay, that his reſidence was at Regium, in Italy; and others again place him in the iſland Lipara. He is repreſented as having authority over the winds, which he held enchained in a vaſt cavern, to prevent their continuing the devaſtations they had been guilty of before they were put under his direction. Mythologiſts explain the original of theſe fables, by ſaying, that he was a wiſe and good prince; and, being ſkilled in aſtronomy, was able, by the flux and reflux of the tides, and the nature of the volcano in the iſland Strongyle, to foretel ſtorms and tempeſts.

Harp of Æolus, or the Æolian Lyre *.

ÆON, a Greek word, properly ſignifying the age or duration of any thing.

Æon, among the followers of Plato, was uſed to ſignify any virtue, attribute, or perfection: hence they repreſented the Deity as an aſſemblage of all poſſible æons; and called him *pleroma*, a Greek term ſignifying *fullneſs*. The Valentinians, who, in the firſt ages of the church, blended the conceits of the Jewiſh cabaliſts, the Platoniſts, and the Chaldean philoſophers, with the ſimplicity of the Chriſtian doctrine, invented a kind of Theogony, or Genealogy of Gods (not unlike that of Heſiod), whom they called by ſeveral glorious names, and all by the general appellation of Æons: among which they reckoned Ζων, *Life;* Λογος, *Word;* Μονογενης, *Only-begotten;* Πληρωμα, *Fullneſs;* and and many other divine powers and emanations, amounting in number to thirty: which they fancied to be ſucceſſively derived from one another; and all from one ſelf-originated deity, named *Bythus*, i. e. *profound* or *unfathomable;* whom they called likewiſe, *The moſt high and ineffable Father*. See Valentinians.

ÆQUIMELIUM, in antiquity, a place in Rome, where ſtood the houſe of Spurius Melius, who, by largeſſes corrupting the people, affected the ſupreme power: refuſing to appear before the dictator Cincinnatus, he was ſlain by Servilius Ahala, maſter of the horſe; his houſe was razed to the ground; and the ſpot on which it ſtood was called *Area Æquimelii*. (Livy).

ÆRA. The point of time from whence any number of years is begun to be counted, is called a *period*, *æra*, or *epoch*. The word *æra* comes from the Latin *æs*, becauſe the Romans marked their years with a kind of ſmall braſs nails. The difference between the terms *æra* and *epoch* is, that the æras are certain points fixed by ſome people, or nation; and the epochs are points fixed by chronologiſts and hiſtorians. The idea of an æra comprehends alſo a certain ſucceſſion of years proceeding from a fixed point of time, and the epoch is that point itſelf. Thus the Chriſtian æra began at the epoch of the birth of Jeſus Chriſt *.

AERIAL, in a general ſenſe, denotes ſomething partaking of the nature of air; thus, aërial ſubſtance, aërial particles, &c.

AERIANS, in church-hiſtory, a branch of Arians, who, to the doctrines of that ſect, added ſome peculiar dogmas of their own; as, that there is no difference between biſhops and prieſts; a doctrine maintained by many modern divines, particularly of the preſbyterian and reformed churches.

Flos ÆRIS, among alchemiſts, ſmall ſcales procured from copper melted by a ſtrong heat; it is ſometimes uſed for ærugo or verdigriſe.

AEROGRAPHY, ſignifies a deſcription of the air.

* See *Acou-ſtics*, nº 12.

* See *Chrono-logy*, Nº iii. 1, 6, 7, and *Aſtrono-my*, nº 314, 315.

AEROLOGY, an account of the nature and properties of the air.

AEROMANCY, a ſpecies of divination performed by means of air, wind, &c. See DIVINATION, n° 5.

AEROMETRY, the ſcience of meaſuring the air. It comprehends not only the doctrine of the air itſelf, conſidered as a fluid body; but alſo its preſſure, elaſticity, rarefaction, and condenſation. But the term is at preſent not much in uſe, this branch of natural philoſophy being more frequently called Pneumatics *.

AEROPHYLACEA, a term uſed by naturaliſts for caverns or reſervoirs of air, ſuppoſed to exiſt in the bowels of the earth.

AERSHOT, a town in the Netherlands, in the duchy of Brabant, and capital of the duchy of Aerſhot. It is ſeated on the river Demur, ten miles caſt of Malines or Mechlin, and eight north of Louvain. E. Lon. 5. 4. N. lat. 51. 15.

ÆRUGINOUS, in ornithology, the trivial name of a ſpecies of falco. See FALCO.

ÆRUGINOUS, an epithet given to ſuch things as reſemble or partake of the nature of the ruſt of copper.

ÆRUGO, in natural hiſtory, properly ſignifies the ruſt of copper, whether natural or artificial. The former is found about copper mines, and the latter made by corroding copper plates with acids †.

ÆRUSCATORES, in antiquity, a kind of ſtrolling beggars, not unlike gypſies, who drew money from the credulous by fortune-telling, &c. It was alſo a denomination given to griping exactors, or collectors of the revenue. The Galli, or prieſts of Cybele, were called *æruſcatores magnæ matris*, and μητραγυρται, on account of their begging or collecting alms in the ſtreets; to which end they had little bells whereby to draw peoples attention to them, much like ſome orders of mendicants abroad.

AERY, or AIRY, among ſportſmen. See AIRY.

ÆS, properly ſignifies copper, or money coined of that metal. See COPPER.

ÆS *Flavum*, yellow copper, among the Romans, an appellation given to the coarſer kinds of braſs.

ÆS *Caldarium*, a term uſed by the German mineraliſts, for a ſubſtance which ſometimes occurs to thoſe who work upon cobalt, and is uſed for the making the fine blue colour called *ſmalt*.

ÆS *Uſtum*, a chemical preparation, made of thin leaves of copper, ſulphur, and nitre, placed *ſtratum ſuper ſtratum* in a crucible, and ſet in a charcoal fire, till all the ſulphur is conſumed; after which, the copper is taken out of the crucible, and reduced to powder. Some quench the leaves of copper in vinegar, and repeat the calcination.—Its principal uſe is in colouring glaſs, to which it gives a beautiful tincture. The ſurgeons uſe it as a deterſive, and ſome have given it internally; but it is certainly a very dangerous medicine, and ſhould be avoided.

ÆSCHINES, a Socratic philoſopher, the ſon of Charinus a ſauſage-maker. He was continually with Socrates; which occaſioned this philoſopher to ſay, that the ſauſage-maker's ſon was the only perſon who knew how to pay a due regard to him. It is ſaid that poverty obliged him to go Sicily, to Dionyſius the Tyrant; and that he met with great contempt from Plato, but was extremely well received by Ariſtippus; to whom he ſhewed ſome of his dialogues, and received from him a handſome reward. He would not venture to profeſs philoſophy at Athens, Plato and Ariſtippus being in ſuch high eſteem; but he ſet up a ſchool to maintain himſelf. He afterwards wrote orations for the Forum. Phrynicus, in Photius, ranks him amongſt the beſt orators, and mentions his orations as the ſtandard of the pure Attic ſtyle. Hermogenes has alſo ſpoken very highly of him.—He alſo wrote ſeveral dialogues, of which there are only three extant: 1. Concerning Virtue, whether it can be taught. 2. Eryxias, or Eraſiſtratus; concerning riches, whether they are good. 3. Axiochus; concerning death, whether it is to be feared. Mr Le Clerc has given a Latin tranſlation of them, with notes, and ſeveral diſſertations, intitled *Sylvæ Philologicæ*.

ÆSCHYLUS, the tragic poet, was born at Athens. Authors differ in regard to the time of his birth, ſome placing it in the 65th, others in the 70th Olympiad; but according to Stanley, who relies on the Arundelian marbles, he was born in the 63d Olympiad. He was the ſon of Euphorion, and brother to Cynegirus and Aminias, who diſtinguiſhed themſelves in the battle of Marathon, and the ſea-fight of Salamis, at which engagements Æſchylus was likewiſe preſent. In this laſt action, according to Diodorus Siculus, Aminias, the younger of the three brothers, commanded a ſquadron of ſhips, and behaved with ſo much conduct and bravery, that he ſunk the admiral of the Perſian fleet, and ſignalized himſelf above all the Athenians. To this brother our poet was, upon a particular occaſion, obliged for ſaving his life: Ælian relates, that Æſchylus being charged by the Athenians with certain blaſphemous expreſſions in ſome of his pieces, was accuſed of impiety, and condemned to be ſtoned to death: they were juſt going to put the ſentence in execution, when Aminias, with a happy preſence of mind, throwing aſide his cloak, ſhewed his arm without a hand, which he had loſt at the battle of Salamis, in defence of his country. This ſight made ſuch an impreſſion on the judges, that, touched with the remembrance of his valour, and with the friendſhip he ſhewed for his brother, they pardoned Æſchylus. Our poet, however, reſented the indignity of this proſecution, and reſolved to leave a place where his life had been in danger. He became more determined in this reſolution when he found his pieces leſs pleaſing to the Athenians than thoſe of Sophocles, tho' a much younger writer. Some affirm, that Æſchylus never ſat down to compoſe but when he had drank liberally. He wrote a great number of tragedies, of which there are but ſeven remaining: and notwithſtanding the ſharp cenſures of ſome critics, he muſt be allowed to have been the father of the tragic art. In the time of Theſpis, there was no public theatre to act upon; the ſtrollers driving about from place to place in a cart. Æſchylus furniſhed his actors with maſques, and dreſſed them ſuitably to their characters. He likewiſe introduced the buſkin, to make them appear more like heroes.—The ancients give Æſchylus alſo the praiſe of having been the firſt who removed murders and ſhocking ſights from the eyes of the ſpectators. He is ſaid likewiſe to have leſſened the number of the chorus. M. Le Fevre has obſerved, that Æſchylus never repreſented women in love, in his tragedies; which, he ſays, was not ſuited to his genius; but, in repreſenting a woman tranſported with fury, he was incomparable. Longinus ſays, that Æſchylus has a noble boldneſs of expreſſion; and that his imagination is lofty and heroic. It muſt be owned, however, that he affected pompous words, and that his ſenſe is too often obſcured by figures: this gave Salmaſius occaſion to ſay, that he was more difficult to be underſtood than the ſcripture itſelf. But notwithſtanding theſe imperfections, this poet was held in great veneration by the Athenians, who made a public decree that his tragedies ſhould be played after his death. He was killed in the 69th year of his age, by an eagle letting fall a tortoiſe upon his head as he was walking in the fields. He had the honour of a pompous funeral from the Sicilians, who buried him near the river Gela; and the tragedians of the country performed plays and theatrical exerciſes at his tomb.—The beſt edition of his plays is that of London, 1663, fol. with a Latin tranſlation and a learned commentary by Tho. Stanley.

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* See *Pneumatics*.

† See *Materia Medica*, n° 74.

ÆSCHYNOMENE, BASTARD SENSITIVE-PLANT; a genus of the decandria order, belonging to the diadelphia claſs of plants. Of this genus they are reckoned ſix

Species. 1. The aſpera (as well as the reſt of this genus) is a native of warm countries. It riſes to the height of four or five feet, having a ſingle herbaceous ſtalk, which is rough in ſome parts. The leaves come out on every ſide towards the top, forming a ſort of head; the flowers come out between the leaves, two or three together upon long footſtalks; they are yellow, and ſhaped like thoſe of peaſe: after the flower is paſt, the germen becomes a flat jointed pod, which, when ripe, parts at the joints, and in each diviſion is lodged a ſingle kidney-ſhaped ſeed. 2. The Americana, ſeldom riſes more than two feet in height. The flowers come out from the leaves on branching footſtalks, five or ſix together; theſe are much leſs than the former, and of a paler yellow colour. The ſeed is lodged in pods like the other. 3. The arborea, grows to the height of ſix or ſeven feet, with a ſingle ſtem; the flowers come out two or three together, of a copper colour, and as large as thoſe of the aſpera. 4. The ſeſban hath woody ſtems, and branches garniſhed with ſmooth leaves. The flowers are ſmall, of a deep yellow colour, and come out in long ſpikes hanging downward. The ſeed is contained in a ſmooth pod, not jointed. 5. The pumila, riſes to the height of about three feet; has flowers of a pale yellow colour, which come out ſometimes ſingle, at other times two or three upon each foot ſtalk. The ſeeds are contained in a long falcated pod having 13 or 14 diviſions, each of which lodges a ſingle ſeed. 6. The grandiflora, riſes ſix or eight feet high, with a woody ſtem, ſending out branches towards the top, garniſhed with obtuſe leaves. The flowers are large, yellow, and ſucceeded by large pods containing kidney-ſhaped ſeeds.

Culture. Theſe plants are propagated by ſeeds, which ſhould be ſown early in the ſpring, on a hot-bed; and when the plants have ſtrength enough to be removed, they ſhould each be put into a ſeparate pot filled with light earth, and plunged into a hot-bed. As they increaſe in ſize, they muſt be removed into larger pots; but if theſe are too large, the plants will not thrive. They muſt be brought forward early in the year, otherwiſe the ſecond kind will not perfect its ſeed.

ÆSCULANUS, or ÆRES, in mythology, a deity who preſided over the coinage of copper-money.

ÆSCULAPIUS. in the heathen mythology, the god of phyſic, was the ſon of Apollo and the nymph Coronis. He was educated by the centaur Chiron, who taught him phyſic; by which means Æſculapius cured the moſt deſperate diſeaſes. But Jupiter, enraged at his reſtoring to life Hippolitus who had been torn in pieces by his own horſes, killed him with a thunderbolt. According to Cicero, there were three deities of this name: the firſt, the ſon of Apollo, worſhipped in Acadia, who invented the probe, and bandages for wounds; the ſecond, the brother of Mercury, killed by lightning; and the third, the ſon of Ariſippus and Arſinoe, who firſt taught the art of tooth-drawing and purging. At Epidaurus, Æſculapius's ſtatue was of gold and ivory, with a long beard, his head ſurrounded with rays, holding in one hand a knotty ſtick, and the other entwined with a ſerpent; he was ſeated on a throne of the ſame materials as his ſtatue, and had a dog lying at his feet. The Romans crowned him with laurel, to repreſent his deſcent from Apollo; and the Phaliaſins repreſented him as beardleſs. The cock, the raven, and the goat, were ſacred to this deity. His chief temples were at Pergamus, Smyrna, Trica a city in Ionia, and the iſle of Coos; in all which, votive tablets were hung up, ſhewing the diſeaſes cured by his aſſiſtance. But his moſt famous ſhrine was at Epidaurus; where, every five years, games were inſtituted to him, nine days after the Iſthmian games at Corinth.

ÆSCULAPIUS's *Serpent*, or COLUBER ÆSCULAPII. See COLUBER.

ÆSCULUS, the HORSE-CHESTNUT; a genus of the monogynia order, belonging to the heptandria claſs of plants. Of this genus there is but one known ſpecies, *viz.* the hippocaſtanum, or common horſe-cheſtnut. It was brought from the northern parts of Aſia about the year 1550, and ſent to Vienna about 1588. It had the name of caſtanea from the ſhape of its fruit; and the title of *equini* was added on account of its being a proper food, when ground, for horſes. This tree makes a noble appearance all the month of May, the extremities of the branches being terminated by fine ſpikes of flowers ſpotted with roſe-colours, ſo that the whole tree ſeems covered with them. It is quick in its growth; ſo that in a few years it arrives at a ſize large enough to afford a good ſhade in ſummer, as alſo to produce plenty of flowers. They have however this great inconvenience, that their wood is of no uſe, being unfit even for burning; and their leaves beginning to fall in July, ſoon deprive the trees of their beauty. There is ſomething very ſingular in the growth of theſe trees, which is, that the whole ſhoot is performed in leſs than three weeks after the buds are opened.—The nuts are reckoned good food for horſes. In Turkey, they are ground, and mixed with the provender of theſe animals, eſpecially thoſe which are troubled with coughs or broken-winded. Deer are alſo very fond of the fruit; and at the time of their ripening keep much about the trees, but eſpecially in ſtrong winds, when the nuts are blown down, which they carefully watch, and greedily devour as they fall. A variety of this ſpecies grows naturally in North America, where it riſes to the height of 20 feet, but does not ſpread its branches to any great extent. The flowers are wholly red, whence it is called the *ſcarlet horſe-cheſtnut:* they are tubulated, and ſmaller than thoſe of the other kind; but, for want of brims to expand, make an indifferent appearance.

Culture. Theſe trees are propagated by ſowing the nuts, which ought to be done early in the ſpring; but the nuts ſhould be preſerved in ſand during the winter, otherwiſe they are apt to grow mouldy and rot.—The tree will thrive in moſt ſoils and ſituations, but beſt in a ſandy loam; and, if it inclines to moiſture, the leaves will continue in verdure much longer than in a very dry ground. When the nuts ſucceed, and have a proper ſoil, the plants will ſhoot near a foot the firſt ſummer; ſo that where they grow pretty thick together, it will be proper to tranſplant them the following autumn. They ought then to be planted in rows three feet aſunder, and one foot diſtance from one another in the rows. In this nurſery they may continue two years, and then be tranſplanted where they are deſigned to remain. In tranſplanting them, the roots ought to be preſerved as entire as poſſible, and none of the branches broken on any account. When ſuch an accident happens, the branch is to be cut over cloſe by the ſtem, that the wound may heal over. Another particularity with reſpect to this tree, beſides its quickneſs of growth, is, that as ſoon as the old leaves fall off, the new bud for the next year is formed, which continues ſwelling till autumn, at which time the folding leaves are covered with a tenacious juice, which ſerves as a pigment to defend the tender bud from the winter-froſts; but, upon the firſt return of warmth in the ſpring, this melts and runs off, leaving the bud at full liberty to expand. The ſcarlet horſe-cheſtnut muſt be propagated from nuts procured from America, for they do not come to perfection in this country. They ſhould be planted in pots early in the ſpring, and the pots plunged in a moderate hot-bed to forward their growth; towards the end of May, the pots ſhould be put into the earth, in a ſouth-eaſt border, and duely watered in dry weather. They muſt be ſcreened from the froſt during the firſt winter or two, being impatient of cold whilſt young; though when they have attained ſtrength, it ſeldom hurts them: the following ſpring they ſhould be carefully ſeparated, and planted a foot diſtance from each other in a ſheltered ſituation.

Æſop.

ÆSOP, the Phrygian, lived in the time of Solon, about the 50th Olympiad, under the reign of Crœſus the laſt king of Lydia. As to genius and abilities, he was greatly indebted to nature; but in other reſpects not ſo fortunate, being born a ſlave and extremely deformed. St Jerom, ſpeaking of him, ſays he was unfortunate in his birth, condition in life, and death; hinting thereby at his deformity, ſervile ſtate, and tragical end. His great genius however enabled him to ſupport his misfortunes; and in order to alleviate the hardſhips of ſervitude, he compoſed thoſe entertaining and inſtructive fables which have acquired him ſo much reputation. He is generally ſuppoſed to have been the inventor of that kind of writing; but this is conteſted by ſeveral, particularly Quintilian, who ſeems to think that Heſiod was the firſt author of fables. Æſop, however, certainly improved this art to a very great degree; and hence it is that he has been accounted the author of this ſort of productions:

> Æſopus auctor quam materiam reperit,
> Hanc ego pollivi verſibus ſenariis.
>
> *Phæd.* Prol. ad lib. i.
>
> If any thoughts in theſe iambics ſhine,
> Th' invention's Æſop's, and the verſe is mine."

The firſt maſter whom Æſop ſerved, was one Caraſius Demarchus, an inhabitant of Athens; and there in all probability he acquired his purity in the Greek tongue. After him he had ſeveral maſters; and at length came under a philoſopher named Idmon or Iadmon, who enfranchiſed him. After he had recovered his liberty, he ſoon acquired a great reputation amongſt the Greeks; ſo that, according to Meziriac, the report of his wiſdom having reached Crœſus, he ſent to inquire after him, and engaged him in his ſervice. He travelled through Greece, according to the ſame author; whether for his own pleaſure, or upon the affairs of Crœſus, is uncertain; and paſſing by Athens ſoon after Piſiſtratus had uſurped the ſovereign power, and finding that the Athenians bore the yoke very impatiently, he told them the fable of the frogs who petitioned Jupiter for a king. The images made uſe of by Æſop are certainly very happy inventions to inſtruct mankind; they poſſeſs all that is neceſſary to perfect a precept, having a mixture of the uſeful with the agreeable. "Æſop the fabuliſt (ſays Aulus Gellius) was deſervedly eſteemed wiſe, ſince he did not, after the manner of the philoſophers, rigidly and imperiouſly dictate ſuch things as were proper to be adviſed and perſuaded; but, framing entertaining and agreeable apologues, he thereby charms and captivates the human mind."—Æſop was put to death at Delphi. Plutarch tells us, that he came there with a great quantity of gold and ſilver, being ordered by Crœſus to offer a ſacrifice to Apollo, and to give a conſiderable ſum to each inhabitant: but a quarrel ariſing betwixt him and the Delphians, he ſent back the money to Crœſus; for he thought thoſe for whom the prince deſigned it, had rendered themſelves unworthy of it. The inhabitants of Delphi contrived an accuſation of ſacrilege againſt him; and pretending they had convicted him, threw him headlong from a rock. For this cruelty and injuſtice, we are told, they were viſited with famine and peſtilence; and conſulting the oracle, they received for anſwer, that the god deſigned this as a puniſhment for their treatment of Æſop: they endeavoured to make an atonement, by raiſing a pyramid to his honour.

ÆSOP (Clodius), a celebrated actor, who flouriſhed about the 670th year of Rome. He and Roſcius were cotemporaries, and the beſt performers who ever appeared upon the Roman ſtage, the former excelling in tragedy, the latter in comedy. Cicero put himſelf under their direction to perfect his action. Æſop lived in a moſt expenſive manner, and at one entertainment is ſaid to have had a diſh which coſt above eight hundred pounds; this diſh, we are told, was filled with ſinging and ſpeaking birds, ſome of which coſt near 50*l.* The delight which Æſop took in this ſort of birds proceeded, as Mr Bayle obſerves, from the expence. He did not make a diſh of them becauſe they could ſpeak, this motive being only by accident, but becauſe of their extraordinary price. If there had been any birds that could not ſpeak, and yet more ſcarce and dear than theſe, he would have procured ſuch for his table. Æſop's ſon was no leſs luxurious than his father, for he diſſolved pearls for his gueſts to ſwallow. Some ſpeak of this as a common practice of his; but others mention his falling into this exceſs only on a particular day, when he was treating his friends. Horace * ſpeaks only of one pearl of great value, which he diſſolved in vinegar, and drank. Æſop, notwithſtanding his expences,

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* Sat. ii. lib. ii. 239.

ces, is ſaid to have died worth above 160,000*l.* When he was upon the ſtage, he entered into his part to ſuch a degree, as ſometimes to be ſeized with a perfect ecſtacy: Plutarch mentions it as reported of him, that whilſt he was repreſenting Atreus deliberating how he ſhould revenge himſelf on Thyeſtes, he was ſo tranſported beyond himſelf in the heat of action, that with his truncheon he ſmote one of the ſervants croſſing the ſtage, and laid him dead on the ſpot.

ÆSTIMATIO capitis, a term met with in old law-books for a fine anciently ordained to be paid for offences committed againſt perſons of quality, according to their ſeveral degrees.

ÆSTIVAL, in a general ſenſe, denotes ſomething connected with, or belonging to, ſummer. Hence æſtival ſign, æſtival ſolſtice, &c.

ÆSTUARIA, in geography, denotes an arm of the ſea, which runs a good way within land. Such is the Briſtol channel, and many of the friths of Scotland.

ÆSTUARIES, in ancient baths, were ſecret paſſages from the hypocauſtum into the chambers *.

ÆSTUARY, among pyſicians, a vapour-bath, or any other inſtrument for conveying heat to the body.

ÆSYMNIUM, in antiquity, a monument erected to the memory of the heroes, by Æſymnus the Megarean. He conſulting the oracle in what manner the Megareans might be moſt hapily governed, was anſwered, *If they held conſultation with the more numerous:* whom he taking for the dead, built the ſaid monument, and a ſenate-houſe that took within its compaſs the monument; imagining, that thus the dead would aſſiſt at their conſultations. (Pauſanias.)

ÆTH, or Ath, a ſtrong little town in the Auſtrian Netherlands and province of Hainault, ſituated on the river Dender, about twenty miles S. W. of Bruſſels.

ÆTHER, in natural philoſophy. See Ether.

Æther, in chemiſtry. See Chemistry, nº 167, 218, 261, 290, 305.

ÆTHERIAL. See Etherial.

ÆTHIOPIA. See Ethiopia.

ÆTHIOPS, *Mineral* and *Antimonial.* See Pharmacy, nº 752, 804.

ÆTHUSA, in botany, a genus of the pentandria digynia claſs. The volucrum is dimidiated, triphyllous, and pendulous. There is but one ſpecies, *viz.* the æthuſa ſynapium, fools-parſley, or leſſer hemlock, (a native of Britain,) which grows in corn-fields and gardens. This plant, from its reſemblance to common parſley, hath ſometimes been miſtaken for it; and when eaten, it occaſions ſickneſs. If the curled-leaved parſley only was cultivated in our gardens, no ſuch miſtakes would happen in future. Cows, horſes, ſheep, goats, and ſwine, eat it. It is noxious to geeſe.

AETIANS, in church-hiſtory, a branch of Arians who maintained, that the Son and Holy Ghoſt are in all things diſſimilar to the Father. See Aetius.

Ætiology, is that part of Pathology which is employed in exploring the cauſes of diſeaſes *.

AETIUS, one of the moſt zealous defenders of Arianiſm, was born in Syria, and flouriſhed about the year 336. After being ſervant to a grammarian, of whom he learned grammar and logic, he was ordained deacon, and at length biſhop, by Eudoxus patriarch of Conſtantinople. St Epiphanius has preſerved 47 of his propoſitions againſt the Trinity. His followers were called Aetians.

Aetius, a famous phyſician, born at Amida in Meſopotamia, and the author of a work intitled *Tetrabiblos*, which is a collection from the writings of thoſe phyſicians who went before him. He lived, according to Dr Freind, at the end of the 5th or the beginning of the 6th century.

Aetius, governor of Gallia Narbonenſis in the reign of Valentinian III. forced the Franks who were paſſing into Gaul to repaſs the Rhine. He defeated the Goths; and routed Attila king of the Huns, who invaded Gaul with an army of 700,000 men. But the emperor, jealous of the merit of this great man, killed him in 454 with his own hand, under the pretence that he had permitted the invaſion of the Huns, after Attila's defeat.

ÆTNA, (in the Itineraries *Æthna*, ſuppoſed from αιθω, to burn; according to Bochart, from *Athuna*, a furnace, or *Ætuna*, darkneſs), now *Monte Gibello*; a vulcano or burning mountain of Sicily, ſituated in lat. 38°. N. long. 15°. E.

This mountain, famous from the remoteſt antiquity, both for its bulk and terrible eruptions, ſtands in the eaſtern part of the iſland, in a very extenſive plain, called *Val Demoni*, from the notion of its being inhabited by devils, who torment the ſpirits of the damned in the bowels of this vulcano.

Concerning the dimenſions of mount Ætna, we can ſcarce extract any thing conſiſtent, even from the accounts of the lateſt and moſt ingenious travellers. Pindar, who lived about 435 years before Chriſt, calls it the *Pillar of heaven*, on account of its great height. All modern writers likewiſe agree, that this mountain is very high, and very large; but differ exceſſively both as to its height and magnitude: ſome making it no leſs than twelve miles high, others eight, others ſix, ſome four, while Mr Brydone, and Sir William Hamilton, who lately aſcended to its higheſt ſummit, reduce its height to little more than two miles; nay, by ſome, it is reduced to 10,036 feet, ſomewhat leſs than two miles. No leſs remarkable are the differences concerning its circumference: ſome making it only 60 miles round, others 100; and Signior Recupero, from whom Mr Brydone had his information in this reſpect, affirms it to be no leſs than 183 miles in circuit.

We are ſorry to detract from the merit of Mr Brydone, or to involve in obſcurity what he hath been at ſo much pains to elucidate; but every perſon who compares the account of mount Ætna's circumference, given by Signior Recupero, and to which Mr Brydone ſeems to have aſſented, with its apparent circumference on the map prefixed to that gentleman's tour through Sicily and Malta, muſt at once be ſtruck with the prodigious diſparity. Indeed, it is plain, that, in the map, the geographer hath not left room for any ſuch mountain; nor can we help thinking, that, by comparing the diſtances of ſome of the Sicilian towns from one another, Signior Recupero's dimenſions will be found enormouſly exaggerated.—Certain it is, that there the geographer hath placed Catania, which ſtands at the foot of mount Ætna, on one ſide, no more than 28 miles from the moſt diſtant point of the river Alcantara, which forms the boundary on the oppoſite ſide; ſo that a circle, whoſe radius is 14 or 15 miles, muſt encompaſs as much ſpace as we can poſſibly think is occupied by the baſis of mount Ætna. Thus we will reduce the circumference of this famous mountain to between 80 and 90 miles; and even when we do ſo, it muſt ſtill be acknowledged to be very great.

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* See *Bath*, and *Hypocauſtum.*

* See *Medicine*, Part II. chap. ii. or nº 72, *et ſeq.*

But if we are embarraſſed with the circumference of Ætna, we are much more ſo with the accounts relating to its height; and one circumſtance, particularly, creates almoſt inſurmountable difficulties. It is agreed upon by all travellers, and among the reſt by Sir William Hamilton, that from Catania, where the aſcent firſt begins, to the ſummit, is not leſs than 30 miles. The deſcent on the other ſide we have no account of; but, whatever ſuppoſition we make, the height of the mountain muſt be prodigious. If we ſuppoſe it likewiſe to be 30 miles, and that mount Ætna can be repreſented by an equilateral triangle, each of whoſe ſides is 30 miles, we will have an amazing elevation indeed, no leſs than 26 miles perpendicular!—Such a height being beyond all credibility, we muſt contract the ſides of our triangle, in proportion to its baſis. We ſhall begin with allowing 10 miles for the difference between a ſtraight line from Catania to the ſummit, and the length of the road, occaſioned by the inequalities of the mountain; and ſuppoſing the deſcent on the other ſide to be ſomewhat ſhorter, we may call it 15 miles. Mount Ætna will now be repreſented by a ſcalene triangle, whoſe baſe is 30 miles, its longeſt ſide 20, and its ſhorteſt 15; from which proportions we will ſtill find its height to be betwixt eight and nine miles.—This is ſtill incredible; and when all the various relations concerning the height of Ætna are compared, we hope it will not be thought preſumptuous in us to give it as our opinion, that the true dimenſions of this mountain are as yet unknown.

General appearance,

Concerning the products and general appearance of this vulcano, authors are much better agreed.—The journey from Catania to its ſummit has been lately deſcribed by three travellers, M. D'Orville, Mr Brydone, and Sir William Hamilton. All theſe agree, that this ſingle mountain affords an epitome of the different climates throughout the whole world: towards the foot, it is very hot; farther up, more temperate; and grows gradually more and more cold the higher we aſcend. At the very top, it is perpetually covered with ſnow: from thence the whole iſland is ſupplied with that article, ſo neceſſary in a hot climate, and without which the natives ſay Sicily could not be inhabited. So great is the demand for this commodity, that the biſhop's revenues, which are conſiderable, ariſe from the ſale of mount Ætna's ſnow; and he is ſaid to draw 1000 *l.* a-year from one ſmall portion lying on the north ſide of the mountain. Great quantities of ſnow and ice are likewiſe exported to Malta and Italy, making a conſiderable branch of commerce. On the north ſide of this ſnowy region, Mr Brydone was aſſured, that there are ſeveral ſmall lakes which never thaw; and that the ſnow mixed with the aſhes and ſalts of the mountain are accumulated to a vaſt depth. The quantity of ſalts contained in this mountain, he, with great probability, conjectures to be one reaſon of the preſervation of its ſnows; for ſalt increaſes the coldneſs of ſnow to a ſurpriſing degree *.

Ætna.

Crater deſcribed.

In the middle of the ſnowy region ſtands the great *crater*, or mouth of Ætna; from which, though contrary to the uſual method of travellers, we ſhall begin our particular account of this mountain. Sir William Hamilton deſcribes the crater as a little mountain, about a quarter of a mile perpendicular, and very ſteep, ſituated in the middle of a gently inclining plain, of about nine miles in circumference. It is entirely formed of ſtones and aſhes; and, as Mr Hamilton was informed by ſeveral people of Catania, had been thrown up about 25 or 30 years before the time (1769) he viſited mount Ætna. Before this mountain was thrown up, there was only a prodigious large chaſm, or gulph, in the middle of the above-mentioned plain; and it has been remarked, that about once in 100 years the top of Ætna falls in; which undoubtedly muſt be the caſe at certain periods, or the mountain behoved continually to increaſe in height. As this little mountain, though emitting ſmoke from every pore, appeared ſolid and firm, Mr Hamilton and his companions went up to the very top. In the middle is a hollow, about two miles and a half in circumference, according to Mr Hamilton; three miles and a half, according to Mr Brydone; and three or four, according to Mr D'Orville. The inſide is cruſted over with ſalts and ſulphur of different colours. It goes ſhelving down, from the top, like an inverted cone; the depth, in Mr Hamilton's opinion, nearly correſponding to the height of the little mountain. From many places of this ſpace iſſue volumes of ſulphureous ſmoke, which being much heavier than the circumambient air, inſtead of aſcending in it, roll down the ſide of the mountain, till, coming to a more denſe atmoſphere, it ſhoots off horizontally, and forms a large tract in the air, according to the direction of the wind; which, happily for our travellers, carried it exactly to the ſide oppoſite to which they were placed. In the middle of this funnel is the tremenduous and unfathomable gulph, ſo much celebrated in all ages, both as the terror of this life, and the place of puniſhment in the next. From this gulph continually iſſue terrible and confuſed noiſes, which in eruptions are increaſed to ſuch a degree as to be heard at a prodigious diſtance. Its diameter is probably very different at different times: for Mr Hamilton obſerved, by the wind clearing away the ſmoke from time to time, that the inverted hollow cone was contracted almoſt to a point; while Mr D'Orville and Mr Brydone found the opening very large. Both Mr Brydone and Mr Hamilton found the crater too hot to deſcend into it; but Mr D'Orville was bolder: and accordingly he and his fellow-traveller, faſtened to ropes which two or three men held at a diſtance for fear of accidents, deſcended as near as poſſible to the brink of the gulph; but the ſmall flames and ſmoke which iſſued from it on every ſide, and a greeniſh ſulphur and pumice-ſtones, quite black, which covered the margin, would not permit them to come ſo near as to have a full view. They only ſaw diſtinctly in the middle, a maſs of matter which roſe, in the ſhape of a cone, to the height of above 60 feet, and which towards the baſe, as far as their ſight could reach, might be 600 or 800. While they were obſerving this ſubſtance, ſome motion was perceived on the north ſide, oppoſite to that whereon they ſtood; and immediately the mountain began to ſend forth ſmoke and aſhes. This eruption was preceded by a ſenſible increaſe of its internal roarings; which, however, did not continue; but after a moment's dilatation, as if to give it vent, the vulcano reſumed its former tranquillity; but as it was by no means proper to make a long ſtay in ſuch a place, our travellers immediately returned to their attendants.

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* See *Cold*, and *Congelation*.

On the ſummit of mount Ætna, Mr Hamilton obſerves that he was ſenſible of a difficulty in reſpiration from the too great ſubtilty of the air, independent of what aroſe from the ſulphureous ſmoke of the mountain. Mr Brydone takes no notice of this; which probably aroſe from the air being in a more rarefied ſtate at the time of Mr Hamilton's obſervation, than of Mr Brydone's; the barometer, as obſerved by the former, ſtanding at 18 inches and 10 lines, by the latter at 19 inches 6½ lines.

In theſe high regions there is generally a very violent wind, which, as all our travellers found it conſtantly blowing from the ſouth, may poſſibly be commonly directed from that point. Here Mr Brydone's thermometer fell to 27°.

Splendor of the ſtars ſeen from the top of Ætna.

The top of Ætna being above the common region of vapours, the heavens appear with exceeding great ſplendor.—Mr Brydone and his company obſerved, as they aſcended in the night, that the number of ſtars ſeemed to be infinitely increaſed, and the light of each of them appeared brighter than uſual; the whiteneſs of the milky way was like a pure flame which ſhot acroſs the heavens; and, with the naked eye, they could obſerve cluſters of ſtars that were inviſible from below. Had Jupiter been viſible, he is of opinion that ſome of his ſatellites might have been diſcovered with the naked eye, or at leaſt with a very ſmall pocket-glaſs. He likewiſe took notice of ſeveral of thoſe meteors called *falling ſtars;* which appeared as much elevated as when viewed from the plain: a proof, according to Mr Brydone, that "theſe bodies move in regions much beyond the bounds that ſome philoſophers have aſſigned to our atmoſphere."

Extenſive proſpect.

To have a full and clear proſpect from the ſummit of mount Ætna, it is neceſſary to be there before ſunriſe; as the vapours raiſed by the ſun, in the day-time, will obſcure every object: accordingly, our travellers took care to arrive there early enough; and all agree, that the beauty of the proſpect from thence cannot be expreſſed.—Here Mr Brydone and Mr Hamilton had a view of Calabria in Italy, with the ſea beyond it; the Lipari iſlands, and Stromboli a vulcano at about 70 miles diſtance, appeared juſt under their feet; the whole iſland of Sicily, with its rivers, towns, harbours, &c. appeared diſtinct, as if ſeen on a map. Maſſa, a Sicilian author, affirms, that the African coaſt as well that of Naples, with many of its iſlands, have been diſcovered from the top of Ætna. The viſible horizon here, is not leſs than 8 or 900 miles in diameter. The pyramidal ſhadow of the mountain reaches acroſs the whole iſland, and far into the ſea on the other ſide, forming a viſible tract in the air, which, as the ſun riſes above the horizon, is ſhortened, and at laſt confined to the neighbourhood of Ætna. The moſt beautiful part of the ſcene, however, in Mr Brydone's opinion, is the mountain itſelf, the iſland of Sicily, and the numerous iſlands lying round it. Theſe laſt ſeem to be cloſe to the ſkirts of Ætna; the diſtances appearing reduced to nothing.

Diviſion into three zones.

This mountain is divided into three zones, which might properly enough be diſtinguiſhed by the names of *torrid*, *temperate*, and *frigid:* they are, however, known by the names of the *Piedmonteſe*, or *Regione culta*, the cultivated, or fertile region; the *Sylvoſa*, woody, or temperate zone; and the *Regione deſerta*, the frigid, or deſert zone, or region. All theſe are plainly diſtinguiſhed from the ſummit.

Regione ſerta.

The *Regione deſerta* is marked out by a circle of ſnow and ice, which extends on all ſides to the diſtance of about eight miles, beginning at the foot of the crater. Greateſt part of this region is ſmooth and even. This is immediately ſucceeded by the *Sylvoſa*, or woody region; which forms a circle of the moſt beautiful green, ſurrounding the mountain on all ſides. This region is variegated with a vaſt number of mountains of a conical form, thrown up by Ætna in thoſe eruptions which burſt out from its ſides. Mr Hamilton counted 44 on the Catania ſide, each having its crater, many with large trees flouriſhing both within and without the crater. All theſe, except a few of late date, have acquired a wonderful degree of fertility. The circumference of this zone, or great circle, according to Recupero, is not leſs than 70 or 80 miles. It is everywhere ſucceeded by the *Regione culta;* which is much broader than the reſt, and extends on all ſides to the foot of the mountain. Here terrible devaſtations are ſometimes committed by the eruptions; and the whole region is likewiſe full of conical mountains thrown up by them. The circumference of this region, is, by Recupero, reckoned 183 miles; but we have already given our reaſons for rejecting theſe dimenſions.—This region is bounded by the ſea to the ſouth and ſoutheaſt; and on all other ſides, by the rivers Semetus and Alcantara, which form the boundaries of mount Ætna.

Il Torre Filoſofo.

About a mile below the foot of the great crater, are found the ruins of an ancient ſtructure, called *Il Torre del Filoſofo*, by ſome ſuppoſed to have been built by the philoſopher Empedocles, who took up his habitation here, the better to ſtudy the nature of mount Ætna. By others they are ſuppoſed to be ruins of a temple of Vulcan. They are of brick, and ſeem to have been ornamented with marble. Somewhere in this region alſo, Mr D'Orville found a great oblong block of poliſhed marble, eight or ten feet high, and three or four thick; though how it came there, was quite unaccountable to him. From Mr D'Orville's and Mr Brydone's accounts, we muſt reckon this part of the mountain pretty ſteep: but Mr Hamilton ſays, that the aſcent was ſo gradual, as not to be in the leaſt fatiguing; and had it not been for the ſnows, they might have rode on their mules to the very foot of the crater.

Regione Sylvoſa.

The woody region deſcends eight or nine miles below the *Regione deſerta*, but differs greatly in the temperature of its climate. Mr Hamilton obſerved a gradual decreaſe of the vegetation as he advanced; the under part being covered with large timber trees, which grew gradually leſs as he approached the third region, at laſt they degenerated into the ſmall plants of the northern climates. He alſo obſerved quantities of juniper and tanſey; and was informed by his guide, that later in the ſeaſon (he viſited Ætna in June 1769) there are a great many curious plants, and in ſome places rhubarb and ſaffron in great plenty. In Carrera's hiſtory of Catania, there is a liſt of all the plants and herbs of Ætna, in alphabetical order.

This region is extolled by Mr Brydone as one of the moſt delightful ſpots on earth. He lodged for a night in a large cave near the middle, formed by one of the moſt

Etna.

moſt ancient lavas. It is called *La Spelonca del Capriole*, or the goats cavern; becauſe it is frequented by thoſe animals, which take refuge there in bad weather. Here his reſt was diſturbed by a mountain thrown up in the eruption 1766. It diſcharged great quantities of ſmoke, and made ſeveral exploſions like heavy cannon fired at a diſtance; but they could obſerve no appearance of fire.

This gentleman likewiſe viſited the eaſtern ſide of the *Regione ſylvoſa*, intending to have aſcended that way to the ſummit, and deſcended again on the ſouth ſide to Catania; but found it impracticable; though what the inſurmountable difficulties were, he does not mention. On this ſide, part of the woody region was deſtroyed, in 1755, by an immenſe torrent of boiling water, which iſſued from the great crater. Its traces were ſtill very viſible, about a mile and an half broad, and in ſome places more. The ſoil was then only beginning to recover its vegetative power, which it ſeems this torrent had deſtroyed for 14 years.—Near this place are ſome beautiful woods of cork, and evergreen oak, growing abſolutely out of the lava, the ſoil having hardly filled the crevices; and not far off, our traveller obſerved ſeven little mountains that ſeemed to have been formed by a late eruption. Each of theſe had a regular cup, or crater, on the top; and, in ſome, the middle gulph, or *Voragine*, as the Sicilians call it, was ſtill open. Into theſe gulphs Mr Brydone tumbled down ſtones, and heard the noiſe for a long time after. All the fields round, to a conſiderable diſtance, were covered with large burnt ſtones diſcharged from theſe little vulcanoes.

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The woody region, eſpecially the eaſt ſide, called *Carpinetto*, abounds with very large cheſtnut-trees; the moſt remarkable of which has been called, from its ſize, *Caſtagno de Cento Cavalli*, or cheſtnut-tree of an hundred horſe. Mr Brydone was greatly diſappointed at the ſight of this tree, as it is only a buſh of five large ones growing together: but his guides aſſured him, that all theſe five were once united into one ſtem; and Signior Recupero told him, that he himſelf had been at the expence of carrying up peaſants with tools to dig round this buſh of trees, and found all the ſtems united below ground in one root. The circumference, as meaſured by Meſſrs Brydone and Glover who accompanied him, amounted to 204 feet. Another of theſe, about a mile and a half higher on the mountain, is called *Caſtagna del Galea*: it riſes from one ſolid ſtem to a conſiderable height; after which it branches out, and is a much finer object than the other: this was meaſured two feet above the ground, and found to be 76 feet in circumference. A third, called *Caſtagno del Nave*, is pretty nearly of the ſame ſize; and Maſſa, one of the moſt eſteemed Sicilian authors, affirms that he has ſeen ſolid oaks there upwards of 40 feet round. All theſe grow on a thick rich ſoil, which ſeems originally to have been formed of aſhes thrown out by the mountain. Here the barometer ſtood at 26 inches 5 lines and an half, indicating an elevation of near 4000 feet.

gione
Culta.

The Piedmonteſe diſtrict is covered with towns, villages, monaſteries, &c. and is well peopled, notwithſtanding the danger of ſuch a ſituation: but the fertility of the ſoil tempts people to inhabit that country; and their ſuperſtitious confidence in their ſaints, with the propenſity mankind have to deſpiſe danger which they do not ſee, render them as ſecure there as in any other place. Here, Sir Wm Hamilton obſerves, they keep their vines low, contrary to the cuſtom of thoſe who inhabit mount Veſuvius; and they produce a ſtronger wine, but not in ſuch abundance: here alſo many terrible eruptions have burſt forth; particularly one in 1669. At the foot of the mountain raiſed by that eruption, is a hole, through which Sir Wm Hamilton deſcended, by means of a rope, into ſeveral ſubterraneous caverns, branching out, and extending much farther than he choſe to venture, the cold there being exceſſive, and a violent wind extinguiſhing ſome of the torches. Many other caverns are known in this and the other regions of Ætna; particularly one near this place called *La Spelonca della Palomba*, (from the wild pigeons building their neſts there.) Here Mr Brydone was told that ſome people had loſt their ſenſes, from having advanced too far, imagining they ſaw devils and damned ſpirits.—Some of theſe caverns are made uſe of as magazines for ſnow; which they are well adapted for, on account of their extreme cold. Theſe are with great probability ſuppoſed by Sir Wm Hamilton to be the hollows made by the iſſuing of the lava in eruptions.

Subterraneous caverns.

River Acis.

In this region the river *Acis*, ſo much celebrated by the poets, in the fable of Acis and Galatea, takes its riſe. It burſts out of the earth at once in a large ſtream, runs with great rapidity, and about a mile from its ſource throws itſelf into the ſea. Its water is remarkably clear; and ſo extremely cold, that it is reckoned dangerous to drink it: it is ſaid, however, to have a poiſonous quality, from being impregnated with vitriol; in conſequence of which, cattle have been killed by it. It never freezes, but is ſaid often to contract a greater degree of cold than ice.

Appearances during an eruption.

Having thus given an account of this mountain in its quiet and peaceable ſtate, we muſt now deſcribe the appearance it puts on during the time of an eruption, when it ſpreads deſtruction for many miles round, and is capable of ſtriking the boldeſt with terror.—Here we are ſurpriſed to find ourſelves at a loſs; for though there are many particular accounts of the eruptions of Veſuvius, we cannot, after the moſt diligent ſearch, find that any writer hath accurately deſcribed the phenomena attending an eruption of Ætna.—Borelli, indeed, an Italian writer, publiſhed a natural hiſtory of this mountain for the year 1669, when a very terrible eruption happened; but as this treatiſe is not now to be found, in this part of the world at leaſt, we muſt ſupply the deficiency in the beſt manner we can, by ſuch hints as can be obtained from the writing of Sir Wm Hamilton and Mr Brydone, together with a very imperfect account given by ſome Engliſh merchants who happened to be in Catania at that time, and recorded in the Philoſophical Tranſactions No 51.

Sir Wm Hamilton, who has examined both Veſuvius and Ætna in a very accurate manner, never had an opportunity of ſeeing an eruption of the latter; but as he is of opinion that the two vulcanoes agree perfectly in all reſpects, only that the latter is on a much larger ſcale than the former, we hope it will not be unacceptable to our readers to give an account of ſome of the general appearances of Veſuvius when in a ſtate of eruption, the better to help their ideas concerning Ætna.

It has been already obſerved, that a ſmoke conſtantly iſſues from the top of Ætna, and that its internal noiſes never ceaſe. The caſe is the ſame with Veſuvius: and Sir W^{m} Hamilton obſerved, that in bad weather the ſmoke was more conſiderable, as well as the noiſes much louder, than when it was fair; ſo that in bad weather he had frequently heard the inward exploſions of the mountain at Naples, ſix miles diſtant from Veſuvius. He alſo obſerved the ſmoke that iſſued from the mountain in bad weather to be very white, moiſt, and not near ſo offenſive as the ſulphureous ſteams from various cracks in the ſide of the mountain.

Signs of an approaching eruption

Hamilton's Obſervations, p. 4.

The firſt ſymptom of an approaching eruption is an increaſe of the ſmoke in fair weather: after ſome time, a puff of black ſmoke is frequently ſeen to ſhoot up in the midſt of the white, to a conſiderable height. Theſe puffs are attended with conſiderable exploſions: for while Veſuvius was in this ſtate, Sir W^{m} Hamilton went up to its top, which was covered with ſnow; and perceiving a little hillock of ſulphur, about ſix feet high, which had been lately thrown up, and burnt with a blue flame at the top, he was examining this phenomenon, when ſuddenly a violent report was heard, a column of black ſmoke ſhot up with violence, and was followed by a reddiſh flame. Immediately a ſhower of ſtones fell; upon which he thought proper to retire. Phenomena of this kind, in all probability, precede the eruptions of Ætna, in a much greater degree.—The ſmoke at length appears wholly black in the day-time, and in the night has the appearance of flame; ſhowers of aſhes are ſent forth, earthquakes are produced, the mountain diſcharges volleys of red-hot ſtones to a great height in the air. The force by which theſe ſtones are projected, as well as their magnitude, ſeems to be in proportion to the bulk of the mountain. Signior Recupero aſſured Mr Brydone, that he had ſeen immenſely large ones thrown perpendicularly upwards to the height of 7000 feet, as he calculated from the time they took to arrive at the earth after beginning to deſcend from their greateſt elevation. The largeſt ſtone, or rather rock, that was ever known to be emitted by Veſuvius, was 12 feet long, and 45 in circumference. This was thrown a quarter of a mile; but much larger ones have been thrown out by mount Ætna, almoſt in the proportion in which the latter exceeds Veſuvius in bulk. Along with theſe terrible ſymptoms, the ſmoke that iſſues from the crater is ſometimes in a highly electrified ſtate. In this caſe, the ſmall aſhes which are continually emitted from the crater, are attracted by the ſmoke, and riſe with it to a great height, forming a vaſt black, and to appearance denſe, column; from this column continual flaſhes of forked or zig-zag lightning iſſue, ſometimes attended with thunder, and ſometimes not, but equally powerful with ordinary lightning. This phenomenon was obſerved by Sir W^{m} Hamilton in the ſmoke of Veſuvius, and has alſo been taken notice of in that of Ætna; and where this electrified ſmoke hath ſpread over a tract of land, much miſchief hath been done by the lightning proceeding from it.

Thunder & lightning from the ſmoke.

When theſe dreadful appearances have continued ſometimes four or five months, the *lava* begins to make its appearance. This is a ſtream of melted mineral matters, which in Veſuvius commonly boils over the top; but very ſeldom does ſo in Ætna; owing to the great weight of the lava, which, long before it can be raiſed to the vaſt height of mount Ætna, burſts out through ſome weak place in its ſide. Upon the appearance of the lava, the violent eruptions of the mountain generally, though not always, ceaſe; for if this burning matter gets not ſufficient vent, the commotions increaſe to a prodigious degree.—In the night-time the lava appears like a ſtream of fire, accompanied with flame: but in the day-time it has no ſuch appearance; its progreſs is marked by a white ſmoke, which by the reflection of the red-hot matter in the night aſſumes the appearance of flame.

Eruption 1669.

All the abovementioned ſymptoms preceded the great eruption of Ætna in 1669. For ſeveral months before the lava broke forth, the *old mouth*, or great crater on the ſummit, was obſerved to ſend forth great quantities of ſmoke and flame; the top had fallen in, ſo that the mountain was much lowered; the iſlands alſo of Volcan and Stromboli, two vulcanoes to the weſtward of Sicily, were obſerved to rage more than uſual.—Eighteen days before the eruption, the ſky was very thick and dark, with thunder, lightning, frequent concuſſions of the earth, and dreadful ſubterraneous bellowings. On the 11th of March, ſome time before the lava got vent, a rent was opened in the mountain twelve miles in length, into which, when ſtones were thrown down, they could not be heard to ſtrike the bottom. Burning rocks, 60 palms (15 of our feet) in length, were thrown to the diſtance of a mile; others of a leſſer ſize were carried three miles off; the internal noiſes of the mountain were exceedingly dreadful, and the thunder and lightning from the ſmoke ſcarce leſs terrible than they. When the lava at laſt got vent, it burſt out of a vineyard, 20 miles below the great crater, and ſprung up into the air to a conſiderable height. Here it formed a mountain of ſtones and aſhes, not leſs, as Sir W^{m} Hamilton conjectures, than half a mile perpendicular in height, and three miles in circumference. For 54 days, neither ſun nor ſtars had appeared; but ſoon after the lava got vent, the mountain became very quiet. The terrible effects of this fiery ſtream may be imagined from its amazing extent; being, as Sir W^{m} Hamilton obſerves, no leſs than 14 miles long, and in many places ſix in breadth. In its courſe, it deſtroyed the habitations of near 30,000 perſons; and meeting with a lake four miles in compaſs, it not only filled it up, though ſeveral fathom deep, but made a mountain in the place of it. Having reached Catania, it deſtroyed part of its walls, and ran for a conſiderable length into the ſea, forming a ſafe and beautiful harbour; which, however, was ſoon filled up by a freſh torrent of the ſame inflamed matter.

Phenome at the brea ing forth the lava.

It is not eaſy for thoſe who have never been preſent at thoſe terrible operations of nature, to repreſent to their minds the horror which muſt attend the breaking forth of a lava; for though the giving vent to this burning matter generally produces a ceſſation of the violent efforts of the internal fire, yet at the very inſtant of its exploſion ſcarce any thing can be conceived ſo dreadful.—As we cannot find a particular account of what happened at the breaking forth of the lava in mount Ætna in 1669, we muſt content ourſelves with giving the reader ſome idea of it from Sir W^{m} Hamilton's account of the breaking forth of a lava in Veſuvius, no more than a quarter of a mile's diſtance from the place where he ſtood. "I was making my obſervations," ſays he, "on the lava, which had already, from the

Hamilton Obſerva tions, p.

“ſpot where it firſt broke out, reached the valley; when, on a ſudden, about noon, I heard a violent noiſe within the mountain, and about a quarter of a mile off the place where I ſtood, the mountain ſplit, and with much noiſe, from this new mouth, a fountain of liquid fire ſhot up many feet high, and then, like a torrent, rolled on directly towards us. The earth ſhook, at the ſame time that a volley of pumice-ſtones fell thick upon us; in an inſtant, clouds of black ſmoke and aſhes cauſed almoſt a total darkneſs; the exploſions from the top of the mountain were much louder than any thunder I ever heard, and the ſmell of ſulphur was likewiſe very offenſive. My guide, alarmed, took to his heels; and I muſt confeſs I was not at my eaſe. I followed cloſe, and we ran near three miles without ſtopping; as the earth continued to ſhake under our feet, I was apprehenſive of the opening of a freſh mouth, which might have cut off our retreat. I alſo feared that the violent exploſions would detach ſome of the rocks off the mountain of Somma, under which we were obliged to paſs; beſides, the pumice-ſtones, falling upon us like hail, were of ſuch a ſize as to cauſe a diſagreeable ſenſation upon the part where they fell. After having taken breath, as the earth ſtill trembled greatly, I thought it moſt prudent to leave the mountain and return to my villa; where I found my family in a great alarm at the continual and violent exploſions of the vulcano, which ſhook our houſe to its very foundation, the doors and windows ſwinging upon their hinges.—The noiſe and ſmell of ſulphur increaſing, we removed from our villa to Naples: and I thought proper, as I paſſed by Portici, to inform the court of what I had ſeen; and humbly offered it as my opinion, that his Sicilian Majeſty ſhould leave the neighbourhood of the threatening mountain.——I obſerved, in my way to Naples, which was in leſs than two hours after I had left the mountain, that the lava had actually covered three miles of the very road through which we had retreated. It is aſtoniſhing that it ſhould have run ſo faſt; as I have ſince ſeen, that the river of lava in the Atrio di Cavallo was 60 and 70 feet deep, and in ſome places near two miles broad. When his Sicilian Majeſty quitted Portici, the noiſe was greatly increaſed; and the concuſſion of the air from the exploſions was ſo violent, that, in the king's palace, doors and windows were forced open, and even one door there, which was locked, was nevertheleſs burſt open. At Naples, the ſame night, many windows and doors flew open: (the windows at Naples open like-folding doors.) In my houſe, which is not on the ſide of the town next Veſuvius, I tried the experiment of unbolting my windows, when they flew wide open upon every exploſion of the mountain. Beſides theſe exploſions, which were very frequent, there was a continued ſubterraneous and violent rumbling noiſe, which laſted this night about five hours.”

Hamilton's Obſervations, p. 10.

Lava of 1669 deſcribed.

No doubt the ſame terrible appearances are put on by Ætna at the time its lavas break forth; but in a much greater degree, in proportion to the ſuperior ſize of the mountain.—The appearance, and indeed the effects, of the lava itſelf, are very dreadful. When it firſt iſſues, the lava appears very fluid, and runs with the rapidity of a ſwift river: but even then it ſurpriſingly reſiſts the impreſſion of ſolid bodies; for Sir W^{m} Hamilton could not pierce that of Veſuvius with a ſtick driven againſt it with all his force; nor did the largeſt ſtone he was able to throw upon it ſink, but made a ſlight impreſſion, and then floated along. This happened almoſt at the very mouth, when the lava appeared liquid as water, and when he ſaw it running with a rapidity equal to the river Severn at the paſſage near Briſtol.—A deſcription of the lava iſſuing from mount Ætna in 1669 was ſent to the court of England by Lord Winchelſea, who at that time happened to be at Catania in his way home from an embaſſy at Conſtantinople. His account is not now to be procured; but Mr Hamilton found a copy in Sicily, and hath given an extract, part of which follows. “When it was night, I went upon two towers in divers places; and I could plainly ſee, at ten miles diſtance, as we judged, the fire begin to run from the mountain in a direct line, the flame to aſcend as high and as big as one of the greateſt ſteeples in your Majeſty's kingdoms, and to throw up great ſtones into the air; I could diſcern the river of fire to deſcend the mountain of a terrible fiery or red colour, and ſtones of a paler red to ſwim thereon, and to be ſome as big as an ordinary table. We could ſee this fire to move in ſeveral other places, and all the country covered with fire, aſcending with great flames in many places, ſmoking like to a violent furnace of iron melted, making a noiſe with the great pieces that fell, eſpecially thoſe that fell into the ſea. A cavalier of Malta, who lives there, and attended me, told me, that the river was as liquid, where it iſſues out of the mountain, as water, and came out like a torrent with great violence, and is five or ſix fathom deep, and as broad, and that no ſtones ſink therein.”

The account given in the Philoſophical Tranſactions is to the ſame purpoſe. We are there told, that the lava is “nothing elſe than diverſe kinds of metals and minerals, rendered liquid by the fierceneſs of the fire in the bowels of the earth, boiling up and guſhing forth as the water doth at the head of ſome great river; and having run in a full body for a ſtone's-caſt or more, began to cruſt or curdle, becoming, when cold, thoſe hard porous ſtones which the people call *Sciarri*.” Thoſe, though cold in compariſon of what firſt iſſues from the mountain, yet retained ſo much heat as to reſemble huge cakes of ſea-coal ſtrongly ignited, and came tumbling over one another, bearing down or burning whatever was in their way.—In this manner the lava proceeded ſlowly on till it came to the ſea, when a moſt extraordinary conflict enſued betwixt the two adverſe elements. The noiſe was vaſtly more dreadful than the loudeſt thunder, being heard thro' the whole country to an immenſe diſtance; the water ſeemed to retire and diminiſh before the lava, while clouds of vapour darkened the ſun. The whole fiſh on the coaſt were deſtroyed, the colour of the ſea itſelf was changed, and the tranſparency of its waters loſt for many months.

While this lava was iſſuing in ſuch prodigious quantity, the merchants, whoſe account is recorded in the Philoſophical Tranſactions, attempted to go up to the mouth itſelf; but durſt not come nearer than a furlong, leſt they ſhould have been overwhelmed by a vaſt pillar of aſhes, which to their apprehenſion exceeded twice the bigneſs of St Paul's ſteeple in London, and went up into the air to a far greater height; at the mouth itſelf was a continual noiſe, like the beating of great waves of the ſea againſt rocks, or like diſtant thunder, which ſometimes was ſo violent as to be heard 60, or even 100 miles off, to which diſtance alſo part of the aſhes were carried.—Some time after, having gone up, they found the mouth from whence this terrible deluge iſſued to be only a hole about 10 feet diameter. This is alſo confirmed by Mr Brydone; and is probably the ſame through which Sir W^{m} Hamilton deſcended into the ſubterranean caverns already mentioned.

Diameter of the hole whence the lava iſſued.

Antiquity of the eruptions.

Mount Ætna, as we have already remarked, has been a celebrated Vulcano from the remoteſt antiquity. Diodorus Siculus mentions eruptions of it as happening 500 years before the Trojan war, or 1693 years before the Chriſtian æra. Many others are recorded by hiſtorians in different ages, but none are particularly deſcribed. The mountain ſeems ſometimes to lie dormant for many years, or even centuries; when it breaks out again with great fury, and will ſometimes burn for years together. Since 1669 there have been ſeveral eruptions, but none of them comparable to that one. The laſt happened in 1766. The lava ſprung up into the air to a conſiderable height, twelve miles below the ſummit; but formed a ſtream only ſix miles in length, and one mile in breadth.

Theſe are the moſt remarkable circumſtances we have been able to collect, that might ſerve to give an adequate idea of this famous mountain.—Many things, however, concerning the extent, antiquity, *&c.* of the lavas, remain to be diſcuſſed, as well as the opinions of philoſophers concerning the origin of the internal fire which produces ſo much miſchief: but the conſideration of theſe belongs to the general article VULCANO, to which the reader is referred.—The fate of *Catania* and *Hybla*, which have often been deſtroyed by eruptions, falls to be mentioned under theſe two words.

ÆTOLARCHA, in Grecian antiquity, the principal magiſtrate or governor of the Ætolians.

AFER (Domitius), born at Niſmes, a famous orator under Tiberius and the three ſucceeding emperors. Quintilian makes frequent mention of him, and commends his pleadings. But he diſgraced his talents, by turning informer againſt ſome of the moſt diſtinguiſhed perſonages in Rome. He died A. D. 59.

AFFECTION, in a general ſenſe, implies an attribute inſeparable from its ſubject. Thus magnitude, figure, weight, &c. are affections of all bodies; and love, fear, hatred, &c. are affections of the mind *.

AFFECTION, ſignifying *a ſettled bent of mind toward a particular being or thing*, occupies a middle ſpace between *diſpoſition* on the one hand, and *paſſion* on the other †. It is diſtinguiſhable from Diſpoſition, which being a branch of one's nature, originally, muſt exiſt before there can be an oportunity to exert it upon any particular object; whereas Affection can never be original, becauſe, having a ſpecial relation to a particular object, it cannot exiſt till the object have once at leaſt been preſented. It is alſo diſtinguiſhable from Paſſion, which, depending on the real or ideal preſence of its object, vaniſhes with its object: whereas Affection is a laſting connection; and, like other connections, ſubſiſts even when we do not think of the perſon. A familiar example will illuſtrate this. There may be in one perſon's mind a diſpoſition to gratitude, which, through want of an object, happens never to be exerted; and which therefore is never diſcovered even by the perſon himſelf. Another, who has the ſame diſpoſition, meets with a kindly office that makes him grateful to his benefactor: An intimate connection is formed between them, termed *affection;* which, like other connections, has a permanent exiſtence, though not always in view. The affection, for the moſt part, lies dormant, till an opportunity offer for exerting it: in that circumſtance, it is converted into paſſion of gratitude; and the opportunity is eagerly ſeized of teſtifying gratitude in the warmeſt manner.

AFFECTION, among phyſicians, ſignifies the ſame as diſeaſe. Thus the hyſteric *affection* is the ſame with the hyſteric diſeaſe.

AFFECTIONS *and Paſſions*, (non-naturals.) See MEDICINE, n° 153.

AFFEERERS, or AFFEERORS, in law, perſons appointed in court-leets, courts-baron, &c. to ſettle, upon oath, the fines to be impoſed upon thoſe who have been guilty of faults arbitrarily puniſhable.

AFFETUOSO, or *Con* AFFETTO, in the Italian muſic, intimates that the part to which it is added ought to be played in a tender moving way, and conſequently rather ſlow than faſt.

AFFIANCE, in law, denotes the mutual plighting of troth between a man and woman to marry each other.

AFFIDAVIT, ſignifies an oath in writing, ſworn before ſome perſon who is authoriſed to take the ſame.

AFFINITY, among civilians, implies a relation contracted by marriage; in contradiſtinction to conſanguinity, or relation by blood.—Affinity does not found any real kinſhip; it is no more than a kind of fiction, introduced on account of the cloſe relation between huſband and wife. It is even ſaid to ceaſe, when the cauſe of it ceaſes: hence a woman who is not capable of being a witneſs for her huſband's brother during his lifetime, is allowed for a witneſs when a widow, by reaſon the affinity is diſſolved. Yet with regard to the contracting marriage, affinity is not diſſolved by death, though it be in every thing elſe.

AFFINITY, is alſo uſed to denote conformity or agreement: Thus we ſay, the affinity of languages, the affinity of words, the affinity of ſounds, &c.

AFFINITY, in chemiſtry, implies that natural impulſe or attraction which various bodies exert towards each other. See CHEMISTRY, n° 15, 27, 64.

AFFIRMATION, in logic, the aſſerting the truth of any propoſition.

AFFIRMATION, in law, denotes an indulgence allowed to the people called Quakers; who, in caſes where an oath is required from others, may make a ſolemn affirmation that what they ſay is true; and if they make a falſe affirmation, they are ſubject to the penalties of perjury. But this relates only to oaths taken to the government, and on civil occaſions; for Quakers are not permitted to give their teſtimony in any criminal caſe, &c.

AFFIRMATION, is alſo uſed for the ratifying or confirming the ſentence or decree of ſome inferior court: thus we ſay, the Houſe of Lords affirmed the decree of the lord chancellor, or the decree of the lords of ſeſſion.

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* See *Moral Philoſophy*, Part I. ſec. i. iv.

† See *Diſpoſition*, and *Paſſion*.

AFFLATUS, literally denotes a blaſt of wind, breath, or vapour, ſtriking with force againſt another body. The word is Latin, formed from *ad* to, and *flare* to blow. Naturaliſts ſometimes ſpeak of the afflatus of ſerpents. Tully uſes the word, figuratively, for a divine inſpiration; in which ſenſe, he aſcribes all great and eminent accompliſhments to a divine afflatus. The Pythian prieſteſs being placed on a tripod or perforated ſtool, over a hollow cave, received the divine afflatus, as a late author expreſſes it, in her belly; and being thus inſpired, fell into agitations, like a phrenetic; during which, ſhe pronounced, in hollow groans and broken ſentences, the will of the deity. This afflatus is ſuppoſed, by ſome, to have been a ſubterraneous fume, or exhalation, wherewith the prieſteſs was literally inſpired. Accordingly, it had the effects of a real phyſical diſeaſe; the paroxyſm of which was ſo vehement, that Plutarch obſerves it ſometimes proved mortal. Van Dale ſuppoſes the pretended enthuſiaſm of the Pythia to have ariſen from the fumes of aromatics.

AFFRAY, or AFFRAYMENT, in law, formerly ſignified the crime of affrighting other perſons, by appearing in unuſual armour, brandiſhing a weapon, &c. but, at preſent, *affray* denotes a ſkirmiſh or fight between two or more.

AFFRONTEE, in heraldry, an appellation given to animals facing one another on an eſcutcheon; a kind of bearing which is otherwiſe called *confrontee*, and ſtands oppoſed to *adoſſee*.

AFRANIUS, a Latin poet, who wrote comedies in imitation of Menander, commended by Tully and Quintilian: he lived in the 170th olympiad.

AFRICA (according to Bochart, from a Punic word, ſignifying *Ears of Corn*) one of the four great diviſions, by the moderns called *quarters*, of the world, and one of the three called by the Greeks Ἤπειροι, or *continents*. By them it was alſo called *Libya*.

Africa lies ſouth of Europe, and weſt of Aſia. It is bounded on the north by the Mediterranean, which ſeparates it from the former; on the north-eaſt, by the Red-ſea which divides it from Aſia, and to which it is attached by a neck of land called the *Iſthmus of Suez*, about 60 miles over, ſeparating the Mediterranean from the Red-ſea. On the weſt, ſouth, and eaſt, it is bounded by the main ocean: ſo that it is properly a vaſt peninſula, bearing ſome faint reſemblance of a pyramid, the baſe of which is the northern part, running along the ſhores of the Mediterranean; and the top of the pyramid is the moſt ſoutherly point, called the *Cape of Good Hope*. Its greateſt length from north to ſouth is 4300 miles, and its greateſt breadth from eaſt to weſt is 3500 miles; reaching from Lat. 37° N. to 35° S. and from Long. 17° W. to 50° E.

Though the greateſt part of this continent hath been in all ages unknown both to the Europeans and Aſiatics, its ſituation is more favourable than either Europe or Aſia for maintaining an intercourſe with other nations. It ſtands, as it were, in the centre of the three other quarters of the globe; and has thereby a much nearer communication with Europe, Aſia, and America, than any one of theſe has with another. For, (1.) It is oppoſite to Europe in the Mediterranean, for almoſt 1000 miles in a line from eaſt to weſt; the diſtance ſeldom 100 miles, never 100 leagues, and ſometimes not above 20 leagues. (2.) It is oppoſite to Aſia for all the length of the Red-ſea, the diſtance ſometimes not exceeding five leagues, ſeldom fifty (3.) Its coaſt for the length of about 2000 miles lies oppoſite to America at the diſtance of, from 500 to 700 leagues, including the iſlands: whereas America, unleſs where it may be a *terra incognita*, is no where nearer Europe than 1000 leagues; and Aſia, than 2500.

As the equator divides this continent almoſt in the middle, the far greateſt part of it is within the tropics; and of conſequence the heat in ſome places is almoſt inſupportable by Europeans, it being there greatly increaſed by vaſt deſerts of burning ſand.—It cannot be doubted, however, that, were the country well cultivated, it would be extremely fertile; and would produce in great abundance not only the neceſſaries, but alſo the luxuries, of life. It has been aſſerted, that the ſugars of Barbadoes and Jamaica, as alſo the ginger, cotton, rice, pepper, pimento, cocoa, indigo, &c. of theſe iſlands, would thrive in Africa to as much perfection as where they are now produced. Nor can it be doubted, that the Eaſt-Indian ſpices, the tea of China and Japan, the coffee of Mocha, &c. would all thrive in ſome parts of the African coaſt; as this continent has the advantage of feeling no cold, the climate being either very warm or very temperate.

Whatever may be the caſe with the internal parts of Africa, it is certain that its coaſts are well watered with many very conſiderable rivers. The Nile and the Niger may be reckoned among the largeſt in any part of the world, America excepted. The firſt diſcharges itſelf into the Mediterranean, after a prodigious courſe from its ſource in Abyſſinia. The origin neither of the Nile, nor of the Niger, is certainly known; but that of the latter is ſuppoſed to run through a tract of land little leſs than 3000 miles. Both theſe rivers annually overflow their banks, fertilizing by that means the countries through which they paſs. The Gambia and Senegal rivers are only branches of the Niger. Many vaſt ridges of mountains alſo run through different parts of this continent; but their extent is very little known. Some of the moſt remarkable are, (1.) Thoſe called *Atlas*, lying between the 20th and 25th degree of north latitude, and ſuppoſed almoſt to divide the continent from eaſt to weſt. (2.) The *mountains of the moon*, ſo called on account of their great height; ſuppoſed to be the boundaries between Abyſſinia and ſome of the interior kingdoms. (3.) The mountains of *Sierra Leona*, ſo called on account of their abounding with lions, and likewiſe ſuppoſed to be the boundaries of ſome of the nations. (4.) Thoſe called by the ancients the *mountains of God*, on account of their being ſubject to perpetual thunder and lightning. Of all theſe, however, little more is known than their names.

To what we have already ſaid concerning the produce of Africa, we may add, that no part of the world abounds with gold and ſilver in a greater degree. Here alſo are a prodigious number of elephants; and it is ſurpriſing, that neither the ancient nor modern Europeans, notwithſtanding their extravagant and inſatiable thirſt after gold and ſilver, ſhould have endeavoured to eſtabliſh themſelves effectually in a country much nearer to them than either America or the Eaſt Indies; and where the objects of their deſire are found in equal, if not greater, plenty.

Next to gold and ſilver, copper is the moſt valuable metal,

metal; and on this continent is found in great plenty, inſomuch that the mountains of Atlas above mentioned are ſaid all to be compoſed of copper ore. In ſhort, Africa, though a full quarter of the globe, ſtored with an inexhauſtable treaſure, and capable of producing almoſt every neceſſary, conveniency, and luxury of life, within itſelf, ſeems to be utterly neglected both by its own inhabitants and all other nations: the former, being in a ſavage ſtate, are incapable of enjoying the bleſſings offered them by nature; and the latter taking no farther notice of the inhabitants, or their land, than to obtain at the eaſieſt rate what they procure with as little trouble as poſſible, or to carry them off for ſlaves to their plantations in America.

Only a ſmall part of this continent was known to the ancients, *viz.* the kingdom of Egypt, and the northern coaſt, comprehending little more than what is now known by the name of *Barbary*. It was divided into *Africa Propria*, and *Africa Interior*. Africa Propria comprehended only the Carthaginian territories. Africa Interior comprehended all other nations to the ſouthward of theſe territories, or thoſe at a greater diſtance from Rome. The only kingdoms, however, with which the Romans had any connection, were the Numidians, the Mauritanians, and the Gætuli. All theſe, as well as Egypt, were ſwallowed up by that enormous power, and reduced to the condition of Roman provinces. But the Romans never ſeem to have penetrated beyond the tropic of cancer. There appears, indeed, to have been ſome intercourſe between them and the Ethiopians: but the latter always preſerved their liberty; and we find their queen Candace mentioned in the times of the apoſtles, when the Roman power was at its higheſt pitch.

Between the tropic of cancer and the equinoctial line, a multitude of ſavage nations were ſuppoſed to have their reſidence, known by the names of Melanogætuli, Nigritæ, Blemmyes, Dolopes, Aſtacuri, Lotophagi, Ichthyophagi, Elephantophagi, &c. (which are taken notice of, as well as the others already mentioned, under their proper names); but that Africa was a peninſula, ſeems to have been totally unknown both to the Europeans and Aſiatics for many ages.—It is probable indeed, that ſome of the Phenicians, and their offspring the Carthaginians, were not ſo ignorant; as they carried navigation to a much greater height than either the Greeks or Romans: but their diſcoveries were all concealed with the greateſt care, leſt other nations ſhould reap the benefit of them; and accordingly we can now find no authentic accounts concerning them. The navigation round Africa, in particular, is recorded by the Greek and Roman writers rather as a ſtrange amuſing tale than as a real tranſaction; and as neither the progreſs of the Phenician and Carthaginian diſcoveries, nor the extent of their navigation, were communicated to the reſt of mankind, all memorials of their extraordinary ſkill in naval affairs ſeem in a great meaſure to have periſhed, when the maritime power of the former was annihilated by Alexander's conqueſt of Tyre, and the empire of the latter was overturned by the Romans.

That the peninſula of Africa, however, was in reality ſailed round by the Phenicians, we have on indiſputable authority; for ſome of that nation undertook the voyage, at the command of Necho king of Egypt, about 604 years before the Chriſtian æra. They ſailed from a port in the Red-ſea, and after three years returned by the Mediterranean: and the very objections that were made to the veracity of their accounts at that time, are unanſwerable proofs to us that this voyage was really accompliſhed. They pretended, that, having ſailed for ſome time, the ſun became more and more vertical, after which he appeared in the north, and ſeemed to recede from them: that as they returned, the ſun gradually ſeemed to move ſouthwards; and, after becoming vertical once more, appeared then in the ſouth ſide of them as before they ſet out. This, which we know muſt certainly have been the caſe, was deemed incredible at that time, and univerſal ignorance concerning the extent of this continent prevailed till the 15th century. The firſt attempts towards attaining a knowledge of Africa was made by the Portugueſe in 1412. Notwithſtanding their vicinity, they had never ventured beyond Cape *Non*, ſituated in about N. lat. 27°.: it had received its name from a ſuppoſed impoſſibility of paſſing it. This year they proceeded 160 miles farther, to Cape Bojador; which ſtretching a conſiderable way into the Atlantic ocean, with rocky clifts, appeared ſo dreadful to the navigators, that they returned without any attempt to paſs it. In an attempt to double this formidable cape, they diſcovered the Madeira iſlands in 1419: but Cape Bojador continued to be the boundary of their continental diſcoveries till 1433; when they penetrated within the tropics, and in a few years diſcovered the river Senegal, Cape de Verd, and the iſlands which lie off that promontory. In 1449, the weſtern iſlands, called the *Azores*, were diſcovered: and in 1471, they firſt penetrated beyond the line; and were ſurpriſed to find, that the torrid zone, contrary to the opinion of the ancients, who imagined it to be burnt up with heat, was not only habitable, but fertile and populous. In 1484, they proceeded 1500 miles beyond the line; ſo that they began to entertain hopes of finding that way a paſſage to the Eaſt Indies: and two years afterwards, the Cape of Good Hope was diſcovered by Bartholomew de Diaz; but it was not till the year 1497, that the Portugueſe, under Vaſquez de Gama, actually doubled this cape, and diſcovered the true ſhape of the continent. Thus the coaſts of Africa were made perfectly known; and probably the knowledge concerning its interior parts would have been much greater than it is, had not the general attention been called off from this continent by the diſcovery of America in 1492.

The Romans for a long time maintained their power in Africa: but in the year 426, Bonifacius, ſupreme governor of all the Roman dominions in this quarter, being compelled to revolt by the treachery of another general called *Aetius*, and finding himſelf unable to contend with the whole ſtrength of the Roman empire, called in Genſeric king of the Vandals to his aid; who thereupon abandoned the provinces he had ſeized in Europe, and paſſed over into Africa. Bonifacius, however, being ſoon after reconciled to his empreſs Placidia, endeavoured in vain to perſuade the Vandals to retire. Hereupon a war enſued, in which the barbarians proved victorious, and quickly over-ran all the Roman provinces in Africa. In the year 435, a peace was concluded; when Numidia and ſome other countries were ceded to the Vandals, who ſoon after ſeized all the reſt. Theſe barbarians did not long enjoy their ill-gotten poſſeſſions: for, about the year 533, Beliſarius drove them out, annexing the provinces to the eaſtern empire; and in 647, the Saracens, having conquered Meſopotamia, Egypt (which anciently was not included in the meaning of the word *Africa*,) Phœnicia, Arabia, and Paleſtine, broke like a torrent into Africa, which they quickly ſubdued. Their vaſt empire being in 936 divided into ſeven kingdoms, the African ſtates retained their independency long after the others were ſubdued by the Turks: but in the beginning of the 16th century, being afraid of falling under the yoke of Spain, they invited the Turks to their aſſiſtance; who firſt protected, and then enſlaved, them. They ſtill continue in a kind of dependence on the Ottoman empire. They are not, however, properly ſpeaking, the *ſubjects* of the grand Signior, but call him their *protector*, paying him an annual tribute. On the coaſts, the natives are almoſt all addicted to piracy; and with ſuch ſucceſs have they carried on their employment, that the greateſt powers in Europe are become their tributaries, in order to procure liberty to trade on the Mediterranean.

Concerning even theſe ſtates, which are neareſt to Europe, very little is known: but the interior nations are ſcarce known by name; nor do almoſt any two of the moſt learned moderns agree in their diviſion of Africa into kingdoms; and the reaſon is, that no traveller hath ever penetrated into theſe inhoſpitable regions. In the year 1774, indeed, an account appeared in our news-papers and magazines, of a Mr Bruce, who had entered Abyſſinia, probably the ancient Ethiopia, where he remained upwards of two years; after which he found means to return, bringing along with him many great curioſities: but this gentleman, contrary to the general diſpoſition of travellers, could never be prevailed upon to make his diſcoveries public, and diſclaimed what was publiſhed by others concerning his travels; and indeed none of thoſe vague accounts contained any thing very ſingular, except the horrible cuſtom aſcribed to the Abyſſinians of eating living animals; which, however problematical, we ſubjoin in the note †. According to the beſt accounts we have been able to procure concerning thoſe regions of Africa lying beyond Egypt and Barbary, they are divided in the following manner. On the weſtern coaſt, to the ſouth of Barbary, lie the kingdoms of Bildulgerid, Zaara, Negroland, Loango, Congo, Angola, Benguela, and Terra de Natal. On the eaſtern coaſt beyond Egypt, are thoſe of Nubia, Adel, Ajan, Zanguebar, (between theſe two a huge deſert is interpoſed), Monomatapa, and Sofola. In the interior parts, the kingdoms of Lower Ethiopia, Abex, Monemuge, and Matanan, are made mention of. The ſouthermoſt part, called Cafraria, is well known for the habitation of the Hottentots, the moſt degenerate of all the human ſpecies.

The chief trade carried on by the Europeans with the more ſavage African nations, is the purchaſing, or carrying off by force when it is in their power, ſlaves for their colonies in other countries; and becauſe they have been remarkably ſucceſsful in this iniquitous trade, it hath been gravely aſſerted, that theſe barbarous nations are deſcended from Canaan the ſon of Ham, whom Noah curſed, and propheſied that he ſhould be a ſervant of ſervants to his brethren: but, not to inſiſt on the abſurdity of ſuppoſing the villany of any nation a puniſhment *ſent from God*, it may juſtly be queſtioned whether the term "ſervant of ſervants" will not apply to ourſelves rather than to them. Certain it is, that the interior parts of Africa have never been conquered by any nation. A ſet of lawleſs banditti, pretending to be deſcended from other vagabonds driven out of Troy by the Greeks, enſlaved the greateſt part of the known world, and this iſland among the reſt. After a number of ages, the Romans were driven out by other banditti, and theſe again by others; ſo that for a ſpace of time much longer than the ſlave-trade hath yet exiſted, the European and moſt Aſiatic nations were ſervants to thoſe who had themſelves been accounted the moſt contemptible of the human race; but during all this time the Africans enjoyed liberty, and do ſtill enjoy it, notwithſtanding the wicked advantages the Europeans take of the barbariſm of the negroes to make them ſell one another. No European nation hath ever made a nation of negroes yield up their country to them, or pay them an annual tribute; nor have they even been able to introduce their cuſtoms among them; ſo that, on the whole, inſtead of being the greateſt ſlaves, we cannot help thinking the barbarous nations in Africa are the only people on earth that have never yet been enſlaved by others.—The moſt probable conjectures concerning the peopling, &c. of thoſe kingdoms of Africa concerning which we have any credible accounts, are mentioned under their proper names, as they occur in the order of the alphabet.

AFRICAN COMPANY, a ſociety of merchants, eſtabliſhed by King Charles II. for trading to Africa; which trade is now laid open to all his majeſty's ſubjects, paying 10 *per cent.* for maintaining the forts.

AFRICANUS (Julius), an excellent hiſtorian of the third century, the author of a chronicle which was greatly eſteemed, and in which he reckons 5500 years from the creation of the world to Julius Cæſar. This work, of which we have now no more than what is to be found in Euſebius, ended at the 221st year of the vulgar æra. Africanus alſo wrote a letter to Origen on the hiſtory of Suſanna, which he reckoned ſuppoſititious; and we have ſtill a letter of his to Ariſtides, in which he reconciles the ſeeming contradictions in the two genealogies of Chriſt recorded by St Matthew and St Luke.

AFT, in the ſea-language, the ſame with ABAFT.

AFTER-BIRTH, in midwifery, ſignifies the membranes which ſurround the infant in the womb, generally called the ſecundines.

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† "Not ſatisfied (ſay theſe accounts) with devouring raw fleſh, their cuſtom is to cut collops from live animals, which they tear to pieces with their teeth while warm and palpitating with vital motion. The fleſh of an animal after it is dead they account quite unſavory. The moſt expert butcher among them is he who can cut moſt fleſh from a beaſt before it is deprived of its life; for doing which the utmoſt attention is neceſſary to avoid the great arteries, or thoſe parts the deſtruction of which will ſoon bring on death. A company of Abyſſinians at dinner is a horrible ſpectacle: they are ſeated, each with a cake of flour in his hand; live cattle are brought to the door, and the inhuman butcher cuts morſels off them, which are inſtantly carried in to the company, who lay them upon their cakes, and eat them directly, all bathed in the tepid blood of the miſerable animals, whoſe lowings and groanings, through violence of anguiſh, ſerve for a dinner-bell, or muſic, to the ſhocking barbarians."

AFTER-MATH, in huſbandry, ſignifies the graſs which ſprings or grows up after mowing.

AFTER-NOON, the latter half of the artificial day, or that ſpace between noon and night.

AFTER-PAINS, in midwifery, exceſſive pains felt in the groin, loins, &c. after the woman is delivered.

AFTER-SWARMS, in the management of bees, are thoſe which leave the hive ſome time after the firſt has ſwarmed. See APIS.

AFWESTAD, a large copper-work belonging to the crown of Sweden, which lies on the Dala, in the province of Dalecarlia, in Sweden. It looks like a town, and has its own church. Here they make copper plates; and have a mint for ſmall ſilver coin, as well as a royal poſt-houſe. W. Long. 14. 10. N. Lat. 58. 10.

AGA, in the Turkiſh language, ſignifies a great lord or commander. Hence the Aga of the Janiſſaries is the commander in chief of that corps; as the general of horſe is denominated *ſpahiclar aga*. The aga of the janiſſaries is an officer of great importance. He is the only perſon who is allowed to appear before the Grand Signior without his arms acroſs his breaſt in the poſture of a ſlave. Eunuchs at Conſtantinople are in poſſeſſion of moſt of the principal poſts of the ſeraglio: The title *aga* is given to them all, whether in employment or out. We find alſo *agas* in other countries. The chief officers under the Khan of Tartary are called by this name. And among the Algerines, we read of *agas* choſen from among the *boluk baſhis* (the firſt rank of military officers), and ſent to govern in chief the towns and garriſons of that ſtate. The *aga* of Algiers is the preſident of the divan, or ſenate. For ſome years, the *aga* was the ſupreme officer; and governed the ſtate in the place of baſhaw, whoſe power dwindled to a ſhadow. But the ſoldiery riſing againſt the *boluk baſhis*, or *agas*, maſſacred moſt of them, and transferred the ſovereign power to the calif, with the title of *Dey*, or King.

AGADES, a kingdom and city of Negroland in Africa. It lies nearly under the tropic of Cancer, between Gubur and Cano. The town ſtands on a river that falls into the Niger; it is walled, and the king's palace is in the midſt of it. The king has a retinue, who ſerve as a guard. The inhabitants are not ſo black as other Negroes, and conſiſt of merchants and artificers. Thoſe that inhabit the fields are ſhepherds or herdſmen, whoſe cottages are made of boughs, and are carried about from place to place on the back of oxen. They are fixed on the ſpot of ground where they intend to feed their cattle. The houſes in the city are ſtately, and built after the Barbary faſhion. This kingdom was, and be may ſtill, tributary to the king of Tombut. It is well watered; and there is great plenty of graſs, cattle, ſenna, and manna. The prevailing religion is the Mahometan, but very looſely profeſſed. N. Lat. 26. 10. E. Long. 9. 10.

AGALOCHUM. See MATERIA MEDICA, n° 75.

AGALMATA, in antiquity, a term originally uſed to ſignify any kind of ornaments in a temple; but afterwards for the ſtatues only, as being moſt conſpicuous.

AGAMEMNON, the ſon of Atreus by Erope, was captain-general of the Trojan expedition. It was foretold to him by Caſſandra, that his wife Clytemneſtra would be his death: yet he returned to her; and accordingly was ſlain by Ægiſthus, who had gained upon his wife in his abſence, and by her means got the government into his own hands.

AGANIPPIDES, in ancient poetry, a deſignation given to the muſes, from a fountain of mount Helicon called *Aganippe*.

AGANIPPE, in antiquity, a fountain of Bœotia at mount Helicon, on the borders between Phocis and Bœotia, ſacred to the muſes, and running into the river Permeſſeus; (Pliny, Pauſanias.) Ovid ſeems to make *Aganippe* and *Hippocrene* the ſame. Solinus more truly diſtinguiſhes them, and aſcribes the blending them to poetical licenſe.

AGAPE, in eccleſiaſtical hiſtory, the love-feaſt, or feaſt of charity, in uſe among the primitive Chriſtians; when a liberal contribution was made by the rich to feed the poor. The word is Greek, and ſignifies *love*.—St Chryſoſtom gives the following account of this feaſt, which he derives from the apoſtolical practice. He ſays, "the firſt Chriſtians had all things in common, as we read in the Acts of the Apoſtles; but when that equality of poſſeſſions ceaſed, as it did even in the Apoſtles time, the agape, or love-feaſt, was ſubſtituted in the room of it. Upon certain days, after partaking of the Lord's ſupper, they met at a common feaſt; the rich bringing proviſions, and the poor who had nothing being invited." It was always attended with receiving the holy ſacrament; but there is ſome difference between the ancient and modern interpreters as to the circumſtance of time, viz. Whether this feaſt was held before or after the communion. St Chryſoſtom is of the latter opinion; the learned Dr Cave of the former.—Theſe love-feaſts, during the three firſt centuries, were held in the church; but at length ſuch abuſes were committed at them, that the councils of Laodicea and Carthage prohibited the practice for the future.

AGAPETÆ, in church-hiſtory, a name given to thoſe young maidens who frequented the company of eccleſiaſtics out of a motive of piety and charity. This practice afterwards degenerated into an occaſion of libertiniſm, inſomuch that *agapetæ* became a term of reproach.

AGARD (Arthur), a learned Engliſh antiquarian, born at Toſton in Derbyſhire in the year 1540. His fondneſs for Engliſh antiquities induced him to make many large collections; and his office as deputy chamberlain of the exchequer, which he held 45 years, gave him great opportunities of acquiring ſkill in that ſtudy. Similarity of taſte brought him acquainted with Sir Robert Cotton, and other learned men, who aſſociated themſelves under the name of *The Society of Antiquarians*, of which ſociety Mr Agard was a conſpicuous member. He made the doomſday-book his peculiar ſtudy; and compoſed a work purpoſely to explain it, under the title of *Tractatus de uſu et obſcurioribus verbis libri de Domeſday*: he alſo compiled a book for the ſervice of his ſucceſſors in office, which he depoſited with the officers of the king's receipt, as a proper index for ſucceeding officers. All the reſt of his collections, containing at leaſt twenty volumes, he bequeathed to Sir Rober Cotton; and died in 1615.

AGARICUS, or MUSHROOM, a genus of the order of fungi, belonging to the cryptogamia claſs of plants.

Species. Botanical writers enumerate 55 ſpecies belonging to this genus; of which the moſt remarkable are the following. 1. The chantarellus, or champignon muſhroom, has a turban-ſhaped hat, rather flat; with branched yellow gills running down the pillar; the pillar ſhort and naked, moſtly of a pale yellow, but ſometimes of a deep and even ſaffron colour. They are excellent food, and have a fine flavour. Of this ſpecies there are two varieties; one called the *common*, and the other the *cup, muſhroom:* theſe have the border of the hat not circular, but running into angles; reflected upwards, in form of an inverted cone, or drinking-glaſs; yellow, and when full grown with a tinge of red; the ſtalk very ſhort and thick. They are found in the meadows and paſtures, and in woods. The French and Italians eat them.—2. The variegatus, or variegated muſhroom, has a very long variegated ſtalk and broad hat. It is of a finer flavour than the common muſhroom.—3. The muſcarius, or reddiſh muſhroom, has a large hat almoſt flat, either white, red, or crimſon, ſometimes beſet with angular red warts; the gills white, flat, and inverſely ſpear-ſhaped; the pillar hollow, the cap fixed to the middle of the pillar, limber, and hanging down. This ſpecies grows in paſtures, and is ſaid to deſtroy bugs effectually if the juice is rubbed upon the walls and bed-poſts. The inhabitants of the north of Europe, whoſe houſes are greatly infeſted with flies at the decline of ſummer, infuſe it in milk, and ſet it in their windows, and the flies upon taſting the leaſt drop are inſtantly poiſoned, An infuſion of common pepper in milk anſwers the ſame purpoſe, but the flies through time become wiſe enough not to taſte it; and though vaſt numbers are at firſt deſtroyed, it is impoſſible to clear a houſe of theſe inſects by this means.—4. The campeſtris, or common muſhroom, has a ſcaly, whitiſh, and convex hat; the gills of a browniſh red; the pillar cylindrical, above the cap ſmooth and white, below it aſh-coloured. The degree of convexity and colour of the gills of this muſhroom depend upon its age. At its firſt appearance it is ſmooth, and almoſt globular; the edges of the hat preſs upon the pillar; and the gills, which are then almoſt white, are covered with a white membrane extending from the edge of the hat to the ſummit of the pillar. In this ſtate it is called a *button*: by degrees it expands, the membrane burſts, the edges of the hat remove from the pillar, and the gills are expoſed to view, of a bright fleſh colour; this, however, ſoon fades, and ſinks at length into a dark brown or chocolate. The hat now loſes its convexity, and becomes almoſt flat, rough, and ſcaly. Of this ſpecies there are ſeveral varieties; particularly one with a broad hat, white above; the gills very numerous, and of a pale red or fleſh colour; the ſtalk ſhort, and pretty thick. It is found in parks and lands that have been long unploughed, commons and poor lands, in paſtures, and in woods. This ſpecies conſtitutes one of the corner-ſtones of modern luxury; either dreſſed in ſubſtance, or boiled up with wine and ſpices under the name of *catchup*. The ſeeds are contained in the ſubſtance of the gills; each of which is compoſed of two layers, and betwixt theſe layers are the ſeeds, which fall to the ground when ripe. Some of them in their fall are catched upon the cup, and detained on its woolly ſurface, where, by the aſſiſtance of a microſcope, they may be eaſily found.—5. The viridis, or green muſhroom, is large, and of a whitiſh green; the fleſh is of a fine flavour. It grows in woods.—6. The æruginoſus or verdigriſe muſhroom, is of a moderate ſize, and covered with a mucus of a verdigriſe colour. It is only to be found in the garden belonging to the company of apothecaries at London, and in St James's park. It has alſo been obſerved in a gravel-pit in the middle of September.—7. The clypeatus, or long-ſtalked muſhroom, has an hemiſpherical hat tapering to a point, and clammy; the pillar long, cylindrical, and white; the gills white, and not concave; duſted with a fine powdery ſubſtance on each ſide; the root bulbous, long, and hooked at the end. It is found in September, in woodlands and paſtures. This ſpecies is thought to be poiſonous; and we have the following account of the ſymptoms produced by eating it, in Dr Percival's Eſſays. "Robert Uſherwood, of Middleton, near Mancheſter, a ſtrong healthy man, aged 50 years, early in the morning gathered and eat what he ſuppoſed to be a muſhroom. He felt no ſymptoms of indiſpoſition, till five o'clock in the evening; when, being very thirſty, he drank near a quart of table-beer. Soon afterwards he became univerſally ſwoln, was ſick, and in great agonies. A ſevere vomiting and purging ſucceeded, with violent cramps in his legs and thighs. He diſcharged ſeveral pieces of the fungus, but with little or no relief. His pains and evacuations continued, almoſt without intermiſſion, till the next night; when he fell into a ſound ſleep, and awaked in the morning perfectly eaſy, and free from complaint."—Many of the different ſpecies of this genus grow on cows or horſes dung, on dunghills, on rotten wood, in cellars, or on the trunks of trees; of which the moſt remarkable is, 8. The quercinus, or agaric of the oak. This is of various ſizes, ſometimes not exceeding the bigneſs of the fiſt, ſometimes as large as a man's head. It takes at leaſt an year or two to grow to its full ſize. There are two kinds of it, called by the ancients *mas* and *femina:* the male is dark coloured, hard, heavy, and woody; it is ſometimes uſed by the dyers, as an ingredient in the black dye. The female, or officinal agaric, is covered with a hard blackiſh rind like the other; but when the cortical part is pared off, the internal ſubſtance appears quite white; by age it changes a little yellowiſh. It ſhould be very light, porous, eaſy to break, and free from any hard pieces or compact veins. It taſtes at firſt ſweetiſh in the mouth, but preſently becomes very bitter and nauſeous. It is an article in the Materia Medica *; but deſerves the name of a poiſon, rather than of a medicine.

Culture. Only the eſculent kinds of muſhrooms are cultivated; and the following method is uſed by the gardeners who raiſe them for ſale.--If the young muſhrooms cannot be procured from gardens, they muſt be looked for in rich paſtures during the months of Auguſt and September: the ground muſt be opened about their roots, where it is frequently found full of ſmall white knots; which are the off-ſets, or young muſhrooms. Theſe muſt be carefully gathered in lumps, with the earth about them: but as this ſpawn cannot be found in the paſture, except at that ſeaſon when the muſhrooms are naturally produced, it may be ſearched for at any time in old dung-hills, eſpecially where there has been much litter, and it hath not been penetrated by wet ſo as to rot: it may alſo be found very often in old hot-beds; or it may be procured by mixing ſome long dung from the ſtable, which has not been

* See *Materia Medica*, nº 76.

Agaricus, or Muſhroom.

thrown on a heap to ferment, with ſtrong earth, and put under cover to prevent wet getting to it. The ſpawn commonly appears in about two months after the mixture is made; but proportionably ſooner the more effectually the air is excluded, provided the mixture is not kept ſo cloſe as to heat. Old thatch, or litter which has lain long abroad ſo as not to ferment, is the beſt covering. The ſpawn has the appearance of white mould ſhooting out into long ſtrings, by which it may be eaſily known wherever it is met with.—The beds for receiving the ſpawn are now to be prepared. Theſe ſhould be made of dung in which there is plenty of litter, but which ſhould not be thrown on a heap to ferment: that dung which has lain ſpread abroad for a month or longer, is beſt. The beds ſhould be made on dry ground, and the dung laid on the ſurface; the width at the bottom ſhould be two and a half or three feet, the length in proportion to the quantity of muſhrooms deſired; then lay the dung about a foot thick, covering it with ſtrong earth about four inches deep. Upon this lay more dung, about 10 inches thick; then another layer of earth, ſtill drawing in the ſides of the bed, ſo as to form it like the roof of a houſe; which may be done by three layers of dung, and as many of earth. When the bed is finiſhed, it muſt be covered with litter or old thatch, both to prevent its dying too faſt, and to keep out wet. In this ſituation it ought to remain eight or ten days, when it will be in a proper temperature to receive the ſpawn; for this is deſtroyed by too much heat; though, before planting, it may be kept very dry, not only without detriment, but with conſiderable advantage.—The bed being in a proper temperature for the ſpawn, the covering of litter ſhould be taken off, and the ſides of the bed ſmoothed; then a covering of light rich earth, about an inch thick, ſhould be laid all over the bed; but this ſhould not be wet. Upon this the ſpawn muſt be thruſt, laying the lumps two or three inches aſunder: then gently cover this with the ſame light earth, above half an inch thick; and put the covering of litter over the bed, laying it ſo thick as to keep out wet, and prevent the bed from drying. In ſpring or autumn the muſhrooms will begin to appear, perhaps in a month after making; but when the beds are made in ſummer or winter, they are much longer before they produce. In any ſeaſon, however, they ought not to be haſtily deſtroyed; ſince muſhroom-beds have been known to produce very plentifully, even after the ſpawn has lain in them five or ſix months. When the beds are deſtroyed, the ſpawn ſhould be carefully preſerved, and laid up in a dry place, at leaſt five or ſix weeks before it is again planted.—The difficulty of managing muſhroom-beds is, to keep them always in a proper degree of moiſture. In the ſummer ſeaſon they may be uncovered to receive gentle ſhowers of rain at proper times; and in long dry ſeaſons the beds ſhould now and then be watered, but much wet ought by no means to be ſuffered to come to them. During the winter ſeaſon they muſt be kept as dry as poſſible, and ſo cloſely covered as to keep out cold. In froſty, or very cold weather, if ſome warm litter, ſhaken out of a dung-heap, is laid on, the growth of the muſhrooms will be promoted: but betwixt this and the bed, a covering of dry litter muſt be interpoſed; which ſhould be renewed as it decays; and, as the cold increaſes, the covering muſt be thickened. By attending to theſe directions, plenty of muſhrooms may be produced all the year round. One bed will continue good for many months.

In the Ephemerides of the Curious we find mention made of a ſtone, called by Dr John George Wolckamerus, who ſaw one in Italy, *Lapis Lyncurius*, which never ceaſes to produce in a few days muſhrooms of an excellent flavour by the moſt ſimple and eaſy proceſs imaginable. "It is (ſays he) of the bigneſs of an ox's head, rough and uneven on its ſurface, and on which alſo are perceived ſome clefts and crevices. It is black in ſome parts, and in others of a lighter and greyiſh colour. Internally it is porous, and nearly of the nature of the pumice-ſtone, but much heavier; and it contains a ſmall piece of flint, which is ſo incorporated with it as to appear to have been formed at the ſame time the ſtone itſelf received its form. This gives room to judge, that thoſe ſtones have been produced by a fat and viſcid juice, which has the property of indurating whatever matter it filtrates into. The ſtone here ſpoken of, when it has been lightly covered with earth, and ſprinkled with warm water, produces muſhrooms of an exquiſite flavour, which are uſually round, ſometimes oval, and whoſe borders, by their inflexions and different curvities, repreſent in ſome meaſure human ears. The principal colour of theſe muſhrooms is ſometimes yellowiſh, and ſometimes of a bright purple; but they are always diſſeminated with different ſpots, of a deep orange colour, or red brown; and when theſe ſpots are recent, and ſtill in full bloom, they produce a very agreeable effect to the ſight. But what appears admirable is, that the part of the ſtalk which remains adhering to the ſtone, when the muſhroom has been ſeparated from it, grows gradually hard, and petrifies in time, ſo that it ſeems that this fungites reſtores to the ſtone the nutritive juice it received from it, and that it thus contributes to its increaſe." John Baptiſt Porta pretends, that this ſtone is found in ſeveral parts of Italy; and that it is not only to be met with at Naples, taken out of mount Veſuvius; but alſo on mount Pantherico, in the principality of Arellino; on mount Garganus, in Apulia; and on the ſummit of ſome other very high mountains. He adds, that the muſhrooms which grow on thoſe ſorts of ſtones, and are uſually called *fungi lyncurii*, have the property of diſſolving and breaking the ſtone of the kidneys and bladder; and that, for this purpoſe, nothing more is required than to dry them in the ſhade, and being reduced to powder, to make the patient, faſting, take a ſufficient quantity of this powder, in a glaſs of white-wine, which will ſo cleanſe the excretory ducts of the urine, that no ſtones will ever after be collected in them. As to the form of thoſe muſhrooms, their root is ſtony, uneven, divided according to its longitudinal direction, and compoſed of fibres as fine as hairs, interwoven one with another. Their form on firſt ſhooting out reſembles a ſmall bladder ſcarce then larger than the bud of a vine; and, if in this ſtate they are ſqueezed between the fingers, an aqueous ſubacid liquor iſſues out. When they are at their full growth, their pedicle is of a finger's length, larger at top than at bottom, and becomes inſenſibly ſlenderer in proportion as it is nearer the earth. Theſe muſhrooms are alſo formed in an umbella, and variegated with an infinity of little ſpecks ſituate very near one another. They are ſmooth and even on the upper part,

but

aric,
ate.

but underneath leafy like the common muſhrooms. Their taſte is likewiſe very agreeable, and the ſick are not debarred eating of them when they have been dreſſed in a proper manner. Curioſity having prompted ſome naturaliſts and phyſicians to ſubmit theſe ſtones to a chemical analyſis, in order to be more competent judges of the uſes they might be put to in medicine, there firſt came forth, by diſtillation, an inſipid water, and afterwards a ſpirituous liquor. The retort having been heated to a certain point, there aroſe an oil, which had nearly the ſmell and taſte of that of guaiacum; and a very acrid ſalt was extracted from the aſhes.

Mineral Agaric, a marley earth reſembling the vegetable of that name in colour and texture. It is found in the fiſſures of rocks, and on the roofs of caverns; and is ſometimes uſed as an aſtringent in fluxes, hæmorrhages, &c.

AGATE, or Achat, (among the Greeks and Latins, Αχατης, and *Achates*, from a river in Sicily, on the banks of which it was firſt found), a very extenſive genus of the ſemipellucid gems.

Theſe ſtones are variegated with veins and clouds, but have no zones like thoſe of the onyx. They are compoſed of cryſtal debaſed by a large quantity of earth; and not formed, either by repeated incruſtations round a central nucleus, or made up of plates laid evenly on one another; but are merely the effect of one ſimple concretion, and variegated only by the diſpoſition given, by the fluid they were formed in, to their differently coloured veins or matters.

Agates are arranged according to the different colours of their ground. Of thoſe with a *white* ground there are three ſpecies. (1.) The *dendrachates* *, *mocoa ſtone*, or *arboreſcent agat*. This ſeems to be the ſame with what ſome authors call the achates with roſemary in the middle, and others achates with little branches of black leaves. (2.) The *dull milky-looking agate*. This, though greatly inferior to the former, is yet a very beautiful ſtone. It is common on the ſhores of rivers in the Eaſt Indies, and alſo in Germany and ſome other parts of Europe. Our lapidaries cut it into counters for card-playing, and other toys of ſmall value. (3.) The *lead-coloured agate*, called the *phaſſachates* † by the ancients.

Of the agates with a *reddiſh* ground there are four ſpecies. (1.) An impure one of a fleſh-coloured white, which is but of little beauty in compariſon with other agates. The admixture of fleſh-colour is but very ſlight; and it is often found without any clouds, veins, or other variegations; but ſometimes it is prettily veined or variegated with ſpots of irregular figures, having fimbriated edges. It is found in Germany, Italy, and ſome other parts of Europe; and is wrought into toys of ſmall value, and often into the German gun-flints. It has been ſometimes found with evident ſpecimens of the perfect moſſes bedded deep in it. (2.) That of a pure blood colour, called *hæmachates* ‡, or the *bloody agate*, by the ancients. (3.) The clouded and ſpotted agate, of a pale fleſh colour, called by the ancients the *carnelian agate*, or *ſardachates* ||. (4.) The red-lead-coloured one, variegated with yellow, called the *coral agate*, or *corallo-achates* §, by the ancients.

Of the agates with a *yellowiſh* ground there are only two known ſpecies: the one of the colour of yellow wax, called *cerachates* by the ancients; the other a very elegant ſtone, of a yellow ground, variegated with white, black, and green, called the *leonina*, and *leonteſeres* †, by the ancients.

* Den-
tes.

† Phaſ-
s.

‡ Hæma-

|| Sarda-

§ Coral-
tes.

Agate.

Laſtly, Of the agates with a *greeniſh* ground, there is only one known ſpecies, called by the ancients *jaſpachates* ‡.

† See *Leonteſeres*.

‡ See *Jaſpachates*.

Of all theſe ſpecies there are a great many varieties; ſome of them having upon them natural repreſentations of men and different kinds of animals, &c. Theſe repreſentations are not confined to the agates whoſe ground is of any particular colour, but are occaſionally found on all the different ſpecies. Velſchius had in his cuſtody a fleſh-coloured agate, on one ſide of which appeared a half-moon in great perfection, repreſented by a milky ſemicircle; on the other ſide, the phaſes of *veſper*, or the evening-ſtar; whence he denominated it an *aphrodiſian agate*. An agate is mentioned by Kircher *, on which was the repreſentation of a heroine armed; and one in the church of St Mark in Venice has the repreſentation of a king's head adorned with a diadem. On another, in the muſæum of the prince of Gonzaga, was repreſented the body of a man with all his clothes in a running poſture. A ſtill more curious one is mentioned by de Boot †, wherein appears a circle ſtruck in brown, as exactly as if done with a pair of compaſſes, and in the middle of the circle the exact figure of a biſhop with a mitre on: but inverting the ſtone a little, another figure appears; and if it is turned yet further, two others appear, the one of a man, and the other of a woman. But the moſt celebrated agate of this kind is that of Pyrrhus, wherein were repreſented the nine muſes, each with their proper attributes, and Apollo in the middle playing on the harp ||. In the emperor's cabinet is an oriental agate of a ſurpriſing bigneſs, being faſhioned into a cup, whoſe diameter is an ell, abating two inches. In the cavity is found delineated in black ſpecks, B. XRISTOR. S. XXX. Other agates have alſo been found, repreſenting the numbers 4191, 191; whence they were called *arithmetical* agates, as thoſe repreſenting men or women have obtained the name of *anthropomorphous*.

* Ephem. German. dec. i. an. 1. obſ. 151.

† De Gem. l. ii. c. 95.

|| Pliny, *l.* xxxvii. *c.* 3

Great medicinal virtues were formerly attributed to the agate, ſuch as reſiſting poiſons, eſpecially thoſe of the viper, ſcorpion, and ſpider; but they are now very juſtly rejected from medicinal practice. The oriental ones are all ſaid to be brought from the river Gambay. A mine of agates was ſome time ago diſcovered in Tranſylvania, of divers colours; and ſome of a large ſize, weighing ſeveral pounds.

Agates may be ſtained artificially with ſolution of ſilver in ſpirit of nitre, and afterwards expoſing the place to the ſun ‡; and though theſe artificial colours diſappear on laying the ſtone for a night in aquafortis, yet a knowledge of the practicability of thus ſtaining agates, muſt render thoſe curious figures above-mentioned ſtrongly ſuſpected of being the work not of nature, but of art. Some account for theſe phenomena from natural cauſes. Thus, Kircher, who had ſeen a ſtone of this kind in which were depicted the four letters uſually inſcribed on crucifixes, I. N. R. I. apprehends that ſome real crucifix had been buried under-ground, among ſtones and other rubbiſh, where the inſcription happening to be parted from the croſs, and to be received among a ſoft mould or clay ſuſceptible

‡ See *Chemiſtry*, nº 197.

of the impreſſion of the letters, came afterwards to be petrified. In the ſame manner he ſuppoſes the agate of Pyrrhus to have been formed. Others reſolve much of the wonder into fancy, and ſuppoſe thoſe ſtones formed in the ſame manner with the *camieux* * or Florentine ſtones.

The agate is uſed for making cups, rings, ſeals, handles for knives and forks, hilts for ſwords and hangers, beads to pray with, ſmelling-boxes, patch-boxes, &c. being cut or ſawed with no great difficulty. At Paris, none have a right to deal in this commodity except the wholeſale mercers and goldſmiths. The ſword-cutlers are allowed to ſell it, but only when made into handles for conteaux de chaſſe, and ready ſet in. The cutlers have the ſame privilege for their knives and forks.

Conſiderable quantities of theſe ſtones are ſtill found near the river Achates in Sicily. There are found in ſome of theſe the ſurpriſing repreſentations abovementioned, or others ſimilar to them. By a dextrous management of theſe natural ſtains, medals have been produced, which ſeem maſter-pieces of nature: for this ſtone bears the graver well; and as pieces of all magnitudes are found of it, they make all ſorts of work it. The high altar of the cathedral of Meſſina is all over encruſted with it. The lapidaries pretend that the Indian agates are finer than the Sicilian; but father Labat * informs us, that in the ſame quarries, and even in the ſame block, there are found pieces much finer than others, and theſe fine pieces are ſold for Indian agates in order to enhance their price.

Agate, among antiquaries, denotes a ſtone of this kind engraven by art. In this ſenſe, agates make a ſpecies of antique gems, in the workmanſhip whereof we find eminent proofs of the great ſkill and dexterity of the ſculptors. Several agates of exquiſite beauty are preſerved in the cabinets of the curious; but the facts or hiſtories repreſented on theſe antique agates, however well executed, are now become ſo obſcure, and their explications ſo difficult, that ſeveral diverting miſtakes and diſputes have ariſen among thoſe who undertook to give their true meaning.

The great agate of the apotheoſis of Auguſtus, in the treaſury of the holy chapel, when ſent from Conſtantinople to St Lewis, paſſed for a triumph of Joſeph. An agate now in the French king's cabinet, had been kept 700 years with great devotion, in the Benedictine abbey of St Evre at Toul, where it paſſed for St John the evangeliſt carried away by an eagle, and crowned by an angel; but the heatheniſm of it having been lately detected, the religious would no longer give it a place among their relicts, but preſented it in 1684 to the king. The antiquaries found it to be the apotheoſis of Germanicus. In like manner the triumph of Joſeph was found to be a repreſentation of Germanicus and Agrippina, under the figures of Ceres and Triptolemus. Another was preſerved, from time immemorial, in one of the moſt ancient churches of France, where it had paſſed for a repreſentation of paradiſe and the fall of man; there being found on it two figures repreſenting Adam and Eve, with a tree, a ſerpent, and an Hebrew inſcription round it, taken from the third chapter of Geneſis, "The woman ſaw that the tree was good, &c." The French academiſts, inſtead of our firſt parents, found Jupiter and Minerva repreſented by the two figures: the inſcription was of a modern date, written in a Rabbinical character, very incorrect, and poorly engraven. The prevailing opinion was, that this agate repreſented ſimply the worſhip of Jupiter and Minerva at Athens.

Agate, is alſo a name of an inſtrument uſed by gold-wire-drawers; ſo called from the agate in the middle of it, which forms its principal part.

AGATHIAS, or, as he calls himſelf in his epigrams, Agathius, diſtinguiſhed by the title of *Scholaſticus*, a Greek hiſtorian in the 6th century under Juſtinian. He was born at Myrina, a colony of the ancient Æolians, in Aſia the leſs, at the mouth of the river Phythicus. He was an advocate at Smyrna. Tho' he had a taſte for poetry, he was yet more famous for his hiſtory, which begins with the 26th year of Juſtinian's reign, where Procopius ends. It was printed in Greek and Latin, with Bonaventure Vulcanius's, at Leyden, 1594, in *4to*; and in Paris at the king's printing-houſe, 1660, in folio.

AGATHO, a tragic and comic poet, diſciple to Prodicus and Socrates, applauded in Plato's dialogues for his virtue and beauty. His firſt tragedy obtained the prize; and he was crowned in the preſence of upwards of 30,000 men, the 4th year of the 90th Olympiad. There is nothing now extant of his, except a few quotations in Ariſtotle, Athenæus, and others.

AGATHOCLES, the famous tyrant of Sicily, ſon of a potter at Reggio. He was a thief, common ſoldier, centurion, general, and a pirate, all in a regular ſucceſſion. He defeated the Carthaginians ſeveral times in Sicily, and was once defeated himſelf. He firſt made himſelf tyrant of Syracuſe, and then of all Sicily; after which, he vanquiſhed the Carthaginians again both in Sicily and Africa. But at length having ill ſucceſs, and being in arrears with his ſoldiers, they mutinied, forced him to fly his camp, and cut the throats of his children, whom he left behind. Recovering himſelf again, he relieved Corfou, beſieged by Caſſander; burnt the Macedonian fleet; returned to Sicily, murdered the wives and children of thoſe who had murdered his; afterwards meeting with the ſoldiers themſelves, he put them all to the ſword; and ravaging the ſea-coaſt of Italy, took the city of Hipponium. He was at length poiſoned by his grandſon Archagathus, in the 72d year of his age, 290 years before Chriſt, having reigned 28 years.

AGATHYRNA, or Agathyrnum, Agathyrsa, (Polybius;) Agathyrsum, (Strabo;) a town of Sicily; now *S. Marco;* as old as the war of Troy, being built by Agathyrnus, ſon of Æolus, on an eminence. The gentilitious name is *Agathyrnæus;* or, according to the Roman idiom, *Agathyrnenſis*.

AGAVE, the common American aloe; a genus of the monogynia order belonging to the hexandria claſs of plants. Of this genus, botanical writers enumerate eight

Species. 1. The Americana, or great American aloe. The ſtems of this, when the plants are vigorous, generally riſe upwards of 20 feet high, and branch out on every ſide towards the top, ſo as to form a kind of pyramid: the ſlender ſhoots being garniſhed with greeniſh yellow flowers, which ſtand erect, and come out in thick cluſters at every joint: theſe make a fine appearance, and continue long in beauty; a ſucceſſion of new flowers being produced for near three months in favourable ſeaſons, if the plant is protected from the autumnal colds. The ſeeds do not ripen in England. It has been generally thought, that theſe plants do not flower till they are 100 years old: but this is a miſtake; for the time of their flowering depends on their growth: ſo that in hot countries where they grow faſt, and expand many leaves every ſeaſon, they will flower in a few years; but in colder climates, where their growth is ſlow, it will be much longer before they ſhoot up their ſtem. There is a variety of this ſpecies with ſtriped leaves, which are pretty common in the Engliſh gardens. 2. The Virginia, or American aloe, with a ſimple ſtalk. This ſo much reſembles the laſt, as to be diſtinguiſhable only by good judges. The principal difference is, that the leaves of this are narrower toward their extremity, and of a paler colour: the ſtems of this ſort do not riſe ſo high as the firſt, nor do they branch in the ſame manner, but the flowers are collected into a cloſe head at the top; they are, however, of the ſame ſhape and colour. 3. The fetida, or piet, hath long, narrow, ſtiff leaves, of a pale green colour: the plants rarely grow above three feet in height, but the flower-ſtem riſes to near 20, and branches out much like that of the firſt, but more horizontally: the flowers are of the ſame ſhape, but ſmaller, and of a greener colour. After the flowers are paſt, inſtead of ſeed-veſſels, young plants ſucceed them; which, falling off, are to be received in pots, where they ſoon take root, and become perfect. This ſort never ſends out off-ſets from the roots; ſo that it can only be multiplied when it flowers; and preſently after the young plants have dropped off, the old one dies. 4. The tuberoſa, or American aloe with a tuberous root, agrees with the laſt in its general characters; only that the leaves are indented, and each of them terminates in a ſtrong thorn. 5. The vivipara, ſo called from its producing young plants after the flowers are fallen off, never grows to a large ſize; the flower-ſtem riſes to about 12 feet in height, and branches out in the ſame manner as the third ſort, with which it agrees in moſt of its other properties. 6. The karratto is as yet ſo little known in Britain, that no particular deſcription of it can be given. 7. The Vera Cruz ſo greatly reſembles the firſt as to be ſcarce diſtinguiſhable. 8. The rigida hath long narrow ſtiff leaves, which are entire, and terminated by a ſtiff black ſpine. It is very little known.

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* See *Camaieux*.

* Voyage d' Ital. tom.v. p.156.

Hiſt. Acad. R. Inſcript. tom.i.p.337, —344.

Culture. The third, fourth, fifth, ſixth, and eighth ſorts are ſo tender, that they cannot be preſerved thro' the winter in England unleſs they are placed in a warm ſtove; nor will they thrive when ſet abroad in ſummer, and therefore muſt conſtantly remain in the ſtove, obſerving to let them enjoy a large ſhare of free air in warm weather. They require a light ſandy earth, and ſhould have little wet in winter; but, in warm weather, may be gently watered twice a-week. They ſhould be ſhifted every ſummer into freſh pots: but theſe muſt not be too large; for if their roots are not confined, they will not thrive. Such as ſend out off-ſets from their roots may be propagated by them; the others, from ſeeds obtained from the countries where they grow, or the young plants produced at flowering time.

AGDE, a city of France, in Lower Languedoc, in the territory of Agadez, with a biſhop's ſee. The dioceſe is ſmall, but it is one of the richeſt countries in the kingdom. It produces fine wool, wine, oil, corn, and ſilk. It is ſeated on the river Eraut, a mile and a quarter from its mouth, where it falls into the gulph of Lyons, and where there is a fort built to guard its entrance. It is well peopled; the houſes are built of black ſtone, and there is an entrance into the city by four gates. The greateſt part of the inhabitants are merchants or ſeamen. The public buildings are but mean: the cathedral is ſmall, and not very handſome: the biſhop's palace is an old building, but convenient enough. The city is extended along the river, where it forms a little port, wherein ſmall craft may enter. There is a great concourſe of pilgrims and other devout people to the chapel of Notre Dame de Grace. It is a little without the city, between which and the chapel there are about 13 or 14 oratories, which they viſit with naked feet. The convent of the Capuchins is well built, and on the outſide are lodgings and apartments for the pilgrims who come to perform their *neuvaine* or nine days devotion. The chapel, which contains the image of the Virgin Mary, is diſtinct from the convent. E. Long. 3. 20. Lat. 43. 19.

Age.

AGE, in the moſt general ſenſe of the word, ſignifies the duration of any being, from its firſt coming into exiſtence to the time of ſpeaking of it, if it ſtill continues; or to its deſtruction, if it has ceaſed to exiſt ſome time before we happen to mention it.

Among the ancient poets, this word was uſed for the ſpace of thirty years; in which ſenſe, *age* amounts to much the ſame with *generation*. Thus, Neſtor is ſaid to have lived *three ages*, when he was 90 years old.—By ancient Greek hiſtorians, the time elapſed ſince the beginning of the world is divided into three periods, which they called *ages*. The firſt reaches from the creation to the deluge which happened in Greece during the reign of Ogyges; this they called the *obſcure* or *uncertain* age, becauſe the hiſtory of mankind is altogether uncertain during that period. The ſecond they call the *fabulous* or *heroic* age, becauſe it is the period in which the fabulous exploits of their gods and heroes are ſaid to have been performed. It began with with the Ogygian deluge, and continued to the firſt Olympiad; where the third, or *hiſtorical*, age commenced.—This diviſion, however, it muſt be obſerved, holds good only with regard to the Greeks and Romans, who had no hiſtories earlier than the firſt Olympiad; the Jews, Egyptians, Phenicians, and Chaldees, not to mention the Indians and Chineſe who pretend to much higher antiquity, are not included in it.

The interval ſince the firſt formation of man has been divided by the poets into four *ages*, diſtinguiſhed by the epithets of *golden*, *ſilver*, *brazen*, and *iron*. During the *golden* age, Saturn reigned in heaven, and juſtice and innocence in this lower world. The earth then yielded her productions without culture; men held all things in common, and lived in perfect friendſhip. This period is ſuppoſed to have laſted till the expulſion of Saturn from his kingdom. The *ſilver* age commenced when men began to deviate from the paths of virtue; and in conſequence of this deviation, their lives became leſs happy. The *brazen* age commenced on a farther deviation, and the *iron* age took place in conſequence of one ſtill greater.—A late author, however, reflecting on the barbariſm of the firſt ages, will have the order which the poets aſſign to the four ages inverted;

joining in their diverſions: one day when he was ſurprized riding upon a ſtick with them, he ſaid to the perſon who had ſeen him in this poſture, "Forbear talking of it till you are a father."

AGESIPOLIS I. king of Lacedæmon, ſucceeded his father Pauſanias, colleague of Ageſilaus II. He ravaged the country of Mantinea, ſubdued that city, and pillaged Olynthia. He died about 380 years before Jeſus Chriſt, and was embalmed in honey, according to the cuſtom of the Lacedæmonians. He died without iſſue, and was ſucceeded by Cleombrotus his brother, the father of Ageſipolis II. who was more remarkable for his apophthegms than his actions.

AGGLUTINANTS, in pharmacy, a general name for all medicines of a glutinous or viſcid nature; which, by adhering to the ſolids, contribute greatly to repair their loſs.

AGGLUTINATION, in a general ſenſe, denotes the joining two or more things together, by means of a proper glue or cement.

Agglutination, among phyſicians, implies the action of reuniting the parts of a body, ſeparated by a wound, cut, &c. It is alſo applied to the action of ſuch internal medicines as are of an agglutinating quality, and which, by giving a glutinous conſiſtence to the animal-fluids, render them more proper for nouriſhing the body.

AGGRAVATION, a term uſed to denote whatever heightens a crime, or renders it more black.

AGGREGATE, in a general ſenſe, denotes the ſum of ſeveral things added together, or the collection of them into one whole. Thus, a houſe is an aggregate of ſtones, wood, mortar, &c. It differs from a mixed or compound, inaſmuch as the union in theſe laſt is more intimate than between the parts of an aggregate.

AGGRESSOR, among lawyers, denotes the perſon who began a quarrel, or made the firſt aſſault.

AGHER, a town of Ireland, which ſends two members to parliament. It is ſituated in the ſouthern part of Ulſter, not far from Clogher.

AGHRIM, a town of Ireland, in the county of Wicklow, and province of Leinſter, ſituated about thirteen miles ſouth-weſt of Wicklow.

AGIADES, in the Turkiſh armies, a kind of pioneers employed in fortifying camps, ſmoothing of roads, and the like offices.

AGILITY, an aptitude of the ſeveral parts of the body to motion; or it may be defined, The art or talent of making the beſt uſe of our ſtrength.—The improving of agility was one of the chief objects of the inſtitution of games and exerciſes. The athletæ made particular profeſſion of the ſcience of cultivating and improving agility. Agility of body is often ſuppoſed peculiar to ſome people; yet it ſeems not owing to any thing in their frame and ſtructure different from others, but entirely to practice.

AGINCOURT, a village of the French Netherlands; famous on account of the victory obtained by Henry V. of England over the French, in 1415. E. long. 2. 10. N. lat. 50. 35.

AGIO, in commerce, is a term chiefly uſed in Holland, and at Venice, to ſignify the difference between the value of bank-ſtock and the current coin. The agio in Holland is generally three or four *per cent.* and at Rome it is from 15 to 25 *per cent.* but at Venice the agio is fixed at 20 *per cent.*

AGIOSYMANDRUM, a wooden inſtrument uſed by the Greek and other churches under the dominion of the Turks, to call together aſſemblies of the people. The *agioſymandrum* was introduced in the place of bells, which the Turks prohibited their Chriſtian ſubjects the uſe of, leſt they ſhould make them ſubſervient to ſedition.

AGISTMENT, Agistage, or **Agistation,** in law, the taking in other people's cattle to graze at ſo much *per* week. The term is peculiarly uſed for the taking cattle to feed in the king's foreſts, as well as for the profits ariſing from that practice.—It is alſo uſed, in a metaphorical ſenſe, for any tax, burden, or change; thus, the tax levied for repairing the banks of Romney-marſh was called *agiſtamentum.*

AGISTOR, or **Agistator,** an officer belonging to foreſts, who has the care of cattle taken in to be grazed, and levies the moneys due on that account. They are generally called *queſt-takers* or *giſt-takers,* and are created by letters-patent. Each royal foreſt has four agiſtors.

AGISYMBA, (anc. geogr.) a diſtrict of Libya Interior, according to Agathemerus, ſituated to the ſouth-eaſt of the Æthiopes Anthropophagi; the parallel paſſing through which, at 16° to the ſouth of the equator, was the utmoſt extent of the knowledge of the ancients to the ſouth, (Ptolemy.)

AGITATION, the act of ſhaking a body, or toſſing it backwards and forwards.

Agitation, in phyſics, is often uſed for an inteſtine commotion of the parts of a natural body. Fermentation and effervеſcence are attended with a briſk agitation of the particles.

Agitation is one of the chief cauſes or inſtruments of mixtion: by the agitation of the parts of the blood and chyle, in their continual circulation, ſanguification is in a good meaſure effected. Butter is made out of milk by the ſame means: in which operation, a ſeparation is made of the oleous parts from the ſerous, and a conjunction of the oleous together. Digeſtion itſelf is only ſuppoſed to be an inſenſible kind of agitation.

Agitation is reputed one of the ſymptoms of inſpiration. Petit informs us †, that, in the laſt century, there aroſe in a church in Italy, for the ſpace of a year, a vapour of an extraordinary kind, which put all the people into trembling and agitations, and unleſs they got away betimes, ſet them a dancing, with ſtrange contortions and geſticulations. This ſeems to verify what has been related of the temple of Delphi.

Agitation is alſo uſed in medicine, for a ſpecies of exerciſe popularly called *ſwinging.* Maurice prince of Orange found this method a relief againſt the ſevere pains of the gout and ſtone. Bartholine mentions fits of the tooth-ach, deafneſs, &c. removed by vehement agitations of the body.

AGITATOR, in antiquity, a term ſometimes uſed for a charioteer, eſpecially thoſe who drove in the circus at the curule games.

Agitators, in the Engliſh hiſtory, certain officers ſet up by the army in 1647, to take care of its intereſts.—Cromwell joined the agitators, only with a view to ſerve his own ends; which being once accompliſhed, he found means to get them aboliſhed.

AGLIONBY (John) an Engliſh divine, chaplain in

† Peti Sybilla, Nouv. Lett. viii. p.

in ordinary to king James I. a man of univerſal learning, who had a very coſiderable hand in the tranſlation of the New Teſtament appointed by king James I. in 1604.

AGMEN, in antiquity, properly denotes a Roman army in march: in which ſenſe, it ſtands contradiſtinguiſhed from *acies*, which denoted the army in battle array; though, on ſome occaſions, we find the two words uſed indifferently for each other. The Roman armies, in their marches, were divided into *primum agmen*, anſwering to our vanguard; *medium agmen*, our main-battle; and *poſtremum agmen*, the rear-guard. The order of their march was thus: After the firſt ſignal with the trumpets, &c. the tents were taken down, and the baggage packed up; at the ſecond ſignal, the baggage was to be loaden on the horſes and carriages; and at the third ſignal, they were to begin their march. Firſt came the *extraordinarii;* then the auxiliaries of the firſt wing, with their baggage; theſe were followed by the legions. The cavalry marched either on each ſide, or behind.

AGNATE, in law, any male relation by the father's ſide.

AGNO, a river of Naples, which, taking its riſe in the mountainous parts of Terra di Lavoro, waſhes the town of Acerra; and, paſſing between Capua and Averſa, falls into the Mediterranean, about ſeven miles north of Puzzuoli.

AGNOETÆ, (from αγνοεω, to be *ignorant* of), in church-hiſtory, a ſect of ancient heretics, who maintained that Chriſt, conſidered as to his human nature, was ignorant of certain things, and particularly of the time of the day of judgment. Eulogius, patriarch of Alexandria, aſcribes this hereſy to certain ſolitaries in the neighbourhood of Jeruſalem, who built their opinion upon the text Mark xiii. 32. "Of that day and" "hour knoweth no man, no not the angels who are" "in heaven, neither the Son, but the Father only."— The ſame paſſage was made uſe of by the Arians; and hence the orthodox divines of thoſe days were induced to give various explications thereof. Some allege, that our Saviour here had no regard to his divine nature, but only ſpoke of his human. Others underſtand it thus, That the knowledge of the day of judgment does not concern our Saviour conſidered in his quality of Meſſiah, but God only: which is the moſt natural ſolution.

AGNOMEN, in Roman antiquity, a kind of fourth or honorary name, given to a perſon on account of ſome extraordinary action, virtue, or other accompliſhment. Thus, the agnomen *Africanus* was beſtowed upon Publius Cornelius Scipio, on account of his great atchievements in Africa.—The agnomen was the third in order of the three Roman names: thus, in Marcus Tullius Cicero, Marcus is the prænomen, Tullius the nomen, and Cicero the *agnomen*.

AGNON, a ſmall river of Bourgogne in France, otherwiſe called *Ignon*.

AGNONE, a city of the kingdom of Naples, in the province of the Hither Abruzzo, called by ſome *Anclone*.

AGNUS, or Lamb, in zoology, the young of the ovis or ſheep. See Ovis.

Agnus *Caſtus*, in botany, the trival name of a ſpecies of the vitex *. The Greeks call it αγνος, chaſte; to which has ſince been added the reduplicative *caſtus*, *q. d.* chaſte chaſte. It was famous among the ancients as a ſpecific for the preſervation of chaſtity. The Athenian ladies, who made profeſſion of chaſtity, lay upon leaves of *agnus caſtus* during the feaſts of Ceres.—Being reputed a cooler, and particularly of the genital parts, it was anciently uſed in phyſic to allay thoſe inordinate motions ariſing from ſeminal turgeſcences: but it is out of the preſent practice.

Agnus *Dei*, in the church of Rome, a cake of wax ſtamped with the figure of a lamb ſupporting a croſs. Theſe being conſecrated by the pope with great ſolemnity, and diſtributed among the people, are ſuppoſed to have great virtues; as, to preſerve thoſe who carry them worthily, and with faith, from all manner of accidents; to expel evil ſpirits, *&c.*—It is alſo a popular name for that part of the maſs, where the prieſt ſtrikes his breaſt thrice, and ſays the prayer beginning with the words *Agnus Dei*.

Agnus *Scythieus*. See *Scythian* Lamb.

AGOGE, among ancient muſicians, a ſpecies of modulation, wherein the notes proceed by contiguous degrees.

AGON, among the ancients, implied any diſpute or conteſt, whether it had regard to bodily exerciſes, or the accompliſhments of the mind; and therefore poets, muſicians, painters, &c. had their agones, as well as the athletæ. Games of this kind were celebrated at moſt of the heathen feſtivals, with great ſolemnity, either annually, or at certain periods of years. Among the latter were celebrated at Athens, the *agon gymnicus*, the *agon nemeus* inſtituted by the Argives in the 53^d^ Olympiad, and the *agon Olympius* inſtituted by Hercules 430 years before the firſt Olympiad. The Romans alſo, in imitation of the Greeks, inſtituted conteſts of this kind. The emperor Aurelian eſtabliſhed one under the name of *agon ſolis*, the conteſt of the ſun; Diocleſian another, which he called *agon capitolinus*, which was celebrated every fourth year, after the manner of the Olympic games. Hence the years, inſtead of *luſtra*, are ſometimes numbered by *agones*.

Agon alſo ſignified one of the miniſters employed in the heathen ſacrifices, and whoſe buſineſs it was to ſtrike the victim. The name is ſuppoſed to have been derived from hence, that ſtanding ready to give the ſtroke he aſked *Agon'?* or *Agone?* ſhall I ſtrike?

Agonales, an epithet given to the Salii.

AGONALIA, in Roman antiquity, feſtivals celebrated in honour of Janus; or of the god Agonius, whom the Romans invoked before undertaking any affair of importance.

AGONISMA, in antiquity, denotes the prize given to the victor in any combat or diſpute.

AGONISTICI, in church-hiſtory, a name given by Donatus to ſuch of his diſciples as he ſent to fairs, markets, and other public places, to propagate his doctrine; for which reaſon they were alſo called *Circuitores*, *Circelliones*, *Catropitæ*, *Coropitæ*, and at Rome *Montenſes*. They were called *Agoniſtici*, from the Greek αγον, combat; in regard they were ſent, as it were, to fight, and ſubdue the people to their opinions.

AGONISTICON, a term uſed by phyſicians for cold water, as being ſuppoſed to combat the febrile heat.

AGONIUM, in Roman antiquity, was uſed for the day on which the *rex ſacrorum* ſacrificed a victim, as well as for the place where the games were celebrated otherwiſe called *agon*.

AGONOTHETA, or Agonothetes, in Grecian antiquity,

* *Vitex.*

antiquity, was the preſident or ſuperintendant of the ſacred games; who not only defrayed the expences attending them, but inſpected the manners and diſcipline of the athletæ, and adjudged the prizes to the victors.

AGONY, any extreme pain. It is alſo uſed for the pangs of death. Much of the terror of death conſiſts in the pangs and convulſions wherewith the agony ſeems attended; tho' we have reaſon to believe, that the pain in ſuch caſes is ordinarily not extremely acute; a courſe of pain and ſickneſs having uſually ſtupified and indiſpoſed the nerves for any quick ſenſations. However, various means have been thought of for mitigating the agony of death. Lord Bacon conſiders this as part of the province of a phyſician; and that not only when ſuch a mitigation may tend to a recovery, but alſo when, there being no further hopes of a recovery, it can only tend to make the paſſage out of life more calm and eaſy. Complacency in death, which Auguſtus ſo much deſired, is certainly no ſmall part of happineſs. Accordingly the author laſt cited ranks *enthanaſia*, or the art of dying eaſily, among the deſiderata of ſcience; and does not even ſeem to diſapprove of the courſe Epicurus took for that end,

——*Hinc ſtygias ebrius hauſit aquas.*

Opium has been applied for this purpoſe, with the applauſe of ſome, but the condemnation of more.

AGONYCLITÆ, or AGONYCLITES, in church-hiſtory, a ſect of Chriſtians, in the 7th century, who prayed always ſtanding, as thinking it unlawful to kneel.

AGORÆUS, in heathen antiquity, an appellation given to ſuch deities as had ſtatues in the market-places; particularly Mercury, whoſe ſtatue was to be ſeen in almoſt every public place.

AGORANOMUS, in Grecian antiquity, a magiſtrate of Athens, who had the regulation of weights and meaſures, the prices of proviſions, &c.

AGOUTI, or AGUTI. See MUS.

AGRA, the capital town of a province of the ſame name, in Indoſtan, and in the dominions of the Great Mogul. It is looked upon as the largeſt city in theſe parts, and is in the form of a half-moon. A man on horſeback can hardly ride round it in a day. It is ſurrounded with a wall of red ſtone, and with a ditch 100 feet wide. The Great Mogul ſometimes reſides here: his palace is prodigiouſly large, and the ſeraglio commonly contains above 1000 women. There are upwards of 800 baths in this town; but that which travellers moſt admire, is the mauſoleum of one of the Mogul's wives, which was 20 years in building. The indigo of Agra is the moſt valuable of all that comes from the Eaſt-Indies. It is ſeated on the river Jemma, about 50 miles above its confluence with the Tehemel, and is 300 miles N. E. of Surat. E. Long. 79. 12. N. Lat. 26. 29.

AGRARIAN LAWS, among the Romans, thoſe relating to the diviſion and diſtribution of lands; of which there were a great number; but that called the *Agrarian Law*, by way of eminence, was publiſhed by Spurius Caſſius, about the year of Rome 268, for dividing the conquered lands equally among all the citizens, and limiting the number of acres which each citizen might enjoy.

AGREDA, a town of Spain, in Old Caſtile, near the frontiers of Arragon, and about three leagues ſouth-weſt of Taracon.

AGREEMENT, in law, ſignifies the conſent of ſeveral perſons to any thing done or to be done.

AGRESTÆ, among phyſicians, denotes unripe grapes, ſaid to be of a cooling nature.

AGRI, or ACRI, a river of the kingdom of Naples, which ariſing in the Apennine mountains, not far from Marſico Nuovo, falls into the gulph of Tarento.

AGRIA, called by the Germans *Eger*, is a ſmall but ſtrong town in Upper Hungary, and is a biſhop's ſee. It is ſituated on a river of the ſame name, and has a citadel called Erlaw. It was beſieged by the Turks in 1552, with 70,000 men: but they loſt 8000 in one day; and were obliged to raiſe the ſiege, though the garriſon conſiſted only of 2000 Hungarians, aſſiſted by the women, who performed wonders on this occaſion. However, it was afterwards taken by Mahomet III. in 1596; but was re-taken by the emperor in 1687, ſince which time it has continued under the dominion of the houſe of Auſtria. It is 47 miles north-eaſt of Buda, and 55 ſouth-weſt of Caſſovia. E. Long. 20. 10. N. Lat. 48. 10.

AGRICOLA (Cneus Junius), born at Frejus in Provence, was made lieutenant in Veſpaſian's time to Vettius Bolanus in Britain; and, upon his return, was ranked by that emperor among the patricians, and made governor of Aquitania. This poſt he held three years; and upon his return was choſen conſul, and afterward appointed governor of Britain, where he greatly diſtinguiſhed himſelf. He reformed many abuſes occaſioned by the avarice or negligence of former governors; put a ſtop to extortion; and cauſed juſtice to be impartially adminiſtered. Veſpaſian dying about this time, his ſon Titus, knowing the great merit of Agricola, continued him in the govrnment. In the ſpring, he marched towards the north, where he made ſome new conqueſts, and ordered forts to be built for the Romans to winter in. He ſpent the following winter in concerting ſchemes to bring the Britons to conform to the Roman cuſtoms: he thought the beſt way of diverting them from riſing and taking arms, was to ſoften their rough manners, by propoſing to them new kinds of pleaſure, and inſpiring them with a deſire of imitating the Roman manners. Soon after this, the country was adorned with magnificent temples, porticos, baths, and many other fine buildings. The Britiſh nobles had at length their ſons educated in learning; and they who before had the utmoſt averſion to the Roman language, now began to ſtudy it with great aſſiduity: they wore likewiſe the Roman habit; and, as Tacitus obſerves, they were brought to conſider thoſe things as marks of politeneſs, which were only ſo many badges of ſlavery. Agricola, in his third campaign, advanced as far as the Tweed; and in his fourth, he ſubdued the nations betwixt the Tweed and the friths of Edinburgh and Dumbritton, into which the rivers Glotta and Bodotria diſcharge themſelves; and here he built fortreſſes to ſhut up the nations yet unconquered. In his fifth, he marched beyond the friths; where he made ſome new acquiſitions, and fixed garriſons along the weſtern coaſts, over againſt Ireland. In his ſixth campaign he paſſed the river Bodotria, ordering his fleet, the firſt which the Romans ever had in thoſe parts, to row along the coaſts, and take a view of the northern parts. In the following ſpring, the Britons raiſed an army of 30,000 men; and the command was given to Galgacus, who, according to Tacitus, made an excellent ſpeech to his countrymen on this occaſion. Agricola likewiſe addreſſed his men in very ſtrong and eloquent terms. The Romans gained the victory, and 10,000 of the Britons are ſaid to have been killed. This happened in the reign of the emperor Domitian; who, growing jealous of the glory of Agricola, recalled him, under pretence of making him governor of Syria. Agricola died ſoon after, and his death is ſuſpected to have been occaſioned by poiſon given him by that emperor. Tacitus the hiſtorian married his daughter, wrote his life, and laments his death in the moſt pathetic manner.

Agricola (George), a German phyſician, famous for his ſkill in metals. He was born at Glaucha, in Miſnia, the 24th of March 1494. The diſcoveries which he made in the mountains of Bohemia gave him ſo great a deſire of examining accurately into every thing relating to metals, that though he had engaged in the practice of phyſic at Joachimſtal by advice of his friends, he ſtill proſecuted his ſtudy of foſſils with great aſſiduity; and at length removed to Chemnitz, where he entirely devoted himſelf to this ſtudy. He ſpent in purſuit of it the penſion he had of Maurice duke of Saxony, and part of his own eſtate; ſo that he reaped more reputation than profit from his labours. He wrote ſeveral pieces upon this and other ſubjects; and died at Chemnitz the 21st of November, 1555, a very firm Papiſt. In his younger years he ſeemed not averſe to the Proteſtant doctrine; and he highly diſapproved of the ſcandalous traffic of indulgencies, and ſeveral other things in the church of Rome. The following lines of his were poſted up in the ſtreets of Zwickaw, in the year 1719:

Si nos injecto ſalvabit ciſtula nummo,
Heu nimium infelix tu mihi, pauper, eris!
Si nos, Chriſte, tua ſervatos morte beaſti,
Tam nihil infelix tu mihi, pauper, eris.
If wealth alone ſalvation can procure,
How ſad a fate for ever waits the poor!
But if thou, Chriſt, our only ſaviour be,
Thy merits ſtill may bleſs ev'n poverty!

In the latter part of his life, however, he had attacked the Proteſtant religion; which rendered him ſo odious to the Lutherans, that they ſuffered his body to remain unburied for five days together; ſo that it was obliged to be removed from Chemnitz to Zeits, where it was interred in the principal church.

Agricola (John), a Saxon divine born at Iſlebe in 1492. He went as chaplain to count Mansfield, when that nobleman attended the Elector of Saxony to the diet of Spire in 1526, and that of Auſburg in 1530. He was of a reſtleſs ambitious temper, rivalled and wrote againſt Melancthon, and gave count Mansfield occaſion to reproach him ſeverely. He obtained a profeſſorſhip at Wittemberg, where he taught particular doctrines, and became founder of the ſect of Antinomians; which occaſioned warm diſputes between him and Luther, who had before been his very good friend. But though he was never able to recover the favour either of the elector of Saxony, or of Luther, he received ſome conſolation from the fame he acquired at Berlin: where he became preacher at court; and was choſen in 1548, in conjunction with Julius Phlug, and Michael Heldingus, to compoſe the famous *Interim*, which made ſo much noiſe in the world. He died at Berlin in 1566.

AGRICULTURE

May be defined, The art of diſpoſing the earth in ſuch a manner as to produce whatever vegetables we deſire, in large quantity, and in the greateſt perfection of which their natures are capable.—But though, by this definition, agriculture, ſtrictly ſpeaking, includes in it the cultivation of every ſpecies of vegetable whatever, and conſequently comprehends all that is underſtood of gardening and planting, we mean here to confine ourſelves to the cultivation of thoſe ſpecies of grain, graſs, &c. which, in this country, are generally neceſſary as food for men and beaſts.

That the antiquity of this art is beyond all others, cannot well be doubted; ſeeing we are informed by Scripture, that Adam was ſent from the garden of Eden *to till the ground;* and, this being the caſe, he certainly muſt have known how to do ſo.—It would be ridiculous, from this, to imagine that he was acquainted with all the methods of ploughing, harrowing, fallowing, &c. which are now made uſe of; and it would be equally fooliſh to imagine, that he uſed ſuch clumſy and unartful inſtruments as wooden hooks, horns of oxen, &c. to dig the ground, which were afterwards employed for this purpoſe by certain ſavages: but as we know nothing of the particular circumſtances in which he was ſituated, we can know as little concerning his method of agriculture.

The prodigious length of life which the antediluvians enjoyed, muſt have been very favourable to the advancement of arts and ſciences, eſpecially agriculture, to which they behoved to apply themſelves in a particular manner, in order to procure their ſubſiſtence. It is probable, therefore, that, even in the antediluvian world, arts and ſciences had made great progreſs, nay, might be farther advanced in ſome things than they are at preſent. Of this, however, we can form no judgment, as there are no hiſtories of thoſe times, and the ſcripture gives us but very ſlight hints concerning theſe matters.

No doubt, by the terrible cataſtrophe of the flood, which overwhelmed the whole world, many ſciences would be entirely loſt, and agriculture would ſuffer; as it was impoſſible that Noah or his children could put in practice, or perhaps, know, all the different methods of cultivating the ground that were formerly uſed. The common methods, however, we cannot but ſuppoſe to have been known to him and his children, and by them tranſmitted to their poſterity; ſo that as long as mankind continued in one body without being diſperſed into different nations, the arts, agriculture eſpecially, behoved to advance; and that they did ſo is evident from the undertaking of the tower of Babel. It is from the diſperſion of mankind conſequent upon the confuſion of tongues, that we muſt date the origin of ſavage nations. In all ſocieties where different arts are cultivated, there are ſome perſons who have a kind of general

ral knowledge of moſt of thoſe practiſed through the whole ſociety, while others are in a manner ignorant of every one of them. If we ſuppoſe a few people of underſtanding to ſeparate from the reſt, and become the founders of a nation, it will probably be a civilized one, and the arts will begin to flouriſh from its very origin; but, if a nation is founded by others whoſe intellects are in a manner callous to every human ſcience, (and of this kind there are many in the moſt learned countries), the little knowledge or memory of arts that were among the original founders will be loſt, and ſuch nations will for many ages be a ſavage and degenerate race, till at laſt they will either begin to improve of themſelves, or the arts will be brought to them from other nations.

From this, or ſimilar cauſes, all nations of equal antiquity have not been equally ſavage, nor is there any ſolid reaſon for concluding that all nations were originally unſkilled in agriculture; though as we know not the original inſtruments of huſbandry uſed by mankind when living in one ſociety, we cannot fix the date of the improvements in this art. Different nations have always been in a different ſtate of civilization; and agriculture, as well as other arts, has always been in different degrees of improvement among different nations at the ſame time.

From the earlieſt accounts of the eaſtern nations, we have reaſon to think, that agriculture has at all times been underſtood by them in conſiderable perfection; ſeeing they were always ſupplied not only with the neceſſaries, but the greateſt luxuries, of life. The Egyptians never appear to have been deſtitute of it, ſeeing they were capable of ſupplying other nations with corn upwards of 2400 years before the Chriſtian æra. The accounts of Herodotus, concerning the judicious conduct of this nation in the diſpoſition of their country with reſpect to the inundations of the Nile, likewiſe evince their knowledge of agriculture to have been very conſiderable.

The Greeks, who were at firſt a ſet of barbarous ſavages, appear to have received their knowledge of agriculture from the eaſtern nations. Some few fragments of theirs are the moſt ancient rudiments of huſbandry upon record. The elder Cato is the moſt ancient Latin author whoſe writings upon this ſubject have reached the preſent time. An improved treatiſe on agriculture was written by Varro, who has embelliſhed his ſubject with elegant language: ſoon after him, Virgil publiſhed his juſtly admired Georgics, by far the moſt laboured and highly finiſhed of any of his works. Columella afterwards collected with great judgment whatever was valuable in the writings of his predeceſſors, and enriched them with his own obſervations on the ſubject. His work is one of the choiceſt remains of antiquity, and has ſcarcely been equalled by any author ſince his time.—Valuable treatiſes on agriculture were alſo publiſhed by Attalus, king of Pergamus; Archelaus, king of Cappadocia; Valerius Aſiaticus, who was judged worthy of the empire after Caligula; and by the emperor Albinus.

The irruptions of the barbarous nations of the north ſoon aboliſhed any improved agriculture. Theſe innumerable and enterpriſing barbarians, who over-ran all Europe, were originally ſhepherds or hunters, like the preſent Tartars and the ſavages of America. They contented themſelves with poſſeſſing thoſe vaſt deſerts made by their own ravages, without labour or trouble, cultivating only a very ſmall ſpot near their habitations; and in this trifling huſbandry, only the meaneſt ſlaves were employed: ſo that the art itſelf, which formerly was thought worthy of the ſtudy of kings, was now looked upon as mean and ignoble; a prejudice which is ſcarcely effaced at preſent, or at leaſt but very lately.

At what time agriculture was introduced into Britain, is uncertain. When Julius Cæſar firſt invaded this iſland, it was not wholly unknown. That conqueror was of opinion, that agriculture was firſt introduced by ſome of thoſe colonies from Gaul which had ſettled in the ſouthern parts of Britain, about 100 years before the Roman invaſion *.

It is not to be expected that we can now be acquainted with many of the practices of theſe ancient huſbandmen. It appears, however, that they were not unacquainted with the uſe of manures, particularly marle. This we have on the authority of Pliny †, who tells us, that it was peculiar to the people of Gaul and of Britain; that its effects continued 80 years; and that no man was ever known to marle his field twice, &c.—It is highly probable, too, that lime was at this time alſo uſed as a manure in Britain, it being certainly made uſe of in Gaul for this purpoſe at the time of Julius Cæſar's invaſion.

The eſtabliſhment of the Romans in Britain produced great improvements in agriculture, inſomuch that prodigious quantities of corn were annually exported from the iſland; but when the Roman power began to decline, this, like all the other arts, declined alſo, and was almoſt totally deſtroyed by the departure of that people. The unhappy Britons were now expoſed to frequent incurſions of the Scots and Picts, who deſtroyed the fruits of their labours, and interrupted them in the exerciſe of their art. After the arrival of the Saxons in the year 449, they were involved in ſuch long wars, and underwent ſo many calamities, that the huſbandmen gradually loſt much of their ſkill, and were at laſt driven from thoſe parts of their country which were moſt proper for cultivation.

After the Britons retired into Wales, though it appears from the laws made relative to this art, that agriculture was thought worthy of the attention of the legiſlature, yet their inſtruments appear to have been very unartful. It was enacted that no man ſhould undertake to guide a plough who could not make one; and that the driver ſhould make the ropes of twiſted willows, with which it was drawn. It was uſual for ſix or eight perſons to form themſelves into a ſociety for fitting out one of theſe ploughs, providing it with oxen and every thing neceſſary for ploughing; and many minute and curious laws were made for the regulation of ſuch ſocieties. If any perſon laid dung on a field with the conſent of the proprietor, he was by law allowed the uſe of that land for one year. If the dung was carried out in a cart in great abundance, he was to have the uſe of the land for three years. Whoever cut down a wood, and converted the ground into arable, with the conſent of the owner, was to have the uſe of it for five years. If any one folded his cattle, for one year, upon a piece of ground belonging to another, with the owner's conſent, he was allowed the uſe of that field for four years.

Thus,

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* Cæſar de Bell. Gal. lib. 5. c. 12.

† Plin. Nat. Hiſt. lib. 17. cap. 6.

Thus, though the Britons had in a great meaſure loſt the knowledge of agriculture, they appear to have been very aſſiduous in giving encouragement to ſuch as would attempt a revival of it; but, among the Anglo-Saxons, things were not at preſent in ſo good a ſtate. Theſe reſtleſs and haughty warriors, having contracted a diſtaſte and contempt for agriculture, were at pains to enact laws to prevent its being followed by any other than women and ſlaves. When they firſt arrived in Britain, they had no occaſion for this art, being ſupplied by the natives with all the neceſſaries of life. After the commencement of hoſtilities, the Saxons ſubſiſted chiefly by plunder; but having driven out or extirpated moſt of the ancient Britons, and divided their lands among themſelves, they found themſelves in danger of ſtarving, there being now no enemy to plunder; and therefore they were obliged to apply to agriculture.

The Saxon princes and great men, who, in the diviſion of the lands, had received the greateſt ſhares, are ſaid to have ſubdivided their eſtates into two parts, which were called the *in-lands* and the *out-lands*. The inlands were thoſe which lay moſt contiguous to the manſion-houſe of their owner, which he kept in his own poſſeſſion, and cultivated by his ſlaves, under the direction of a bailiff, for the purpoſe of raiſing proviſions for the family. The out-lands were thoſe at a greater diſtance from the houſe, and were let to the *ceorls*, or farmers of thoſe times, at very moderate rents. By the laws of Ina king of the weſt Saxons, who reigned in the end of the ſeventh and beginning of the eight century, a farm, conſiſting of ten hides, or plough-lands, was to pay the following rent: "Ten caſks of honey; three hundred loaves of bread; "twelve caſks of ſtrong ale; thirty caſks of ſmall ale; "two oxen; ten wedders: ten geeſe; twenty hens; "ten cheeſes; one caſk of butter; five ſalmon; twenty pounds of forage; and one hundred eels." From this low rent the imperfection of agriculture at that time is eaſily diſcoverable; but it is ſtill more ſo from the low prices at which land was then ſold. In the ancient hiſtory of the church of Ely, publiſhed by Dr Gale, there are accounts of many purchaſes of lands by Ædelwold the founder of that church, and by other benefactors, in the reign of Edgar the Peaceable, in the tenth century. By a compariſon of theſe accounts it appears, that the ordinary price of an acre of the beſt land in that part of England, in thoſe times, was no more than 16 Saxon pennies, or about four ſhillings of our money; a very trifling price, even in compariſon of that of other commodities at the ſame time: for, by comparing other accounts, it appears, that four ſheep were then equal in value to an acre of the beſt land, and one horſe of the ſame value with three acres. The frequent and deplorable famines which afflicted England about this time, are further inſtances of the wretched ſtate of agriculture. In 1043, a quarter of wheat ſold for 60 Saxon pennies, (15 of our ſhillings) and at that time equal in value to ſeven or eight pounds of our money now.

The invaſion of the Normans, in 1066, contributed very much to the improvement of agriculture; for, by that event, many thouſands of huſbandmen from Flanders, France, and Normandy, ſettled in Britain, obtained eſtates or farms, and cultivated them after the manner of their country. The implements of huſbandry, uſed at this time, were of the ſame kind with thoſe employed at preſent; but ſome of them were leſs perfect in their conſtruction. The plough, for example, had but one ſtilt, or handle, which the ploughman guided with one hand, having in his other hand an inſtrument which ſerved both for cleaning and mending the plough, as well as for breaking the clods. The Norman plough had two wheels; and in the light ſoil of Normandy was commonly drawn by one or two oxen; but, in England, a greater number was often neceſſary. In Wales, the perſon who conducted the oxen in the plough walked backwards. Their carts, harrows, ſcythes, ſickles, and flails, from the figures of them ſtill remaining, appear to have been nearly of the ſame conſtruction with thoſe that are now uſed. In Wales, they did not uſe a ſickle for reaping their corns, but an inſtrument like the blade of a knife, with a wooden handle at each end.—Their chief manure, next to dung, ſeems ſtill to have been marle. Summer fallowing of lands deſigned for wheat, and ploughing them ſeveral times, appear to have been frequent practices of the Engliſh farmers in this period.

All this time, agriculture ſeems to have been in a very imperfect ſtate in Scotland. Though we are certain that the knowledge of it in this country proceeded originally from England, we know not when it was introduced. In 1214, the legiſlature ſeem to have directed their attention towards the improvement of this art; for by an act of Alexander II. dated this year, all farmers that had four oxen or cows, or upwards, were commanded to till their land by *ploughing*, and to begin to till fifteen days before Candlemas; that ſuch farmers as had not ſo many oxen, ſhould delve with hand and foot as much land as would produce a ſufficient quantity of corn to ſupport themſelves and their families. It is probable, however, that this law was deſigned for the Highlands, and moſt uncultivated parts of the kingdom; for, in the ſame parliament, a very ſevere law was made againſt thoſe farmers who did not extirpate a pernicious weed called *guilde* out of their lands, which ſeems to indicate a more advanced ſtate of cultivation.

The moſt conſiderable improvements in agriculture, however, have taken place in Britain ſince the reign of Queen Elizabeth. The reformation was no leſs favourable to the arts than to religion. Improvements were firſt begun by ſome natives of Switzerland who ſettled in England; and the liberal ſpirit of inquiry ſucceeding this remarkable period, hath in a manner entirely put an end to that ſlaviſh attachment to the cuſtoms of preceding ages, which, under the dominion of popery, proved an unſurmountable bar to the progreſs of every ſcience. Societies for the improvement of this moſt uſeful art have been inſtituted both in England and Scotland; and though the agriculture of Scotland hath hitherto ſcarcely equalled that of England, yet the improvements that are daily making in the former, and the univerſal increaſe of the knowledge of the art among her inhabitants, leave no room to doubt, that in a few years ſhe will ſhow every mark of equality that ſoil, climate, and other natural differences, will allow.

Part I. THEORY of AGRICULTURE.

IN an art ſo extenſively uſeful to mankind, and which has been ſo univerſally practiſed ſince the creation of the world, it is natural to expect the moſt exact and perfect theory; but in this we are not only totally diſappointed, but likewiſe find the greateſt diſagreement among thoſe who practiſe it, new ſchemes ſtarting up and receiving the higheſt applauſe to day, and ſinking into total neglect and oblivion to-morrow.

1 Ignorance of the food of vegetables, the reaſon of imperfection in the theory of agriculture.

One reaſon of this want of a diſtinct theory of agriculture is, the ignorance of what is properly the food of vegetables; for as the whole art of agriculture conſiſts only in ſupplying them with a proper quantity of food, in the moſt favourable circumſtances, it is evident, we could proceed upon a much more ſure foundation if we could aſcertain what their proper nouriſhment is, than we can do without this knowledge. —The reaſon of the great differences regarding the practice, probably, is the difficulty of making experiments in agriculture. It is not in this art as in Mechanics, Chemiſtry, *&c.* where an experiment can be made in an hour, or a day or two at fartheſt: an experiment in agriculture cannot be properly made in leſs than ſeveral years. Some favourable unobſerved circumſtances, quite foreign to the experiment itſelf, may concur to produce plentiful crops for a year or two; and thus the farmer may be induced to publiſh his fancied improvements, which failing in the hands of others, or perhaps even in his own on a repetition of the experiment, the new improvements are totally neglected, and things continue in their old way. Was he, however, capable of ſeeing and handling the food of vegetables, as well as he can do that of a horſe or an ox, and procuring it in any imaginable quantity, it is plain, that he would be able to cauſe vegetables grow in their utmoſt luxuriancy, or, if we may be allowed the expreſſion, *fatten* them, with as great certainty as he can fatten a horſe or an ox, when he hath plenty of proper food to give them.—To aſcertain what this food is, therefore, muſt be a ſtep towards the perfection of agriculture; and to this we ſhall contribute our endeavour.

SECT. I. *Of the proper Food of Plants.*

2 Various ſuppoſitions concerning the food of plants.

WE ſhall not here ſpend time in refuting the theories of thoſe who imagined the vegetable food to conſiſt of oily and ſaline ſubſtances. Theſe will be conſidered when ſpeaking of the different kinds of manures. The theory which ſeems to gain moſt credit at preſent is, that Water and Air are the proper vegetable food, to which alone they owe their increaſe in bulk and weight.—That plants cannot be ſupported without both theſe, is very certain: but we know, that air is a compound fluid; and water is never without ſome impurities, ſo may alſo be conſidered as a compound.—Dr Prieſtley hath ſhewn, that our atmoſphere is compoſed of earth, of phlogiſton, and the nitrous acid *. To theſe we may add water; for whether that is an ingredient in the Doctor's pure dephlogiſticated air or not, we are very ſure that it is ſo in that air which has acceſs to all vegetables, and contributes ſo much to their growth. Is it then the aqueous, the earthy, the acid, or the phlogiſtic part of the air, which nouriſhes plants? In like manner, is it the pure elementary part of water, which nouriſhes them? or does it contribute to their growth only by the heterogeneous ſubſtances which it contains?

3 Vegetables thrive in putrid air.

From Dr Prieſtley's experiments on different kinds of air, it appears that the pureſt kind of that fluid is not the fitteſt for the purpoſes of vegetation. On the contrary, vegetables flouriſhed in a ſurpriſing degree when confined in a ſmall quantity of air made perfectly noxious by the putrid effluvia of animal bodies. In theſe circumſtances, a ſprig of mint extended itſelf, in ſeven days, three inches in length, and put forth ſeveral new ſhoots; the putrid air, in the mean time, being deprived of its noxious quality, and becoming ſo wholeſome that animals might breathe it with ſafety. This property of abſorbing ſuch noxious effluvia, he found to belong not only to mint, but indiſcriminately to every vegetable ſubſtance; and hence he concludes, that one uſe of the vegetable creation is to purify the air from that immenſe quantity of putrid effluvia which is continually abſorbed by it from the breath of living creatures, and the putrefaction of animal and vegetable bodies. By the abſorption of theſe effluvia from the air we find that vegetables are remarkably increaſed in bulk. We are aſſured, therefore, that they conſtitute at leaſt one ſpecies of vegetable food; and when vegetables are put into ſuch circumſtances that the ſteams of putrefying bodies can have acceſs to them, we are ſure they will thrive the better.

4 Water capable of imbibing putrid effluvia.

Beſides this method of reſtoring the ſalubrity of putrid air by growing vegetables, the Doctor found another; namely, by agitating it in water, part of which was expoſed to the atmoſphere. In this caſe, the water acquired a very putrid noxious ſmell; which ſhews, that water, as well as air, is capable of abſorbing thoſe effluvia which are found proper food for vegetables. We cannot help concluding, therefore, that in the continual aſcent of water in vapour, and its deſcent again in rain, which is a much more effectual *agitation* than could be made by Dr Prieſtley, the water muſt be very intimately combined with the *phlogiſtic* or putrid effluvia which are contained in the air. To this union we are led ſtrongly to ſuſpect that rain-water owes its fertilizing qualities; for the pureſt ſpring waters, though moſt wholeſome for animals, are not found to be fitteſt for promoting the growth of vegetables.—As, therefore, vegetables evidently receive nouriſhment both by their leaves and roots, and increaſe remarkably in bulk by abſorbing the putrid effluvia from the air; and as they likewiſe increaſe in bulk by admitting water to their roots, and more ſo when the water contains much of that kind of effluvium, than when it contains leſs; we muſt neceſſarily conclude, that the nouriſhment received by the roots of plants is of the ſame kind with that received by their leaves; and that this food may be given them in greater plenty, than they naturally receive it, by impregnating the air which ſurrounds them, or the water which moiſtens them, with a greater quantity of putrid matter than what they contain in a natural ſtate.

5 Putrid effluvia the proper food of plants.

6 Objections anſwered.

Some will perhaps laugh at this ſcanty proviſion we are making for the immenſe quantity of vegetables with which the whole ſurface of the earth is covered; for the

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* See *Air.*

THEORY.

the food we have juſt now aſſigned them is naturally *inviſible*, and conſequently will be looked upon by many as a kind of non-entity. Its inviſibility, however, is no argument for its exiſting only in a ſmall quantity; for the ſubtile matter which increaſes the weight of calcined metals is equally inviſible with what we have juſt now aſſigned for the ſupport of the vegetable creation; nevertheleſs, it is ſo far from being in ſmall quantity, that any imaginable weight of it may be abſorbed from the air in a ſhort time. It is ſaid by ſome, that lead, by being converted into the ſubſtance called *minium* or *red lead*, gains one fourth, by others only one tenth, in weight from the air*: as a medium, we ſhall ſuppoſe that it gains $\frac{1}{7}$th. If ſeven tons of lead, then, were converted into minium at once, it would gain one ton, or 2000℔. from the air, in three or four days at moſt, for that is the longeſt time required for the calcination. We ſhould be ſurpriſed at finding a vegetable increaſe ſo much in ſuch a ſhort time, though it receives food both from the air and earth; but if the air contains ſuch a quantity of mineral food, if we pleaſe to call it ſo, why ſhould it not contain an equal quantity of matter for the ſupport of vegetables alſo, even ſuppoſing them to have no other ſource of nouriſhment?

* See Chemiſtry, nº 402.

SECT. II. *The foregoing Theory confirmed from conſiderations on the nature of vegetable Mould, and the different kinds of Manure found proper for fertilizing the Soil.*

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THOUGH plants will grow on any kind of earth, and flouriſh vigorouſly, if plentifuly ſupplied with water; yet ſome kinds of ſoils are found much more proper for ſupplying them with nouriſhment than others.—We cannot, indeed, allow the inferences to be quite fair which ſome would draw from experiments on plants ſet in mere ſand, &c.; *viz.* that the earth is of no other uſe to vegetation than to afford a proper ſupport to the plant, that it be not eaſily moved out of its place; becauſe the experiments made on ſingle vegetables are always performed in or very near houſes, where the air is by no means ſo pure as in the open fields, and conſequently where they have an opportunity of receiving as much nouriſhment from the air as may compenſate the want of what they would have derived from the earth if planted in a rich ſoil. Lord Kaimes, in the Gentleman Farmer, mentions an experiment wherein a pea was planted on ſome cotton ſpread on water, in a vial. It ſprung, and puſhed roots through the cotton into the water. The plant grew vigorouſly, and, at the time of his writing the experiment, carried large pods full of ripe ſeed.—From this experiment, or others of a ſimilar kind, however, a farmer would not be thought to act very judiciouſly, who ſhould conclude that nothing more was requiſite to produce a plentiful crop, than to keep his fields conſtantly ſoaking with water, and apply his labour only for that purpoſe, without regarding either tillage, manure, or the difference of ſoils. Experience has abundantly ſhewn, that by certain operations performed on the earth itſelf, it is rendered much more capable of ſupplying vegetables with plenty of nouriſhment than if ſuch operations were omitted; and that ſome kinds of ſoils cannot without certain additions be rendered ſo fit for this purpoſe as others; and this is what conſtitutes the difference between a *rich* and a *poor* ſoil.

8
Of the true vegetable earth.

Chemiſts have diſtinguiſhed the different kinds of earths into particular claſſes*, from whence we might expect ſome inſight into the nature of different ſoils; but ſo far from this, that ſpecies of earth, which alone is capable of ſupplying the vegetable kingdom with nouriſhment in the greateſt plenty, ſeems entirely overlooked, and is ſcarce ever mentioned. This kind of earth is the moſt common of any, and is found in its greateſt perfection in well cultivated gardens. It is not however, even in theſe, found in perfect purity; being conſtantly mixed with greater or leſs proportions of ſand, ſmall ſtones, &c. It can be had by itſelf, and entirely ſeparated from all other ſubſtances, only by ſuffering vegetable or animal bodies to putrify. By undergoing this operation, they are at laſt reſolved into a kind of earth, which appears perfectly the ſame, from whatever ſubſtance it is produced. Of this earth Dr Lewis gives us the following characters. It is indiſſoluble in acids, ſomewhat tenacious when moiſtened with water, friable when dry, and acquires no additional hardneſs in the fire.—The chemiſtry of nature, and of art, however, are ſo very diſſimilar, that an account of the chemical properties of this earth can be but of very little ſervice to the practice of agriculture; however, to thoſe above mentioned we may add, that when it is diſtilled with a violent fire, a volatile alcaline ſpirit, and fœtid oil, ſimilar to thoſe of hartſhorn or other animal ſubſtances, are obtained.

* See Chemiſtry, nº 33.

9
This earth impregnated with putrid effluvia.

As the volatile alcali is known to be produced in great plenty by diſtilling putrid ſubſtances either animal or vegetable, the obtaining an alcaline ſpirit from this kind of earth is a ſtrong argument of its being much impregnated with the putrid effluvium, which we have already mentioned as the proper vegetable food contained in the air and water. Indeed, conſidering that this kind of earth is produced by putrefaction, it is next to an impoſſibility that it ſhould not be impregnated with putrid ſteams, as much as earth can be; and if the earth which is moſt impregnated with theſe ſteams is found to afford the greateſt quantity of nouriſhment to vegetables, we have from thence an additional proof that they live on the putrid matter emitted from dead animals and vegetables like themſelves.

10
Earth is capable of abſorbing putrid ſteams in prodigious quantities.

That we may be the more aſcertained of this, it muſt be conſidered, that the earth, which undoubtedly is the great ſource of nouriſhment to vegetables, is capable of abſorbing putrid effluvia more powerfully, or at leaſt in much greater quantity, before it is ſaturated, than either the air or water. The practice of burying dead bodies is an undeniable proof of this. They are laid but a ſmall depth under ground; yet the abominable ſtench emitted by the dead carcaſe is retained in the earth, ſo that it never penetrates in ſuch a manner as to be offenſive. That earth may be ſaturated with this putrid matter, as well as air or water, is very certain; and, in caſe of ſuch a ſaturation, no doubt either of theſe will take up the ſuperfluous quantity, and become noxious: but unleſs the earth is fully ſaturated, both of them will depoſit part of what they themſelves contain in the earth, and by that means become more ſalutary than they were before.

11
Agreeable odour emitted by moiſt earth.

That earth is capable of attracting putrid effluvia from the air, perhaps, may not be ſo readily granted; and indeed we know of no experiment whereby it can be ſhewn that putrid air is made ſalutary by having any kind of earth agitated in it: but if we conſider the exceeding great ſalubrity of the air in the country, and the healthineſs of thoſe who follow the plough or are employed in digging the ground, we muſt at leaſt allow, that when the ground is turned up, it communicates no kind of noxious quality to the air; which it moſt certainly would do, if it emitted a putrid effluvium. So far from this, the ſmell of moiſt earth is always agreeable and wholeſome; and here we have the ſatisfaction to find our theory ſomewhat confirmed by the celebrated Baron van Swieten, late phyſician to the empreſs of Hungary.

"Phyſicians" ſays he "uſually adviſe their patients to ruſtication, not only that they may enjoy a pure and freely circulating air, but that, as their ſtrength increaſes, they may, diſengaged from all care, exerciſe their body by the ſlighter labours of agriculture, and other country amuſements.

"There may perhaps be another cauſe why ruſtication will be of benefit in conſumptions. It is well known, that, after ſome days drought, on the falling of rain that moiſtens the earth, there ariſes a grateful ſmell, which we all are ſenſible of; and this is commonly attributed to the vegetables, which before ſapleſs, but now refreſhed by rain, perſpire more copiouſly. But Reaumur obſerved, that a like fragrancy is alſo perceptible after rain when the corn has been cut down in the fields, where there only remains dry ſtubble; and examining the matter more particularly, he found that dry earth is without ſmell, but as ſoon as it is moiſtened to the degree of having the conſiſtence of ſoftiſh pap, it then diffuſes a ſtrong ſmell; but if more water is added, the ſmell is diminiſhed, nay even quite diſſipated. Neither does it ſeem an eaſy matter to exhauſt that power of producing ſmells which the earth is poſſeſſed of. Every day, during a fortnight, he made cakes of moiſtened earth; and having dried and wetted them over again, he could not perceive that the earth was leſs fragrant after all theſe repeated experiments, if it was again wetted. He further obſerved, that this fragrancy does not diffuſe itſelf to any thing at a great diſtance, without being much diminiſhed, and ſoon entirely gone.—It has been obſerved, that this exſpiration of the earth ceaſes if thunder and ſtorms ſoon follow: while they continue, it begins to return; and when over, the ſame fragrancy of the earth for ſome hours affects the ſmell of a man as he walks along over a conſiderable tract of ground. There is no one, I believe, but has ſometimes made this obſervation; and hence the earth, when moiſtened to a certain degree, ſeems to exhale fragrant odours, and indeed various in various places, as we are ſenſible of from their diverſity. They are for the moſt part of a ſalubrious quality; as ſome perſons quite faint and languid in the ſummer-heats perceive themſelves wonderfully refreſhed, whilſt, after rain, they ſnuff up the fragrant odour. In ſome places thoſe effluvia are perhaps bad, and may be the cauſes of diſeaſes."

This property of emitting a fragrant ſmell is likewiſe taken notice of by Dr Home in his Principles of Agriculture and Vegetation. Some phyſicians have preſcribed a bath of earth for the cure of conſumptive patients; and Dr Solano de Luque was of opinion, that the earth had the property of abſorbing contagious miaſmata into it: and we are certain, that whether it can abſorb theſe miaſmata from living bodies or not, it certainly can abſorb them from dead ones; for a piece of putrid meat will be much ſweetened by lying for a ſhort time in the ground.

12
Power of tranſmutation in the earth aſſerted.

From all this we cannot indeed infer, that putrid air is ſweetened by mere earth; but we diſcover what is perhaps more important, namely, that though earth is the common receptacle of all putrid matters both animal and vegetable, there is a change made on them when in it, which cannot be made either by air or water. Thus, if the carcaſe of a ſmall animal is left to putrefy in the air, it becomes exceedingly offenſive, and continues ſo from firſt to laſt. The ſame thing happens if it is left to putrefy in water. But, in earth, the caſe is quite different. After the carcaſe is conſumed, the earth which has imbibed all the putrid ſteams, inſtead of exhaling an offenſive odour, diffuſes an agreeable one; and thus we may ſee that it is endued with a power no leſs remarkable than that of attraction or repulſion, and which we may diſtinguiſh by the name of *tranſmutation*. With regard to water, the caſe is more evident; for the moſt putrid water will be ſweetened by percolation through earth, or even running in a channel for ſome time on its ſurface; but if it contains any impurities of the ſaline kind, they will not be ſeparated, or at leaſt in very ſmall quantity.

13
Attraction inſufficient to ſolve th phenomen of vegetation.

The exiſtence of ſuch a power as that of tranſmutation we will be obliged to own, whatever we imagine the vegetable food to conſiſt of; for it is impoſſible to ſolve the phenomena of vegetation by attractions and repulſions. If we ſuppoſe the vegetable food to be ſalt, let us attract and repel ſalt as we will, it remains ſalt from firſt to laſt. Let us ſuppoſe it water, the caſe is the ſame; and, by mere attraction, nothing but maſſes of ſalt, or pools of water, could be produced. The caſe is the ſame on our own hypotheſis; for, ſuppoſing plants compoſed of the putrid effluvia of others, and of dead animals, if nature was endued with no other power than attraction or repulſion, the vegetable behoved to be a corrupted maſs like that of which it was compoſed.—This power, as we have already ſeen, reſides only in the earth, and in the vegetables themſelves; air and water can indeed act as powerful ſolvents, but cannot transform or compound.

14
Confirmation of the above theo from the different o perations agricultu

We muſt next conſider the nature of thoſe different operations, which, from time immemorial, have been performed on the earth, in order to cauſe it produce the greateſt crops of vegetables. If all of theſe ſhall be found conſpiring to one general purpoſe, then the ſhorteſt and moſt eaſy method of attaining that purpoſe is undoubtedly the moſt proper to be practiſed in agriculture, whether it hath been as yet put in execution or not. Theſe are,

15
Fallowin

1. *Frequent ploughing, or fallowing.* The immediate conſequences of this is to expoſe different quantities of the ſoil to the action of the air and ſun, which will not fail to exert their ſolvent powers upon it. In conſequence of this action, the earth is partly reduced to powder; many of the roots of vegetables, with which it always abounds, are diſſolved and putrified; and the earth produced from them mixes with the reſt, as well as the effluvia they emit during their diſſolution. The earth ſoon begins again to exert its prolific quality, and a crop of vegetables is produced. By a repetition of the ploughing, theſe are turned with their roots upwards,

wards, are expoſed to the ſolvent powers of the air and light, in conſequence of which they die, are putrefied, and more of the native ſoil is reduced to powder, and mixed with them. By a frequent repetition of this proceſs, the ſoil becomes vaſtly more tender, and approaches to the nature of garden-mould, and its fertility is conſiderably increaſed.

16 he capaci- y of a ſoil o retain wa- er not in- reiſed by llowing.

Lord Kaimes is of opinion, that the reaſon of the fertility of any ſoil being increaſed by fallowing, is, that its capacity of retaining water is increaſed. But this we abſolutely deny; for ſo far from being more diſpoſed to retain water by its pulveriſation, the ſoil is evidently more diſpoſed to part with it, either by evaporation, or by ſuffering the moiſture to percolate thro' it. In this reſpect it is far inferior to clay; for tho' dry garden-mould abſorbs water much more quickly than clay, it alſo dries much ſooner, and thus all the advantage is loſt.

17 ils and lts not the ue vege- ble food.

To thoſe who reckon the food of vegetables to conſiſt of oils or ſalts, the operation of fallowing ground muſt appear an uſeleſs one, as it can tend neither to produce oils nor ſalts, but to deſtroy them. As its utility, however, cannot be denied, the favourers of this theory imagine, that the ground, by repeated operations of this kind, is fitted for attracting the nitrous ſalts from the air: but it is found, that theſe ſalts cannot be attracted by earth, or any other ſubſtance, even when expoſed for a great length of time to the air with a view to produce ſalt-petre; which gives a ſtrong ſuſpicion againſt their exiſtence*; and even if nitre is mixed with the ſoil, it is found to be detrimental, and will kill or poiſon plants inſtead of nouriſhing them.

18 erflowing e ſoil with ter.

2. *Overflowing the ground with water.*—This is found prodigiouſly to increaſe the fertility of any ſoil. It is well known how much Egypt owes to the annual overflowing of the Nile; and even in this country the overflowing of any ground is found to be attended with great advantage. This is practiſed by Mr Bakewell of Leiceſterſhire, famous for his improvements in the breed of cattle; and he finds it fully to anſwer an annual manuring of any other ſort. It is alſo recommended by Mr Anderſon of Monkſhill, in his eſſays on agriculture.

19 ſons of increaſe fertility he over- ing.

The fertilizing quality of water will eaſily be accounted for on the ſame principles. When grown vegetables are covered with water, their growth, however vigorous before, is immediately ſtopt, unleſs they be of the aquatic kind; they die; are diſſolved, and putrefied; in which caſe, their finer parts are undoubtedly abſorbed by the earth: and thus the *floating*, as it is called, of fields with water, anſwers the purpoſe of fallowing, with very little trouble. This is not all: for ſtagnating water always depoſits a ſediment, which, mixing with the diſſolved parts of the vegetables all over the field, forms an excellent manure; and when the water is allowed to run off, the heat of the ſun ſoon brings the higheſt degree of putrefaction on the dead vegetables, the effluvia of which, mixing with the mud depoſited from the water, makes it exceedingly rich.

20 & ſalts ot be vegeta- ood.

Upon the ſuppoſition of oily and ſaline food for vegetables, this operation muſt certainly be prejudicial; for nothing can ſo effectually deprive any ſubſtance of ſalt, as ſteeping it in water. Neither will water either depoſit oil from itſelf, or ſuffer it to mix with the ground if accidentally brought to it; nay, though a field were previouſly impregnated with oil, upon overflowing it with water, great part of the oil would be ſeparated, and riſe to the top: ſo that, in either caſe, this operation behoved to impoveriſh land, rather than enrich it; and as vegetables are found to be ſupplied with food in plenty, by an operation which muſt undoubtedly tend to take away both oils and ſalts from them, we cannot help thinking this a demonſtration that their food is compoſed neither of oil nor ſalt.

21 Of manures, and their operation.

3. *Manuring*, or mixing the ſoil with different ſubſtances.—We ſhall here confine ourſelves to thoſe which are of undoubted efficacy, and have their credit eſtabliſhed by long experience. Theſe are, 1. lime, chalk, marle, ſhells, or other earths called by the chemiſts *calcareous earths*; 2. ſoot; 3. aſhes; 4. dung of different kinds.—(1.) The lime, chalk, marle, and ſhells, are all found to be of the ſame nature. The marle differs from the reſt, only in having a mixture of clay along with its calcareous part. Theſe contain neither ſalt nor oil of any kind; they readily imbibe water, and as readily part with it. Quicklime, indeed, retains water very obſtinately; but ſuch lime as is laid upon the ground ſoon returns to the ſame ſtate in which it originally was, and powdered limeſtone is found to anſwer as well for the purpoſes of manure as that which has been burnt; ſo that here we may conſider them all as ſubſtances of the ſame claſs.—If any of theſe ſubſtances are mixed with dead animal or vegetable bodies, they remarkably quicken their diſſolution and corruption, as appears from Sir John Pringle's experiments on putrefaction. When mixed with the ſoil, therefore, they muſt undoubtedly exert their powers on ſuch ſubſtances as they find there, in the ſame manner as they do on others; that is, they muſt haſten their diſſolution and putrefaction, and give the pure vegetable mould an opportunity of abſorbing their putrid ſteams, and conſequently of being fertilized by it in the ſame manner as by putrid ſubſtances of any kind. (2.) Thoſe who contend for oily and ſaline principles in the vegetable food, avail themſelves of the uſefulneſs of ſoot as a manure; which is not only oily of itſelf, but affords a great quantity of volatile ſalt, along with ſome neutral ſal-ammoniac. It muſt be remembered, however, that not an atom either of volatile ſalt or ſal-ammoniac can be extracted from ſoot without a conſiderable heat, which no ſoil can give, nor could any vegetable bear. Neither doth its oil appear without a great degree of heat: and though it feels ſomewhat unctuous to the touch, this is but a mere deception; for no true oil, capable of floating on water, can be obtained from ſoot without diſtillation. It is impoſſible, therefore, that ſoot can act upon the ſoil either as an oily or a ſaline ſubſtance; how far it is capable of diſſolution by putrefaction, or being otherwiſe converted into an earth, hath not yet been determined by experiments; but as it yields, on diſtillation, the ſame principles which are obtained from animal or putrefied vegetable ſubſtances, it is probable that ſoot enriches the ground in the ſame manner that they do. (3.) The uſe of aſhes in manure is likewiſe urged as an argument for the food of vegetables being of a ſaline nature; as it is known, that the common alcaline ſalts are procured by lixiviating the aſhes of wood and other vegetables. Experience, however, ſhews us, that aſhes are no leſs fit for manure after the ſalt is extracted from them than

See *Chemi-* *y*, nº 177.

before. Indeed, if there is any difference, it is in favour of the waſhed aſhes. The alcali itſelf, though in Sir John Pringle's experiments it was found to be *antiſeptic*, or a reſiſter of putrefaction, is nevertheleſs a powerful diſſolvent; and as it muſt ſoon loſe its alcaline properties when mixed with the earth, in conſequence of the univerſal exiſtence of the vitriolic acid *, thoſe ſubſtances which it has diſſolved will be more diſpoſed to putrefaction than before, and conſequently tend to fertilize the ground in the manner we have already deſcribed. The waſhed aſhes are *ſeptics*, or promoters of putrefaction, and conſequently act in the ſame manner as chalk or limeſtone. (4.) All kinds of dung are ſo much diſpoſed to putrefaction, that it is difficult to imagine any other way in which they can be ſerviceable to vegetation than by their putrid effluvia.—People indeed may dream of imaginary ſalts in dung; but if they conſidered, or even knew the difficulty of procuring ſalt of any kind from dung, they would probably alter their ſentiments. The volatile-ſalts procured from this as well as other animal-matters are mere creatures of the fire: putrid urine produces them indeed without heat, but ſcarce any other animal-ſubſtance *. Nevertheleſs other putrid ſubſtances will fertilize the ground as well as urine, and therefore muſt act in ſome other way than by their ſalts. Tho' Dr Prieſtley's experiments had never been made, we could have formed no other rational ſuppoſition concerning the manner in which putrid ſubſtances fertilize the earth than what we have already done; but as he has ſhewn that vegetables are prodigiouſly increaſed in bulk by the mere contact of theſe putrid ſteams, where no ſaline ſubſtance could have acceſs to them, we cannot help thinking this a deciſive experiment concerning the manner in which the ground is fertilized by manuring with dung or other putrid ſubſtances.

22
Effects of ſaline ſubſtances on growing vegetables.

We ſhall conclude this part of the ſubject with an account of ſome experiments concerning the effects of ſaline ſubſtances on the growth of vegetables. The following are related by Lord Kaimes, in his Gentleman Farmer.—" A number of Jeruſalem artichokes were ſet in pots filled with pure ſand. One plant was kept as a ſtandard, being nouriſhed with water only. Other plants of the ſame kind were nouriſhed with water in which ſalt of tartar, a fixed alcali, was diſſolved. Theſe grew more vigorouſly than the ſtandard plant; but, by reiterated waterings, there came to be ſuch an accumulation of the fixed alcali among the ſand, as to make the plants decay, and at laſt to die. Some plants were nouriſhed with water in which ſal-ammoniac, a volatile alcali, was diſſolved. Theſe grew alſo well for ſome time; but, like the former, were deſtroyed by frequent reiterations of it. Weak lime-water promoted the growth of its plants more than common water. But water, completely ſaturated with quicklime, proved more noxious than that which contained a fixed alcali; though leſs than that which contained a ſolution of volatile alcali.—Urine promoted, for a long time, the growth of its plants; and *the moſt putrid appeared to have the ſtrongeſt effect*; but at laſt it totally deſtroyed them. *Water impregnated with putrid animal and vegetable ſubſtances did more effectually promote the growth of its plants than any other ſolution; and in every ſtage of the proceſs appeared to be ſalutary.*"

23
Common ſalt ineffectual as a manure.

With regard to other ſaline ſubſtances there are not many experiments which can be depended upon concerning their qualities as a manure. Mr Anderſon relates an experiment made with common ſalt, the ſucceſs of which, we apprehend, may juſtly enough be taken as a ſpecimen of what is to be expected from manures of a ſimilar kind.—He marked out a circle of ſix feet diameter in the middle of a graſs-field, which he diſtinguiſhed by driving a ſtake in its centre. All over this circle he ſtrewed common ſalt, which, about the ſtake, lay near an inch thick on the ground. In this ſtate he left it to the operations of nature. The graſs ſprung up as uſual, neither better nor worſe about the ſtake than in the reſt of the field, and the place where the circle was could be diſtinguiſhed only by the ſtake, which was left there for ſome years.

Upon theſe experiments we need make very few obſervations. They are ſo much in favour of our theory, that they ſeem made on purpoſe to confirm it. The fixed alcali employed in Lord Kaimes's experiments would firſt exert its ſolvent powers on ſuch heterogeneous ſubſtances as it met with among the ſand; for no ſand can be ſuppoſed to be perfectly free of theſe. As long as it exerted its ſtrength on theſe only, the plant would thrive, for the reaſons we have already mentioned; but, having exhauſted the ſmall quantity of ſubſtances contained in the ſand, it would next attack the plant itſelf, which conſequently would decay and die. The ſame effects behoved to follow in a greater degree from ſtrong lime-water which contains lime in its cauſtic ſtate; for this is a more powerful ſolvent than fixed alcali itſelf, and would not fail to deſtroy every thing it touched; nor is it at all improbable that the plant would ſeem to grow vigorouſly by the diſſolution of part of its own roots, more nouriſhment being by this means given to thoſe which remained ſound.—Volatile alcali is likewiſe a powerful ſolvent; but, by reaſon of its volatility, would exert its cauſtic power on the plant ſooner than either lime, or fixed alcali; and accordingly it ſeems to have been the moſt deſtructive of any thing that was tried. It ſeems owing to this, that putrid urine at laſt deſtroyed the plants whoſe growth it ſo long promoted; while water impregnated with other putrid matters which yield no volatile alcali without heat, proved always ſalutary.

24
End to b
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From all this we may draw the following general concluſion, *viz.* That the principal end which a farmer ought to keep in view, is to impregnate his ground as much as poſſible, with ſubſtances which either actually contain putrid matter, or which are in their own nature *ſeptic*, or promoters of putrefaction. To impregnate the air with putrid effluvia is impoſſible; and though it could be done, would be highly dangerous; for however ſalutary ſuch effluvia may be to vegetables, nothing can be more fatal to mankind. The putrid ſubſtances therefore can only be uſed by mixing them with the earth; and in whatever manner they can be moſt perfectly, and in the greateſt quantity, mixed with the ſoil, there the beſt crops may be expected.

SECT. III. *Of the different Soils, and the Manures moſt proper for each.*

25
Richeſt ſo
muſt at l
be impo
riſhed.

ACCORDING to the theory we have juſt now laid down, the richeſt ſoil muſt be that which contains the greateſt quantity of putrid matter, either animal or vegetable; and ſuch is the earth into which animal and vegeta-

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* See Chemiſtry, nº 103.

* See Chemiſtry, nº 329.

Theory.

vegetable ſubſtances reſolve themſelves. Was this earth to be had in perfection, it is evident it could not ſtand in need of manure of any kind, or be in the leaſt enriched by it; for containing an immenſe quantity of putrid matter, it would freely communicate it to the vegetables planted in it, which would grow in the moſt luxuriant manner, without requiring any other care than that of keeping them conſtantly ſupplied with water. If we ſuppoſe the crop left upon the ground to putrefy and mix with the earth as before, the ſoil will contain the ſame quantity of putrid matter the ſecond year that it did the firſt, and be equally prolific: but if the crop is removed to another place, and nothing is brought back to enrich the ground in its ſtead, it is evident that it will contain leſs of the true vegetable food the ſecond year than it did the firſt, and conſequently be leſs prolific. For ſome time, however, the difference will not be perceptible, and people who are in poſſeſſion of ſuch ground may imagine that they enjoy a ſoil which will be perpetually fertile; but long experience has taught us, that the richeſt ſoils will at laſt be exhauſted by repeated croping without manure, as according to our theory they ought to be.

Where the ground has been ſuffered to remain uncultivated for many ages, producing all that time ſucculent plants which are eaſily putrefied, and trees, the leaves of which likewiſe contribute to enrich the ground by their falling off and mixing with it, the ſoil will in a manner be totally made up of pure vegetable earth, and be the richeſt, when cultivated, that can be imagined. This was the caſe with the lands of America. They had remained uncultivated perhaps ſince the creation, and were endowed with an extraordinary degree of fertility; nevertheleſs we are aſſured by one who went to America in order to purchaſe lands there, that ſuch grounds as had been long cultivated were ſo much exhauſted, as to be much worſe than the generality of cultivated grounds in this country. Here, then, we have an example of one ſpecies of poor ſoil, namely, one that has been formerly very rich, but has been deprived, by repeated cropping, of the greateſt part of the vegetable food it contained. The farmer who is in poſſeſſion of ſuch ground would no doubt willingly reſtore it to its former ſtate; the preſent queſtion is, What muſt be done in order to obtain this end? We have mentioned ſeveral kinds of manures which long practice has recommended as ſerviceable for improving ground: we ſhall ſuppoſe the farmer tries lime, or chalk; for, as we have already ſeen, their operations upon the ſoil muſt be preciſely the ſame. This ſubſtance, being of a ſeptic nature, will act upon ſuch parts of the ſoil as are not putrified, or but imperfectly ſo; in conſequence of which, the farmer will reap a better crop than formerly. The ſeptic nature of the lime is not altered by any length of time. In ploughing the ground, the lime is more and more perfectly mixed with it, and gradually exerts its power on every putreſcible matter it touches. As long as any matter of this kind remains, the farmer will reap good crops: but when the putreſcible matter is all exhauſted, the ground then becomes perfectly barren; and the cauſtic qualities of the lime are moſt unjuſtly blamed for *burning* the ground, and reducing it to a *caput mortuum;* while it is plain, the lime has only done its office, and made the ſoil yield all that it was capable of yielding.

26
One ſpecies of poor ſoil deſtroyed by lime.

27
A ſpecies of poor ſoil meliorated by lime.

When ground has been long uncultivated, producing all the time plants, not ſucculent, but ſuch as are very difficultly diſſolved, and in a manner incapable of putrefaction; there the ſoil will be exceſſively barren, and yield very ſcanty crops, though cultivated with the greateſt care. Of this kind are thoſe lands covered with heath, which are found to be the moſt barren of any, and the moſt difficultly brought to yield good crops. In this caſe, lime will be as ſerviceable as it was detrimental in the other: for, by its ſeptic qualities, it will continually reduce more and more of the ſoil to a putrid ſtate; and thus there will be a conſtant ſucceſſion of better and better crops, by the continued uſe of lime, when the quantity firſt laid on has exerted all its force. By a continued uſe of this manure, the ground will be gradually brought nearer and nearer the nature of garden-mould; and, no doubt, by proper care might be made as good as any: but it will be as great a miſtake to imagine, that, by the uſe of lime, this kind of ſoil may be rendered perpetually fertile, as to think that the other was naturally ſo; for though lime enriches this ſoil, it does ſo, not by adding vegetable food to it, but by preparing what it already contains; and when all is properly prepared, it muſt as certainly be exhauſted as in the other caſe.

28
Poor ſoils how reſtored.

Here then we have examples of two kinds of *poor* ſoils, the one of which is totally deſtroyed, the other greatly improved, by lime, and which therefore require very different manures; lime being more proper for the laſt than dung; and dung, being more proper to reſtore an exhauſted ſoil than lime, ought only to be uſed for the firſt. Beſides dunging land which has been exhauſted by long cropping, it is of great ſervice to let it lie fallow for ſome time; for to this it owed its original fertility, and what gave the fertility originally cannot fail to reſtore it in ſome degree.

By attending to the diſtinction between the reaſons for the poverty of the two ſoils juſt now mentioned, we will always be able to judge with certainty in what caſes lime is to be uſed, and when dung is proper. The mere poverty of a ſoil is not a criterion whereby we can judge; we muſt conſider what hath made it poor. If it is naturally ſo, we may almoſt infallibly conclude that it will become better by being manured with lime. If it is *artificially* poor, or exhauſted by continual cropping, we may be as certain that lime will entirely deſtroy it.—We aprehend that it is this *natural* kind of poverty only which Mr Anderſon ſays, in his Eſſays on Agriculture, may be remedied by lime; for we can ſcarce think that experience would direct any perſon to put lime upon land already exhauſted. His words are.

29
Mr Anderſon's opinion concerning lime.

> "Calcareous matters act as powerfully upon land that is naturally poor, as upon land that is more richly impregnated with thoſe ſubſtances that tend to produce a luxuriant vegetation."

"Writers on agriculture have long been in the cuſtom of dividing manures into two claſſes, *viz. Enriching* manures, or thoſe that tended directly to render the ſoil more prolific, however ſterile it may be; among the foremoſt of which was dung: *Exciting* manures, or thoſe that were ſuppoſed to have a tendency to render the ſoil more prolific, merely by acting upon thoſe enriching manures that had been formerly in the ſoil, and giving them a new ſtimulus, ſo as to enable them to operate anew upon that ſoil which they had formerly fertilized. In which claſs of ſtimulating manures, *lime* was always allowed to hold the foremoſt place."

"In conſequence of this theory, it would follow, that lime could only be of uſe as a manure when applied to rich ſoils,—and, when applied to poor ſoils, would produce hardly any, or even perhaps hurtful, effects."

"I will frankly acknowledge that I myſelf was ſo far impoſed upon by the beauty of this theory, as to be hurried along with the general current of mankind, in the firm perſuaſion of the truth of this obſervation, and for many years did not ſufficiently advert to thoſe facts that were daily occurring to contradict this theory.—I am now, however, firmly convinced, from repeated obſervations, that lime, and other calcareous manures, produce a much greater *proportional* improvement upon poor ſoils, than on ſuch as are richer.—And that lime alone, upon a poor ſoil, will, in many caſes, produce a much greater and more laſting degree of fertility than dung alone."

Thus far Mr Anderſon's experience is exactly conformable to the theory we have laid down, and what ought to happen according to our principles. He mentions, however, ſome facts which ſeem very ſtrongly to militate againſt it; and indeed he himſelf ſeems to proceed upon a theory altogether different.

30 Query concerning the nature of a proper ſoil.

"Calcareous matter alone" (ſays he) "is not capable of rearing plants to perfection;—mould is neceſſary to be mixed with it in certain proportions, before it can form a proper ſoil. It remains, however, to be determined what is the due proportion of theſe ingredients for forming a proper ſoil.

"We know that neither chalk, nor marle, nor lime, can be made to nouriſh plants alone; and ſoils are ſometimes found that abound with the two firſt of theſe to a faulty degree. But the proportion of calcareous matter in theſe is ſo much larger than could ever be produced by art, where the ſoil was naturally deſtitute of theſe ſubſtances, that there ſeems to be no danger of erring on that ſide. Probably it would be much eaſier to correct the defects of thoſe ſoils in which calcareous matters ſuper-abound, by driving earth upon them as a manure, than is generally imagined; as a very ſmall proportion of it ſometimes affords a very perfect ſoil. I ſhall illuſtrate my meaning by a few examples.

31 Examples of ſoil perpetually fertile.

"Near Sandſide, in the county of Caithneſs, there is a pretty extenſive plain on the ſea-coaſt, endowed with a moſt ſingular degree of fertility. In all ſeaſons it produces a moſt luxuriant herbage, altho' it never got any manure ſince the creation; and has been, for time immemorial, ſubjected to the following courſe of crops.

"1. Bear, after once ploughing from graſs, uſually a good crop.

"2. Bear, after once ploughing, a better crop than the firſt.

"3. Bear, after once ploughing, a crop equal to the firſt.

"4. 5. and 6. Natural-graſs, as cloſe and rich as could be imagined, might be cut, if the poſſeſſor ſo inclined, and would yield an extraordinary crop of hay each year.

"After this the ſame courſe of cropping is renewed. The ſoil that admits of this ſingular mode of farming, appears to be a pure incoherent ſand, deſtitute of the ſmalleſt particle of vegetable mould; but, upon examination, it is found to conſiſt almoſt entirely of broken ſhells: the fine mould here bears ſuch a ſmall proportion to the calcareous matter, as to be ſcarce perceptible, and yet it forms the moſt fertile ſoil that ever I yet met with.

"I have ſeen many other links (downs) upon the ſea-ſhore, which produced the moſt luxuriant herbage, and the cloſeſt and ſweeteſt pile of graſs, where they conſiſted of ſhelly ſand, which, without doubt, derive their extraordinary fertility from that cauſe.

"A very remarkable plain is found in the iſland of *Jir-eye*, one of the Hebrides. It has been long employed as a common; ſo that it has never been diſturbed by the plough, and affords annually the moſt luxuriant crop of herbage, conſiſting of white clover, and other valuable paſture-graſſes, that can be met with any where. The ſoil conſiſts of a very pure ſhelly ſand.

"From theſe examples I think it is evident, that a very ſmall proportion of vegetable mould is ſufficient to render calcareous matter a very rich ſoil. Perhaps, however, a larger proportion may be neceſſary when it is mixed with clay than with ſand; as poor chalky ſoils ſeem to be of the nature of that compoſition."

To theſe examples brought by Mr Anderſon, we may add ſome of the ſame kind mentioned by Lord Kaimes. His Lordſhip having endeavoured to eſtabliſh the theory of water being the only food of plants, tho' he himſelf frequently deviates from that theory, yet thinks it poſſible, upon ſuch a principle, to make a ſoil perpetually fertile.

"To recruit," (ſays he,) "with vegetable food, a ſoil impoveriſhed by cropping, has hitherto been held the only object of agriculture. But here opens a grander object, worthy to employ our keeneſt induſtry, that of making a ſoil perpetually fertile. Such ſoils actually exiſt; and why ſhould it be thought, that imitation here is above the reach of art? Many are the inſtances of nature being imitated with ſucceſs. Let us not deſpair, while any hope remains; for invention never was exerciſed upon a ſubject of greater utility. The attempt may ſuggeſt proper experiments: it may open new views: and if we fail in equalling nature, may we not, however, hope to approach it? A ſoil perpetually fertile muſt be endowed with a power to retain moiſture ſufficient for its plants; and at the ſame time muſt be of a nature that does not harden by moiſture. Calcareous earth promiſes to anſwer both ends: it prevents a ſoil from being hardened by water; and it may probably alſo invigorate its retentive quality. A field that got a ſufficient doſe of clay-marle, carried above 30 ſucceſſive rich crops, without either dung or fallow. Doth not a ſoil ſo meliorated draw near to one perpetually fertile? Near the eaſt ſide of Fife, the coaſt for a mile inward is covered with ſea-ſand, a foot deep or ſo; which is extremely fertile, by a mixture of ſea-ſhells reduced to powder by attrition. The powdered ſhells, being the ſame with ſhell-marle, make the ſand retentive of moiſture; and yet no quantity of moiſture will unite the ſand into a ſolid body. A ſoil ſo mixed, ſeems to be not far diſtant from one perpetually fertile. Theſe, it is true, are but faint eſſays; but what will not perſeverance accompliſh in a good cauſe?"

Having thus, in a manner, poſitively determined, with Mr Anderſon, that no doſe of calcareous matter can poſſibly be too great, we cannot help owning ourſelves ſurpriſed on finding his Lordſhip expreſſing himſelf as follows.

31 Inconſiſten- y in Lord aimes's heory.

"An over-doſe of ſhell-marle, laid perhaps an inch, and an inch and a half, or two inches thick, produces, for a time, large crops: but, at laſt, it renders the ſoil a *caput mortuum*, capable of neither corn nor graſs; of which there are too many inſtances in Scotland: the ſame probably would follow from an over-doſe of clay-marle, ſtone-marle, or pounded lime-ſtone."—To account for this, he is obliged to make a ſuppoſition directly contrary to his former one; namely, that calcareous matter renders the ſoil *incapable* of retaining water. This phenomenon, however, we think is ſolved upon the principles above laid down, in a ſatisfactory manner, and without the leaſt inconſiſtency.

33 erpetual rtility of ils chime- cal.

As to rendering ſoils perpetually fertile, we cannot help thinking the attempt altogether chimerical and vain. There is not one example in nature of a ſoil perpetually fertile, where it has no ſupply but from the air, and the rain which falls upon it. The above recited examples can by no means be admitted as proofs of perpetual fertility. We know, that the graſs on the banks of a river is much more luxuriant than what grows at a diſtance: the reaſon is, that the water is attracted by the earth, and communicates its fertilizing qualities to it; but was the river to be dried up, the graſs would ſoon become like the reſt. Why ſhould not the ocean have the ſame power of fertilizing plains near its ſhores, that rivers have of fertilizing ſmall ſpots near their banks? We ſee, however, that it hath not; for the ſea-ſhores are generally ſandy and barren. The reaſon of this is, that the waters of the ocean contain a quantity of looſe acid *; and this acid is poiſonous to plants; but, abſtracting this acid part, we heſitate not to affirm, that ſea-water is more fertilizing than river-water. It is impoſſible to know how far the waters of the ocean penetrate under ground, through a ſandy ſoil. Where they meet with nothing to abſorb their acid, there the ground is quite barren: but, in paſſing through an immenſe quantity of broken ſhells, the calcareous matter, we are very certain, will abſorb all the acid; and thus the ſoil will be continnally benefited by its vicinity to the ocean. All the above fields, therefore, are evidently ſupplied with nouriſhment from the ocean: for, if the ſalt-water has ſufficient efficacy to render fields which are in its neighbourhood barren, why ſhould it not render them fertile when the cauſe of barrenneſs is removed from its waters?

* ee *Water*.

After all, the field in Caithneſs, mentioned by Mr Anderſon, ſeems to have been perpetually fertile only in graſs: for though, the ſecond year, it carried a better crop of bear than it did the firſt; yet, the third year, the crop was worſe than the ſecond, and only equal to the firſt. Had it been ploughed a fourth time, the crop would probably have been worſe than the firſt. Ground is not near ſo much exhauſted by graſs as corn, even though the crop be cut, and carried off; and ſtill leſs, if it only feeds cattle, and is manured by their dung; which appears to have been the caſe with this field. Lord Kaimes, indeed, mentions fields in Scotland, that, paſt memory, have carried ſucceſſive crops of wheat, peaſe, barley, oats, without a fallow, and without a manure; and particularizes one on the river Carron, of nine or ten acres, which had carried 103 crops of oats without intermiſſion, and without manure: but as we are not acquainted with any ſuch fields, nor know any thing about their particular ſituation, we can form no judgment concerning them.

34 Clay and ſandy ſoils.

Beſides the two kinds of ſoils abovementioned, there are others, the principal ingredient of which is clay, or ſand. The firſt of theſe is apt to be hardened by the heat of the ſun, ſo that the vegetables can ſcarce penetrate it in ſuch a manner as to receive proper nouriſhment. The ſecond, if it is not ſituated ſo as to receive a great deal of moiſture, is very apt to be parched up in ſummer, and the crop deſtroyed; nor has it ſufficient adheſion to ſupport plants that have few roots and grow high. From theſe oppoſite qualities, it is evident, that theſe two ſoils would be a proper manure for one another; the clay would give a ſufficient degree of firmneſs to the ſand, and the ſand would break the too great tenacity of the clay. According to Dr Home's experiments, however, ſand is the worſt manure for clay that can be uſed. He recommends marle moſt. To reduce clay-ground as near as poſſible to the form of pure vegetable mould, it muſt firſt be pulverized. This is moſt effectually performed by ploughing and harrowing; but care muſt be taken not to plough it whilſt too wet, otherwiſe it will concrete into hard clots, which can ſcarcely be broken. After it is pulverized, however, ſome means muſt be taken to keep it from concreting again into the ſame hard maſſes as before. According to Lord Kaimes, though clay, after pulverization, will concrete into as hard a maſs as before, if mixed with water; yet if moiſtened with dunghill juice, it will not concrete any more. Lime alſo breaks its tenacity, and is very uſeful as a manure for this kind of ſoil.

35 Fertility of the earth limited.

The concluſion we wiſh the practical farmer to draw from our theory is, That there is a certain limit to the fertility of the earth, both as to duration, and to degree, at any particular time: that the nearer any ſoil approaches to the nature of pure garden-mould, the nearer it is to the moſt perfect degree of fertility; but that there are no hopes of keeping it perpetually in ſuch a ſtate, or in any degree of approximation to it, but by conſtant and regular manuring with dung. Lime, chalk, marle, &c. may be proper to bring it near to this ſtate, but are abſolutely unfit to keep it continually ſo. They may indeed for ſeveral years produce large crops: but the more they increaſe the fertility for ſome years, the ſooner will they bring on an abſolute barrenneſs; while regular manuring with plenty of dung, will always enſure the keeping up the ſoil in good condition, without any occaſion for fallow. What we have ſaid concerning the uſe of lime, &c. applies likewiſe to the practice of frequent ploughing, though in a leſs degree. This tends to meliorate ground that is naturally poor, by giving an opportunity to the vegetable parts to putrefy; but, when that is done, it tends to exhauſt, though not ſo much as lime. A judicious farmer will conſtantly ſtrive to keep his lands always in good condition, rather than to make them ſuddenly much better; leſt a few years ſhould convince him that he was in reality doing almoſt irreparable miſchief, while he fancied himſelf making improvements. As for the ridiculous notions of ſtimulating the ground by ſaline manures, we hope they will never enter the brain of any rational practitioner of agriculture.

Sect. IV. *Of the different kinds of Vegetables proper to be raiſed with a view to the Melioration of Soil.*

36 Soil pulveriſed by certain vegetables.

The methods of meliorating ſoils, which we have mentioned above, conſiſting of tedious and laborious operations that yield no return at firſt, it is natural for a farmer to wiſh for ſome method of meliorating his ground, and reaping crops at the ſame time. One very conſiderable ſtep towards the melioration of ground, is its pulveriſation. This is accompliſhed by repeated ploughings, as already mentioned; eſpecially if performed in autumn, that the ground may be expoſed to the winter's froſt; but theſe ploughings yield no crop, as long as the field is not ſown. By planting in the field, however, thoſe vegetables whoſe roots ſwell to a conſiderable bulk, the ground muſt conſtantly be acted upon by the ſwelling of their roots in all directions; and thus the growing of the crop itſelf, may be equal, or ſuperior, in efficacy to ſeveral ploughings, at the ſame time that the farmer enjoys the benefit of it. The plant moſt remarkable for the ſwelling of its roots, is the potatoe; and by none is the ground meliorated more, or even ſo much. They are not, however, equally proper for all ſoils. In clay they do not thrive, nor are palatable; but in hard gravelly or ſandy ſoils, they grow to a large ſize, and are of an excellent quality. Turneps likewiſe contribute to meliorate the ground, by the ſwelling of their roots, though not ſo much as potatoes. They have this advantage, however, that they will thrive in almoſt any ſoil. In clay ground, peaſe and beans thrive exceedingly well, and therefore are proper in this kind of ſoil as a preparatory for other kinds of grain. Theſe puſh their roots deep into the ground, and cover it with their leaves more than other crops; ſo that the ſun has not ſo much acceſs, as when it is covered with other kinds of grain. Where-ever any of theſe kinds of vegetables are raiſed, it is obſervable that more or leſs blackneſs is communicated to the ſoil: an evident ſign of its melioration; this being the colour of the true vegetable mould, or *loamy ſoil*, as it is called.

Beſides the above-mentioned plants, carrots, parſnips, cabbages, and all thoſe vegetables which ſink their roots deep in the ground, anſwer the ſame purpoſe of looſening and pulverizing the earth; but as they will not thrive but on ground already well cultivated, they cannot be raiſed to any advantage for the purpoſe of meliorating a poor ſoil.

It hath been cuſtomary in many places, particularly in England, to ſow turnip, peaſe, buck-wheat, &c. and then to plough them down for manuring the land.—This, being ſimilar to that operation of nature by which ſhe renders the uncultivated ſoils ſo exceedingly fertile, cannot fail of being attended with ſingular advantages; and might be looked upon as preferable even to driving dung on the land to fatten it, was it not attended with the entire loſs of a crop for that year.

Sect. V. *Of deſtroying Weeds.*

What we have already ſaid regarding the cultivation of the ſoil, reſpects only the fitting it for producing all kinds of vegetables indiſcriminately. Experience, however, ſhews, that the ground is naturally much more diſpoſed to produce and nouriſh ſome kinds of vegetables than others; and thoſe which the earth ſeems moſt to delight in, are commonly ſuch as are of very little uſe to man; but if neglected, will increaſe to ſuch a degree as entirely to deſtroy the plants intended to be raiſed, or at leaſt hinder them from coming to perfection, by depriving them of nouriſhment. The clearing the ground of weeds, therefore, is an article no leſs neceſſary in agriculture, than the diſpoſing it to produce vegetables of any kind in plenty.

37 Weeds divided into annual and perennial.

The weeds may be divided, according to the time of their duration, into *annual*, or ſuch as ſpring from a ſeed, and die the ſame year; and *perennial*, that is, ſuch as are propagated by the roots, and laſt for a number of years. The firſt kind are the leaſt noxious, and moſt eaſily deſtroyed. For this purpoſe it will be ſufficient to let them ſpring up till near the time of ripening their ſeed, and then plough them down before it comes to maturity. It is alſo of ſervice to deſtroy ſuch weeds as grow in borders, or neglected corners, and frequently ſcatter their ſeeds to a great diſtance; ſuch as the thiſtle, dandelion, rag-weed, &c. for theſe are ſufficient to propagate their ſpecies through a deal of ground; as their ſeeds are carried about with the wind to very conſiderable diſtances. A farmer ought alſo to take care, that the ſmall ſeeds of weeds, ſeparated from corn in winnowing, be not ſown again upon the ground; for this certainly happens, when they are thrown upon a dunghill; becauſe, being the natural offspring of the earth, they are not eaſily deſtroyed. The beſt method of preventing any miſchief from this cauſe, would be to burn them.

38 Perennial weeds how deſtroyed.

Perennial weeds cannot be effectually deſtroyed, but by removing the roots from the ground, which is often a matter of ſome difficulty. Many of theſe roots ſtrike ſo deep in the ground, that they can ſcarcely be got out. The only method that can be depended upon in this caſe, is frequent ploughing, to render the ground as tender as poſſible; and harrowing with a particular kind of harrow which ſhall hereafter be deſcribed, in order to collect theſe pernicious roots. When collected, they ought to be dried and burnt, as the only effectual method of inſuring their doing no further miſchief.

There is a particular ſpecies of weed, peculiar only to graſs-lands, of a ſoft ſpungy nature, called *fog*, which it is found very difficult to exterminate. Where the land can be conveniently tilled, this weed may be deſtroyed by covering it with a crop of peaſe, potatoes, &c.: or, paſſing a heavy roller over the ground will be of great ſervice; for fog owes its origin to too great a laxity of the ſoil, and will not grow upon firm ground.

39 Broom, furze, &c. how deſtroyed.

Beſides theſe kinds of weeds which are of an herbaceous nature, there are others which are woody, and grow to a very conſiderable ſize; ſuch as broom, furze or whins, and thorns. *Broom* is an evergreen ſhrub, that thrives beſt in ſandy ſoil; and there it grows ſo vigorouſly, as ſcarce to admit any graſs under it. It propagates by ſeed which grows in pods; and theſe, when fully ripe, break with violence, ſcattering the ſeeds all around. Thus, a field which is overgrown with broom, beſides the old plants, always contains an infinite number of young ones; ſo that though the old plants die when cut over, a freſh crop conſtantly ſprings up. It may, however, be deſtroyed by frequent ploughing and harrowing, in the ſame manner as other perennial weeds are; for it does not for ſome time carry any ſeed, and the frequent ploughing encourages the vegetation of all thoſe that are already in the ground, which cannot fail of being deſtroyed by frequent repetitions of the operation. Another method of deſtroying broom, is, by paſturing the field where it grows, with ſheep. A few of the old buſhes may be left as a ſhelter, and theſe will be in a good meaſure prevented from ſpreading by the cropping of the ſheep. Theſe animals are very fond of broom, and greedily devour every young ſhoot; ſo that if any remain after the firſt year, there will not be a veſtige the ſecond. If this method of extirpating broom is equally effectual with that of frequent ploughing, it is certainly much more profitable, as there is no food more nouriſhing to ſheep than young broom. Broom, however, is ſaid to have a ſingular effect upon ſheep: it makes them drunk ſo effectually, that, when heated with a little driving, they tumble over, and lie without motion.

The *whin* is a fine evergreen ſhrub, carrying a ſweet-ſmelling flower all the year round. It propagates both by ſeed, and by its roots, which ſpread ſometimes to the diſtance of ten or twelve feet; and hence, when once eſtabliſhed, it is very difficultly extirpated. The beſt method is to ſet fire to the whins in froſty weather; for froſt has the effect to wither whins, and make them burn readily. The ſtumps muſt then be cut over with a hatchet; and when the ground is well ſoftened by rain, it may be ploughed up, and the roots taken out by a harrow adapted to that purpoſe.—If the field is ſoon laid down to graſs, the whins will again ſpring up in great abundance, from the ſeeds, and ſmall parts of the roots left in the ground. In this caſe, paſturing with ſheep is an effectual remedy; as they are no leſs fond of young whins than of young broom; and if there are a ſufficient number, they will not leave a ſingle plant above ground. But if graſs is not immediately wanted, the moſt effectual method of clearing a field of whins, is by reiterated ploughings.

The *thorn*, or *bramble*, ſpreads its roots very wide, and at the ſame time ſinks them deep in the earth. Though cut in the winter, it riſes, and comes to ſuch perfection as to carry fruit in ſummer. It can only be extirpated by ploughing up the ground, and collecting the roots.

Sect. VI. *Of the moſt proper kinds of Vegetables to be raiſed for the purpoſes of feeding Cattle.*

Though this muſt be an article of the utmoſt conſequence to every farmer, we do not find that it has been much conſidered. Mr Anderſon ſeems to have been the firſt writer on agriculture who hath properly attended to this ſubject; and what he hath wrote upon it, is rather a catalogue of deſiderata, than any thing elſe: and indeed the deſiderata on this ſubject are ſo many and ſo great, that we muſt acknowledge ourſelves very unable to fill them up.——To attain to a competent knowledge in this reſpect, the following things muſt be taken into conſideration. (1.) The wholeſomeneſs of the food for cattle, with regard to health and ſtrength, or fatneſs. (2.) The quantity that any extent of ground is capable of yielding. (3.) The quantity neceſſary to feed the different kinds of cattle. (4.) The labour of cultivation; and, (5.) The ſoil they require to bring them to perfection, and the effect they have upon it.

40
Qualities of
e food re-
iſite for
tle.

With regard to the wholeſomeneſs, it is plain, that as the natural food of wild cattle is the green ſucculent plants they meet with all the year round, food of this kind, could it be had, muſt be preferable to hay; and accordingly we find that cattle will always prefer ſucculent vegetables where they can get them. To find plants of this kind, and having proper qualities in other reſpects, we muſt ſearch among thoſe which continue green all the year round, or come to their greateſt perfection in the winter-time.—Of theſe, cabbages bid fair for holding the firſt place; both as being very ſucculent, and a very large quantity of them growing upon a ſmall ſpace of ground. In Mr Young's Six Months Tour, we have an account of the produce of cabbages in many different places, and on a variety of ſoils. The produce by Mr Crow at Keplin, on a clay ſoil, was, on an average of ſix years, 35 tons per acre; by Mr Smelt at the Leaſes, on a ſandy gravel, 18 tons per acre; by Mr Scroop at Danby, on an average of ſix years, 37 tons per acre: and the general average of all the accounts giving by Mr Young, is 36 tons per acre.

41
Cabbages, their properties.

Cabbages, however, have the great inconveniency of ſometimes imparting a diſagreeable flavour to the milk of cows fed with them, and even to the fleſh of other cattle. This, it is ſaid, may be prevented by carefully picking off the decayed and withered leaves: and very probably this is the caſe; for no vegetable inclines more to putrefaction than this; and therefore particular care ought to be taken to pull off all the leaves that have any ſymptoms of decay. Dr Prieſtley found that air was rendered noxious by a cabbage-leaf remaining in it for one night, though the leaf did not ſhew any ſymptom of putrefaction.—For milk-cows, probably the cabbages might be rendered more proper food by boiling them.

42
Air rendered noxious by them.

Turnips likewiſe produce very bulky crops, though far inferior to thoſe of cabbages. According to Mr Young's calculation, the fineſt ſoil does not produce upabove five tons of turnips per acre; which is indeed a very great diſproportion: but poſſibly ſuch a quantity of turnips may not be conſumed by cattle as of cabbages; an ox, of 80 ſtone weight, eat 210 ℔ of cabbages in 24 hours, beſides ſeven ℔ of hay.

43
Turnips.

Carrots are found to be an excellent food for cattle of all kinds, and are greatly reliſhed by them. In a rich ſand, according to Mr Young's account, the produce of this root was 200 buſhels per acre. In a finer ſoil, it was 640 buſhels per acre. A lean hog was fatted by carrots in ten days time: he eat 196 ℔; and his fat was very fine, white, firm, and did not boil away in the dreſſing. They were preferred to turnips by the cattle; which having taſted the carrots, ſoon became ſo fond of them as difficultly to be made to eat the turnips at all. It is probable, indeed, that carrots will make a more wholeſome food for cattle than either cabbages or turnips, as they are ſtrongly antiſeptic; inſomuch as to be uſed in poultices for correcting the ſanies of cancers. It is probably owing to this, that the milk of cows fed on carrots is never found to have any bad taſte. Six horſes kept on them thro' the winter without oats, performed their work as uſual, and looked equally well. This may be looked upon as a proof of their ſalubrity as a food; and it certainly can be no detriment to a farmer to be ſo much verſant in medical matters as to know the impropriety of giving

44
Carrots.

giving putreſcent food to his cattle. It is well known, what a prodigious difference there is in the health of the human ſpecies when fed on putrid meats, in compariſon of what they enjoy when ſupplied with food of a contrary nature; and why may there not be a difference in the health of beaſts, as well as of men, when in ſimilar circumſtances?—It is alſo very probable, that as carrots are more ſolid than cabbages or turnips, they will go much farther in feeding cattle than either of them. The above-mentioned example of the hog, ſeems ſome kind of confirmation of this; he being fed, for ten days together, with 21 ℔ leſs weight of carrots, than what an ox devoured of cabbages and hay in one day. There is a great diſproportion, it muſt be owned, between the bulk of an ox, and that of a hog; but we can ſcarce think that an ox will eat as much at a time as ten hogs. At Parlington in Yorkſhire, 20 work horſes, four bullocks, and ſix milk-cows, were fed on the carrots that grew in three acres, from the end of September till the beginning of May; and the animals never taſted any other food but a little hay. The milk was excellent, and thirty hogs were fattened upon what was left by the other cattle.

45 Potatoes.

Potatoes likewiſe appear to be a very palatable food for all kinds of cattle; and not only oxen, hogs, *&c.* are eaſily fed by them, but even poultry. The cheapneſs of potatoes compared with other kinds of food for cattle, cannot well be known, as, beſides the advantage of the crop, they improve the ground more than any other known vegetable. The quantities of this root required to feed different kinds of cattle are not known, nor how far the food itſelf is ſalutary; though it is probable, that as the human ſpecies find no detriment from the uſe of potatoes, neither will cattle of any kind.

The above-mentioned vegetables have all of them the property of meliorating, rather than exhauſting the ſoil; and this is certainly a very valuable qualification: but carrots and cabbages will not thrive except in ſoils that are already well cultivated; while potatoes and turnips may be uſed as the firſt crops of a ſoil with great advantage. In this reſpect, they are greatly ſuperior to the others; as it may be diſagreeable to take up the beſt grounds of a farm with plants deſigned only for food to cattle.

46 Whins an excellent food for horſes.

Whins have lately been recommended as a very proper food for cattle, eſpecially horſes; and are recommended by Mr Anderſon, in a particular manner. They have this advantage, that they require no culture, and grow on the very worſt ſoil; but they are troubleſome to cut, and require to be bruiſed in a mill conſtructed for this purpoſe; neither is the ground at all meliorated by letting whins grow upon it for any length of time. Notwithſtanding theſe diſadvantages, however, as whins continue green all the year round, and when bruiſed will afford an excellent ſucculent food, which ſeems poſſeſſed of ſtrongly invigorating qualities, they may be looked upon as the cheapeſt winter-food that can poſſibly be given to cattle.—According to the calculations of Mr Eddiſon of Gateford, a ſingle acre, well cropped with whins, will winter ſix horſes: at three or four years growth, the whole crop ſhould be taken, cut cloſe to the ground, and carried to the mill; in which the whins are to be bruiſed, and then given to the horſes. Four acres ought to be planted, that one may be uſed each year, at the proper age to be cut; and he reckons the labour of one man ſufficient for providing food to this number of horſes. He ſays they all prefer the whins to hay, or even to corn.

47 Burnet.

The herb called *burnet* hath likewiſe been recommended as proper food for cattle, on account of its being an evergreen, and further recommended, by growing almoſt as faſt in winter as in ſummer. Of this herb, however, we have very various accounts. In a letter addreſſed by Sir James Caldwell F. R. S. to the Dublin Society, the culture of this plant is ſtrongly recommended on the authority of one Bartholomew Rocque, farmer at Walham-Green, a village about three miles ſouth-weſt of London.

48 Recommended by Sir James Caldwell.

What gave occaſion to the recommendation of this plant, was, that, about the year 1760, Mr Wych, chairman of the Committee of Agriculture of the London Society, for the encouragement of arts, manufactures, and commerce, came to Rocque (who was become very eminent by the premiums he had received from the ſociety), and told him, he had been thinking, that as there are many animals which ſubſiſt wholly upon the fruits of the earth, there muſt certainly be ſome plant or herb fit for them, that naturally vegetates in winter; otherwiſe we muſt believe the Creator, infinitely wiſe and good, to have made creatures without providing for their ſubſiſtence; and that if there had been no ſuch plants or herbs, many ſpecies of animals would have periſhed before we took them out of the hands of nature, and provided for them dry meat at a ſeaſon, when, indigenous plants having been indiſcriminately excluded, under the name of weeds, from cultivated fields and places ſet apart for natural graſs, green or freſh meat was no longer to be found.

Rocque allowed the force of this reaſoning; but ſaid, the knowledge of a graſs, or artificial paſture, that would vegetate in winter, and produce green fodder for cattle, was loſt; at leaſt, that he knew of no ſuch plant.—Mr Wych, however, knowing how very great the advantage would be of diſcovering a green fodder for winter, and early in the ſpring, wrote to Bern, and alſo to ſome conſiderable places in Sweden, ſtating the ſame argument, and aſking the ſame queſtion. His anſwers to theſe letters were the ſame that had been given by Rocque. They owned there muſt be ſuch a plant, but declared they did not know it.

Mr Wych then applied again to Rocque; and deſired him to ſearch for the plant ſo much deſired, and ſo certainly exiſting. Rocque ſet about this ſearch with great aſſiduity, and finding that a pimpernel, called *burnet*, was of very ſpeedy growth, and grew near as faſt in winter as in ſummer, he took a handful of it and carried it into his ſtable, where there were five horſes, every one of which eat of it with the greateſt eagerneſs; ſnatching it even without firſt ſmelling it. Upon the ſucceſs of this experiment he went to London, and bought all the burnet-ſeed he could get, amounting to no more than eight pounds, it having been only uſed in ſallads; and he paid for it at the rate of 4 *s.* a pound. Six of the eight pounds of ſeed he ſowed upon half an acre of ground, in March, in the year 1761, with a quarter of a peck of ſpring-wheat, both by hand. The ſeed being very bad, it came up but thin. However, he ſowed the other two pounds in the beginning of June, upon about ſix rood of ground: this he mowed in the beginning of Auguſt; and at Michaelmaſs he planted off the plants on about 20 rood of ground, giving each plant a foot every way, and taking care not to bury the heart. Theſe plants bore two crops of ſeed the year following; the firſt about the middle of June, the ſecond about the middle of September; but the June crop was the beſt. The year after, it grew very rank, and produced two crops of ſeed, both very good. As it ought not to be cut after September, he let it ſtand till the next year; when it ſheltered itſelf, and grew very well during all the winter, except when there was a hard froſt; and even during the froſt it continued green, though it was not perceived to grow. In the March following it covered the ground very well, and was fit to receive cattle.

If the winter is not remarkably ſevere, the burnet, though cut in September, will be 18 inches long in March; and it may be fed from the beginning of February till May: if the cattle are taken off in May, there will be a good crop of ſeed in the beginning of July. Five weeks after the cattle are taken off, it may be removed, if that is preferred to its ſtanding for ſeed; it grows at the rate of an inch a-day, and is made into hay like other graſs. It may be mown three times in one ſummer, and ſhould be cut juſt before it begins to flower. Six rood of ground has produced 1150 pounds at the firſt cutting of the third year after it was ſowed; and, in autumn 1763, Rocque ſold no leſs than 300 buſhels of the ſeed.

According to Rocque, the ſoil in which burnet flouriſhes beſt is a dry gravel; the longeſt drought never hurts it: and Sir James Caldwell aſſerts, that he ſaw a very vigorous and exuberant plant of this kind, growing from between two bricks in a wall in Rocque's ground, without any communication with the ſoil; for he had cut away all the fibres of the root that had ſtretched downward, and penetrated the earth, long before.

Burnet was found equally fit for feeding cows, ſheep, and horſes; but the ſheep muſt not be ſuffered to crop it too cloſe. Though no ſeed was left among the hay, yet it proved nouriſhing food; and Rocque kept a horſe upon nothing elſe, who, at the time of writing the account, was in good heart, and looked well. He affirmed alſo, that it cured horſes of the diſtemper called the *greaſe*, and that by its means he cured one which was thought incurable; but ſays it is only the firſt crop which has this effect.

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This is the ſubſtance of Sir James Caldwell's letter to the Dublin ſociety, at leaſt as to what regards the culture of burnet; and it might reaſonably be expected, that a plant, whoſe uſe was recommended to the public with ſo much parade, would ſoon have come into univerſal eſteem. We were ſurpriſed, therefore, on looking into Mr Miller's Dictionary, to find the following words, under the article *Poterium*:—"This plant has of late been recommended by *perſons of little ſkill*, to be ſown as a winter pabulum for cattle: but whoever will give themſelves the trouble to examine the grounds where it naturally grows, will find the plants left uneaten by the cattle, when the graſs about them has been cropped to the roots; beſides, in wet winters, and in ſtrong land, the plants are of ſhort duration, and therefore very unfit for that purpoſe: nor is the produce ſufficient to tempt any perſon of ſkill to engage in its culture; therefore I wiſh thoſe perſons to make trial of it in ſmall quantities, before they embark largely in theſe new ſchemes."—Mr Anderſon, too, in his Eſſays on Agriculture, mentions the produce of burnet being ſo ſmall, as not to be worth cultivating.

50
White beet recommended.

Upon the authority of Mr Rocque, likewiſe, the white beet is recommended as a moſt excellent food for cows; that it vegetates during the whole winter, conſequently is very forward in the ſpring; and that the moſt profitable way of feeding cows is, to mow this herb, and give it to them green all the ſummer. It grew in Rocque's garden, during a very great drought, no leſs than four feet high, from the 30th of May to the 3d of July; which is no more than one month and four days. In ſummer it grows more than an inch a-day, and is beſt ſown in March: a buſhel is enough for an acre, and will not coſt more than 10 ſhillings. It thrives beſt in a rich, deep, light ſoil: the ſtalks are very thick and ſucculent; the cows ſhould therefore eat them green.

51
Sheeps feſcue-graſs.

In Mr Anderſon's eſſays, we find it recommended to make trial of ſome kinds of graſſes, which probably would not only anſwer for freſh fodder during the winter, but might alſo be cut for hay in ſummer. This is particularly the caſe with that ſpecies called *ſheep's feſcue-graſs*. "I had," (ſays he) "a ſmall patch of this graſs in winter 1773; which, having been cut in the month of Auguſt or September preceding, was ſaved from that period, and had advanced before winter to the length of five or ſix inches; forming the cloſeſt pile that could be imagined. And although we had about ſix weeks of very intenſe froſt, with ſnow; and about other ſix weeks, immediately ſucceeding that, of exceeding keen froſt every night, with frequent thaws in the day-time without any ſnow, during which time almoſt every green thing was deſtroyed; yet this little patch continued all along to retain as fine a verdure as any meadow in the month of May; hardly a point of a leaf having been withered by the uncommon ſeverity of the weather. And as this graſs begins to vegetate very early in the ſpring, I leave the reader to judge what might be the value of a field of graſs of this kind in theſe circumſtances."

52
Purple feſcue.

Of another kind of graſs, called *purple feſcue*, Mr Anderſon gives the following character. "It retained its verdure much better than rye-graſs during the winter-ſeaſon; but it had more of its points killed by the weather than the former. It likewiſe riſes in the ſpring, at leaſt as early as rye-graſs."

This ingenious farmer has alſo made experiments on the culture of theſe and ſeveral other kinds of graſſes; which being very well worthy of attention, we ſhall here inſert.

1. *Purple feſcue-graſs*. "Although this graſs is very often found in old paſtures, yet as it has but few flower-ſtalks, and as it is greedily eat by all domeſtic animals, theſe are ſeldom ſuffered to appear; ſo that it uſually remains there unperceived. But it ſeems to be better able to endure the peculiar acrimony of the dung of dogs than almoſt any other plant; and is therefore often to be met with in *dog-hills*, as I call the little hills by road-ſides where dogs uſually piſs and dung: and as it is allowed to grow there undiſturbed, the farmer may have an opportunity of examining the plant, and becoming acquainted with its appearance.

"The leaves are long and ſmall, and appear to be roundiſh, ſomething like a wire; but, upon examination, they are found not to be tubulated like a reed or ruſh; the ſides of the leaf being only folded together from the middle rib, exactly like the ſtrong bent-graſs on the ſea-ſhore. The flower-ſtalk is ſmall, and branches out in the head, a little reſembling the wild-oat; only the grains are much ſmaller, and the ear does not ſpread full open, but lies bending a little to one ſide. The ſtalks are often ſpotted with reddiſh freckles, and the tops of the roots are uſually tinged with the ſame colour; from whence it has probably obtained its diſtinctive name of *feſtuca rubra*, or *red (purple) feſcue*.

"It is often to be met with in old garden-walks; and, as its leaves advance very quickly after cutting, it may uſually be diſcovered above the other graſſes, about a week or fortnight after the walks are cut. Nor do they ſeem to advance only at one ſeaſon, and then ſtop and decay, like the rye-graſs; but continue to advance during the whole of the ſummer, even where they are not cut; ſo that they ſometimes attain a very great length. Laſt ſeaſon, (1774,) I meaſured a leaf of this graſs, that ſprung up in a neglected corner, which was four feet and four inches in length, although not thicker than a ſmall wire. It is unneceſſary to add, that theſe leaves naturally trail upon the ground, unleſs where they meet with ſome accidental ſupport; and that if any quantity of it is ſuffered to grow for a whole ſeaſon, without being eat down or cut, the roots of the leaves are almoſt rotted, by the overſhadowing of the tops of the other leaves, before the end of the ſeaſon.

53
Appearance in its cultivated ſtate.

"This is the appearance and condition of the plant in its native ſituation: as it is ſeldom that it is diſcovered but in pretty old paſtures, and as in that ſtate it carries only a very few ſeed-ſtalks, it was with ſome difficulty that I could collect a ſmall handful of the ſeed, which I carefully ſowed in a ſmall patch of garden-mould, to try if it could be eaſily cultivated. It came up as quickly as any other kind of graſs, but was at firſt as ſmall as hairs: the leaves, however, advanced apace; and were, before autumn, when the grain with which they had been ſowed was cut down, about 16 or 18 inches in length: but having been ſown very thin, it was neceſſary to pick out ſome other kinds of graſs that came up amongſt it, leſt it might have been choaked by them. Early next ſpring it advanced with prodigious vigour, and the tufts that were formed from every ſeed became exceeding large; ſo that it quickly filled the whole ground. But now the leaves were almoſt as broad as thoſe of common rye-graſs, and the two ſides only inclined a little towards one another from the mid-rib, without any appearance of roundneſs. In due time a great many ſeed-ſtalks ſprung out, which attained very nearly to the height of four feet, and produced ſeeds in abundance; which may be as eaſily ſaved as thoſe of common rye-graſs.

"The prodigious difference between this plant in its native and cultivated ſtate amazed me; but it was with a good deal of ſatisfaction that I found there would be no difficulty of procuring ſeeds from it, which I had much doubted of at firſt. It would ſeem, that nature hath endowed this plant with a ſtrong generative power during its youth, which it gradually loſes as it advances in age, (for the difference perceived in this caſe could not be attributed to the richneſs of the ſoil); and that, on the contrary, when it was old, the leaves advanced with an additional vigour, in proportion to the declining ſtrength of the flower-ſtalks: for the leaves of the young plant ſeldom exceed two feet, whereas numbers of the old leaves were near four feet in length.

"From theſe peculiarities in the growth of this plant, it would ſeem to promiſe to be of great uſe to the farmer; as he could reap from a field of it, for the firſt two or three years, as great a weight of hay as he could obtain from any of the culmiferous graſſes, (thoſe bearing a long jointed ſtalk); and, if he meant afterwards to paſture it, he would ſuffer no inconveniencies from the flower-ſtalks; and the ſucculent leaves that continue to vegetate during the whole ſummer, would at all times furniſh his cattle with abundance of wholeſome food. It has alſo been remarked, that this graſs riſes as early in the ſpring as rye-graſs; and continues green for the greateſt part of winter, which the other does not. It is moreover an abiding plant, as it ſeems never to wear out of the ground where it has once been eſtabliſhed. On all which accounts, it appears to me highly to merit the attention of the farmer; and well deſerves to have its ſeveral qualities, and the culture that beſt agrees with it, aſcertained by accurate experiments.

54
Sheeps feſcue deſcribed.

2. "*Sheeps feſcue-graſs*, or *feſtuca ovina*, is much praiſed by the Swediſh naturaliſts for its ſingular value as a paſture-graſs for ſheep; this animal being repreſented as fonder of it than of any other graſs, and fattening upon it more quickly than on any other kind of food whatever. And indeed, the general appearance of the plant, and its peculiar manner of growth, ſeems very much to favour the accounts that have been given us of it.

"This plant is of the ſame family with the former, and agrees with it in ſeveral reſpects; although they may be eaſily diſtinguiſhed from one another. Its leaves, like the former, in its natural ſtate, are always rounded, but much ſmaller; being little bigger than large horſe-hairs, or ſwines-briſtles, and ſeldom exceed ſix or ſeven inches in length. But theſe ſpring out of the root in tufts, ſo cloſe upon one another, that they reſemble, in this reſpect, a cloſe hair-bruſh more than any thing elſe I know: ſo that it would ſeem naturally adapted to form that thick ſhort pile of graſs in which ſheep are known chiefly to delight. Its flower-ſtalks are numerous, and ſometimes attain the height of two feet; but are more uſually about 12 or 15 inches high.

55
Its appea ance w cultivated

"Upon gathering the ſeeds of this plant, and ſowing them as the former, it was found that they ſprung up as quickly as any other kind of graſs; but the leaves are at firſt no bigger than a human hair. From each ſide ſprings up one or two of theſe hair-like filaments, that in a ſhort time ſend out new off-ſets, ſo as quickly to form a ſort of tuft, which grows larger and larger, till it at length attains a very large ſize, or till all the intervals are cloſed up, and then it forms the cloſeſt pile of graſs that it is poſſible to imagine. In April and May it puſhed forth an innumerable quantity of flower-ſtalks, that afforded an immenſe quantity of hay; it being ſo cloſe throughout, that the ſcythe could ſcarcely penetrate it. This was allowed to ſtand till the ſeeds ripened; but the bottom of the ſtalks were quite blanched, and almoſt rotted for want of air before that time.

"This was the appearance that it made the firſt year after it was ſowed: but I have reaſon to think, that, after a few years, it likewiſe produces fewer ſeed-ſtalks, and a greater quantity of leaves than at firſt. But however that may be, it is certain, that if theſe are eat down in the ſpring, it does not, like rye-graſs, perſiſt in a continued tendency to run to ſeed; but is at once determined to puſh forth a quantity of leaves without almoſt any ſtalks at all: and as all domeſtic animals, but more eſpecially ſheep, are extremely fond of this graſs, if they have liberty to paſture where it grows, they bite it ſo cloſe as never to ſuffer almoſt a ſingle ſeed-ſtalk to eſcape them; ſo that the botaniſt will often ſearch in vain for it, when he is treading upon it with his feet. The beſt way to diſcover it in any paſture, is to ſearch for it in winter, when the tufts of it may be eaſily diſtinguiſhed from every other kind of graſs, by their extraordinary cloſeneſs, and the deep green colour of the leaves.

56 What ſoil moſt proper

"It ſeems to grow in almoſt any ſoil; altho' it is imagined that it would flouriſh beſt in a light ſandy ſoil, as it can evidently live with leſs moiſture than almoſt any other kind of graſs; being often ſeen to remain in the ſods that have been employed in coping for ſtone-dykes, after all the other graſſes that grew in them have diſappeared. It is likewiſe found in poor barren ſoils, where hardly any other plant can be made to grow at all; and on the ſurface of dry worn-out peat-moſs, where no moiſture remains ſufficient to ſupport any other plant whatever: but in neither of theſe ſituations does it thrive; as it is there only a weak and unſightly plant, very unlike what it is when it has the good fortune to be eſtabliſhed upon a good ſoil; although it is ſeldomer met with in this laſt ſtate than in the former.

"I will not here repeat what has been already ſaid about the particular property that this plant poſſeſſes of continuing all winter; nor point out the benefits that the farmer may reap from this valuable quality.—He need not, however, expect to find any verdure in winter on ſuch plants as grow upon the looſe moſſy ſoil above-mentioned; for, as the froſt in winter always hoves up the ſurface of this ſoil, the roots of the plants are ſo lacerated thereby, as to make it, for ſome time in the ſpring, to all appearance dead. Nor will he often perceive much verdure in winter upon thoſe plants that grow upon poor hungry ſoils, which cannot afford abundant nouriſhment to keep them in a proper ſtate of vegetation at all times: but ſuch plants as grow on earthen dykes, which uſually begin to vegetate with vigour when the autumnal rains come on, for the moſt part retain their verdure at that ſeaſon almoſt as well as if they were in good garden-mould.

"I have been very particular in regard to this plant; becauſe, in as far as my obſervations have yet gone, it promiſes on many accounts to make a moſt valuable acquiſition to the farmer, and therefore juſtly demands a very particular ſhare of his attention."

57 cus lana-

3. The *holcus lanatus*, or creeping ſoft-graſs of Hudſon.—This is conſidered by our author as one of the moſt valuable kinds of meadow-graſſes; its pile being exceedingly cloſe, ſoft, and ſucculent. It delights much in moiſture, and is ſeldom found on dry ground, unleſs the ſoil is exceeding rich. It is often found on thoſe patches near ſprings, over which the water frequently flows; and may be known by the uncommon ſoftneſs and ſucculence of the blade, the lively light green colour of the leaves, and the matted intertexture of its roots. But, notwithſtanding the ſoftneſs of its firſt leaves, when the ſeed-ſtalks advance, they are rough to the touch, ſo that the plant then aſſumes a very different appearance from what we would have expected. The ear is branched out into a great number of fine ramifications ſomewhat like the oat, but much ſmaller.—This kind of graſs, however, would not be eaſily cultivated, on account of a kind of ſoft membrane that makes the ſeeds adhere to the ſtalk, and to one another, after they are ſeparated from it, as if they were intermixed with cobweb, ſo that it is difficult to get them ſeparated from the ſtalk, or to ſpread readily in ſowing. It ſpreads, however, ſo faſt by its running roots, that a ſmall quantity ſowed very thin, would be ſufficient to ſtock a large field in a ſhort time.

Theſe are the kinds of *graſſes*, properly ſo called, which have not as yet been cultivated, that Mr Anderſon thinks the moſt likely to be of value; but, beſides theſe, he recommends the following, of the pea-tribe.

58 Milk-vetch.

1. *Milk-vetch*, *liquorice-vetch*, or *milkwort*. This plant, in ſome reſpects, very much reſembles the common white clover; from the top of the root a great number of ſhoots come out in the ſpring, ſpreading along the ſurface of the ground every way around it; from which ariſe a great many cluſters of bright yellow flowers, exactly reſembling thoſe of the common broom. Theſe are ſucceeded by hard round pods, filled with ſmall kidney-ſhaped ſeeds. From a ſuppoſed reſemblance of a cluſter of theſe pods to the fingers of an open hand, the plant has been ſometimes called *ladies-fingers*. By others it is called *crow-toes*, from a fancied reſemblance of the pods to the toes of a bird. Others, from the appearance of the bloſſom, and the part where the plant is found, have called it *ſeal*, improperly *ſell-broom*. It is found plentifully almoſt every where in old graſs-fields; but as every ſpecies of domeſtic animal eats it, almoſt in preference to any other plant, it is ſeldom allowed to come to the flower in paſture-grounds, unleſs where they have been accidentally ſaved from the cattle for ſome time; ſo that it is only about the borders of corn-fields, or the ſides of incloſures to which cattle have not acceſs, that we have an opportunity of obſerving it. As it has been imagined that the cows which feed on theſe paſtures, where this plant abounds, yield a quantity of rich milk, the plant has, from that circumſtance, obtained its moſt proper Engliſh name of *milk-vetch*.

59 Its good qualities.

One of the greateſt recommendations of this plant is, that it grows in poor barren ground, where almoſt no other plant can live. It has been obſerved in ground ſo poor, that even heath, or ling, *(Erica Communis)* would ſcarcely grow; and upon bare obdurate clays, where no other plant could be made to vegetate; inſomuch that the ſurface remained entirely uncovered, unleſs where a plant of this kind chanced to be eſtabliſhed; yet even in theſe unfavourable circumſtances, it flouriſhed with an uncommon degree of luxuriance, and yielded as tender and ſucculent, though not ſuch abundant ſhoots, as if reared in the richeſt manured fields. In dry, barren ſands alſo, where almoſt no other plant could be made to live, it has been found to ſend out ſuch a number of healthy ſhoots all round, as to cover the earth with the cloſeſt and moſt beautiful carpet that can be deſired.

The ſtalks of the milk-vetch are weak and ſlender, ſo that they ſpread upon the ſurface of the ground, unleſs they are ſupported by ſome other vegetable. In ordinary ſoils they do not grow to a great length, nor produce many flowers; but in richer fields the ſtalks grow to a much greater length, branch out a good deal, but carry few or no flowers or ſeeds. From theſe qualities our author did not attempt at firſt to cultivate it with any other view than that of paſture; and, with this intention, ſowed it with his ordinary hay-ſeeds, expecting no material benefit from it till he deſiſted from cutting his field. In this, however, he was agreeably diſappointed; the milk-vetch growing, the firſt ſeaſon, as tall as his great clover, and forming exceeding fine hay; being ſcarce diſtinguiſhable from lucerne, but by the ſlenderneſs of the ſtalk, and proportional ſmallneſs of the leaf.

Another recommendation to this plant is, that it is perennial. It is ſeveral years after it is ſowed before it attains to its full perfection; but, when once eſtabliſhed, it probably remains for a great number of years in full vigour, and produces annually a great quantity of fodder. In autumn 1773, Mr Anderſon cut the ſtalk from an old plant that grew on a very indifferent ſoil; and after having thoroughly dried it, he found that it weighed 14 ounces and an half.

The ſtalks of this plant die down entirely in winter, and do not come up in the ſpring till the ſame time that clover begins to advance; nor does it advance very faſt, even in ſummer, when once cut down or eat over: ſo that it ſeems much inferior to the abovementioned graſſes; but might be of uſe to cover the worſt parts of a farm, on which no other vegetable could thrive.

60 Yellow vetchling. 2. The *common yellow vetchling, lathyrus pratenſis*, or *everlaſting tare*, grows with great luxuriance in ſtiff clay ſoils, and continues to yield annually a great weight of fodder, of the very beſt quality, for any length of time. This is equally fit for paſture, or hay; and grows with equal vigour in the end of ſummer, as in the beginning of it; ſo would admit being paſtured upon in the ſpring, till the middle, or even the end of May, without endangering the loſs of the crop of hay. This is an advantage which no other plant except clover poſſeſſes; but clover is equally unfit for early paſture, or for hay. Sain-foin is the only plant whoſe qualities approach to it in this reſpect, and the yellow vetchling will grow in ſuch ſoils as are utterly unfit for producing ſain-foin.—It is alſo a perennial plant; and increaſes ſo faſt by its running roots, that a ſmall quantity of the ſeed would produce a ſufficient number of plants to fill a whole field in a very ſhort time. If a ſmall patch of good ground is ſowed with the ſeeds of this plant in rows, about a foot diſtance from one another, and the intervals kept clear of weeds for that ſeaſon, the roots will ſpread ſo much as to fill up the whole patch next year; when the ſtalks may be cut for green fodder or hay. And if that patch were dug over in the ſpring following, and the roots taken out, it would furniſh a great quantity of plants, which might be planted at two or three feet diſtance from one another, where they would probably overſpread the whole field in a ſhort time.

61 Blue tare. 3. The *common blue tare*, ſeems more likely than the former to produce a more nouriſhing kind of hay, as it abounds much more in ſeeds; but as the ſtalks come up more thinly from the root, and branch more above, it does not appear to be ſo well adapted for a paſture-graſs as the other. The leaves of this plant are much ſmaller, and more divided, than thoſe of the other; the ſtalks are likewiſe ſmaller, and grow to a much greater length. Though it produces a great quantity of ſeeds, yet the ſmall birds are ſo fond of them, that, unleſs the field was carefully guarded, few of them would be allowed to ripen.

4. The *vicia ſepium, purple everlaſting*, or *buſh-vetch.* Our author gives the preference to this plant beyond all others of the ſame tribe for paſture. The roots of it ſpread on every ſide a little below the ſurface of the ground, from which, in the ſpring, many ſtems ariſe quite cloſe by one another; and as theſe have a broad tufted top covered with many leaves, it forms as cloſe a pile as could be deſired. It grows very quickly after being cut or cropt, but does not arrive at any great height; ſo that it ſeems more proper for paſturage than making hay; altho', upon a good ſoil, it will grow ſufficiently high for that purpoſe; but the ſtalks grow ſo cloſe upon one another, that there is great danger of having it rotted at the root, if the ſeaſon ſhould prove damp. It ſeems to thrive beſt in a clay ſoil. 62 Buſh-vetch.

Beſides theſe, there are a variety of others of the ſame claſs, which he thinks might be uſeful to the farmer. The common garden everlaſting pea, cultivated as a flowering plant, he conjectures, would yield a prodigious weight of hay upon an acre; as it grows to the height of ten or twelve feet, having very ſtrong ſtalks, that could ſupport themſelves without rotting, till they attained a great height. 63 Everlaſting pea.

One other plant, hitherto unnoticed, is recommended by our author to the attention of the farmer; it is the *common yarrow, achillea millefolium*, or hundred-leaved graſs. Concerning this plant, he remarks, that, in almoſt every fine old paſture, a great proportion of the growing vegetables with which the field is covered, conſiſts of it; but the animals which feed there are ſo fond of the yarrow, as never to allow one ſeed-ſtalk of it to come to perfection. Hence theſe ſeed-ſtalks are never found but in neglected corners, or by the ſides of roads; and are ſo diſagreeable to cattle, that they are never taſted; and thus it has been erroneouſly thought that the whole plant was refuſed by them.—The leaves of this plant have a great tendency to grow very thick upon one another, and are therefore peculiarly adapted for paſturage. It arrives at its greateſt perfection in rich fields that are naturally fit for producing a large and ſucculent crop of graſs. It grows alſo upon clays; and is among the firſt plants that ſtrike root in any barren clay, that has been lately dug from any conſiderable depth; ſo that this plant, and thiſtles, are uſually the firſt that appear on the banks of deep ditches formed in a clayey ſoil. All animals delight to eat it; but, from the dry aromatic taſte it poſſeſſes, it would ſeem peculiarly favourable to the conſtitution of ſheep. It ſeems altogether unfit for hay. 64 Achillea millefolium

Beſides theſe plants, which are natives of our own country, there are others, which, though natives of a foreign climate, are found to thrive very well in Britain; and have been raiſed with ſuch ſucceſs by individuals, as highly to merit the attention of every farmer. 65 Lucerne.

mer. Among theſe the firſt place is claimed by lucerne. This plant hath a perennial root, and annual ſtalks, which, in good ſoil, riſe to three feet; or ſometimes more in height; but for a particular deſcription of the whole plant, ſee the article **Medica**. All ſorts of domeſtic cattle are fond of this plant, eſpecially when allowed to eat it green, and black cattle may be fed very well with the hay made from it; but an exceſs of this food is ſaid to be very dangerous.

Lucerne has the property of growing very quickly after it is cut down, inſomuch that Mr Rocque has mowed it five times in a ſeaſon, and Mr Anderſon affirms he has cut it no leſs than ſix times. It is, however, not very eaſily cultivated; in conſequence of which it ſometimes does not ſucceed; and as it dies entirely in the winter, it is perhaps inferior to the feſcue graſſes already mentioned, which, tho' deſpiſed and neglected, might probably yield as rich a crop as lucerne, without any danger of a miſcarriage.

66
imothy-
aſs.

Another graſs was brought from Virginia, where it is a native, and ſown by Rocque in 1763. This graſs is called *Timothy*, from its being brought from New-York to Carolina by one Timothy Hanſon. It grows beſt in a wet ſoil; but will thrive in almoſt any. If it is ſown in Auguſt, it will be fit for cutting in the latter end of May or beginning of June. Horſes are very fond of it, and will leave lucerne to eat it. It is alſo preferred by black cattle and ſheep; for a ſquare piece of land having been divided into four equal parts, and one part ſowed with lucerne, another with ſain-foin, a third with clover, and the fourth with timothy, ſome horſes, black cattle, and ſheep, were turned into it, when the plants were all in a condition for paſturage; and the timothy was eaten quite bare, before the clover, lucerne, or ſain-foin, was touched.

One valuable property of this graſs is, that its roots are ſo ſtrong and interwoven with one another, that they render the wetteſt and ſofteſt land, on which a horſe could not find footing, firm enough to bear the heavieſt cart. With the view of improving boggy lands, therefore, ſo as to prevent their being poached with the feet of cattle, Mr Anderſon recommends the cultivation of this kind of graſs, from which he has little expectation in other reſpects.

Sect. VII. *Of the Diſeaſes of Plants.*

These are divided by Tournefort into the following claſſes. 1. Thoſe which ariſe from too great an abundance of juice; 2. from having too little; 3. From its bad qualities; 4. From its unequal diſtribution; and 5. From external accidents.

67
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ndance
uices.

Too great an abundance of juices cauſes at firſt a prodigious luxuriant growth of the vegetable; ſo that it does not come to the requiſite perfection in a due time. Wheat is ſubject, in ſome climates, to a diſeaſe of this kind; it vegetates exceſſively, without ever carrying ripe grain; and the ſame diſeaſe may be artificially produced in any grain, by planting it in too rich a ſoil. Too much rain is apt likewiſe to do the ſame. When a vegetable is ſupplied too abundantly with juices, it is very apt to rot; one part of it overſhadowing another in ſuch a manner as to prevent the acceſs of freſh air; upon which, putrefaction ſoon enſues, as has been already obſerved with regard to the feſcue graſſes.

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In graſs, or any herbaceous plant, where the leaves are only wanted, this over-luxuriancy cannot be called a diſeaſe, but is a very deſirable property; but in any kind of grain, it is quite otherwiſe. Dr Home, in his Principles of Agriculture and Vegetation, claſſes the *ſmut* in grain among the diſeaſes ariſing from this cauſe. He is of opinion, that too great an abundance of juices in a vegetable will produce diſeaſes ſimilar to thoſe occaſioned by repletion in animal-bodies; *viz.* ſtagnations, corruptions, varices, carioſities, *&c.* along with the too great luxuriancy we have juſt now mentioned, which he expreſſes by "too great an abundance of water-ſhoots." Hence he is induced to claſs the ſmut among diſeaſes ariſing from this cauſe; it being a corruption happening moſt in rainy ſeaſons, and to weak grain.—Like other contagious diſeaſes, he tells us, the ſmut may be communicated from the infected to healthful grain. As a preventative, he recommends ſteeping the grain in a ſtrong pickle of ſea-ſalt. Beſides the effect which this has upon the grain itſelf, it is uſeful for ſeparating the good from the bad; the beſt ſeed falling to the bottom, and the faulty ſwimming on the top of the liquor.—For the ſame purpoſe, a ley of wood-aſhes and quicklime is recommended by ſome; and, by others, a ſolution of ſalt-petre or copperas; after which the grain is to be dried with ſlacked lime, or dry turf aſhes. This ſolution, however, we can by no means recommend, as it ſeems moſt likely to kill the grain entirely.

69
How prevented.

70
Diſeaſes from too great moiſture, how prevented.

According to Dr Home, dung is a preventative of diſeaſes ariſing from too great moiſture; in confirmation of which, he relates the following experiment. "Two acres of poor ground, which had never got any manure, were fallowed with a deſign to be ſown with wheat; but the ſcheme being altered, ſome dung was laid on a ſmall part of it, and the whole ſowed, after it had got five furrows, with barley. A great quantity of rain fell. The barley on that part which was dunged, was very good; but what was on the reſt of the field turned yellow after the rains, and, when ripe, was not worth the reaping."

71
Diſeaſe peculiar to ſaffron.

The want of nouriſhment in plants may be eaſily known by their decay; in which caſe, the only remedy is, to ſupply them with food, according to the methods we have already directed; or to remove from their neighbourhood ſuch other plants as may draw off the nouriſhment from thoſe we wiſh to cultivate.—In the Memoirs of the Academy of Sciences for 1728, Mr Du Hamel mentions a diſeaſe, which he calls *le mort*, that attacks ſaffron in the ſpring. It is owing to another plant, a ſpecies of trefoil, fixing ſome violet-coloured threads, which are its roots, to the roots of the ſaffron, and ſucking out its juice. This diſeaſe is prevented by digging a trench, which ſaves all the unaffected.

72
Vegetables deſtroyed by inſects.

The bad qualities, or unequal diſtributions, of the juices of plants, are the occaſion of ſo few of the diſeaſes to which vegetables in this country are ſubject, that we forbear to mention them at preſent. Moſt of the diſeaſes of our plants are owing to external accidents, particularly to the depredations of inſects.—The inſects by which the greateſt devaſtations are committed in this country are, ſnails, caterpillars, grubs, and flies. The ſnails and caterpillars feed on the leaves and young ſhoots; by which means they often totally deſtroy the vegetable. Where the plants are of eaſy acceſs, theſe vermin may be deſtroyed by ſprinkling the vegetable with lime-water, for quick-lime is a mortal poiſon to crea-

73
Inſects deſtroyed by lime-water.

tures of this kind, and throws them into the greateſt agonies the moment they are touched with it. On trees, however, where this method cannot ſo well be followed, fumigation is the moſt proper; and, for this purpoſe, nothing is better than the ſmoke of vegetables not perfectly dry. In ſome caſes the eggs of theſe deſtroying creatures may be obſerved, and ought without doubt immediately to be taken away. On the fruit-trees, as apples, pears, medlars, on ſome foreſt-trees, the oak and dwarf-maple eſpecially, and the white and black thorn in hedges, a kind of little tufts are to be obſerved, reſembling, at firſt ſight, withered leaves twiſted, by a cobweb, about the uppermoſt twigs or branches. Theſe contain a vaſt number of little black eggs, that in the ſpring produce ſwarms of caterpillars which devour every thing. To prevent this, all the twigs on which theſe cobwebs appear ſhould be taken off and burnt as ſoon as poſſible. This ought to be done before the end of March, that none of the eggs be allowed ſufficient time for hatching.

74 Grubs. The grubs are a kind of worms which deſtroy the corn by feeding upon its roots; they are transformed every fourth year into the beetles called *cock-chafers*, *may-bugs*, &c. they are very deſtructive when in their vermicular ſtate, and cannot then be deſtroyed becauſe they go deep in the ground. When become beetles, they conceal themſelves under the leaves of trees, where they ſeem aſleep till near ſunſet, when they take their flight. It is only now that they can be deſtroyed, and that by a very laborious method; namely, by ſpreading pack-ſheets below the trees in the day-time when the beetles are in their torpid ſtate, then ſhaking them off and burning them. Some time ago, they made ſuch devaſtations in the county of Norfolk, that ſeveral farmers were entirely ruined by them; one gathered 80 buſhels of theſe inſects from the trees which grew on his farm. It is ſaid that, in 1574 there fell ſuch a multitude of theſe inſects into the river Severn, that they ſtopped and clogged the wheels of the water-mills.

75 Turnip-fly. Turnips, when young, are apt to be totally deſtroyed by a multitude of little black flies, from thence called the *turnip-fly*. As a preventative of theſe, ſome adviſe the ſeed to be mixed with brimſtone; but this is improper, as brimſtone is found to be poiſonous to vegetables. The beſt method ſeems to be the fumigation of the fields with ſmoke of half-dried vegetables. For this purpoſe weeds will anſwer as well as any. This fumigation muſt no doubt be often repeated, in order to drive away the innumerable multitudes of theſe inſects which are capable of deſtroying a large field of turnip.

76 Corn butterfly. Some time ago an inſect, called the *corn-butterfly*, committed ſuch ravages while in its vermicular ſtate, in France, that upwards of 200 pariſhes were ruined by it; and the miniſtry offered a reward to the diſcoverer of an effectual remedy againſt this deſtroying worm. The cure which was at laſt diſcovered, was to heat the corn, in an oven, ſo much as not to deſtroy its vegetative power, but ſufficiently to deſtroy the ſmall worms, which made their neſt in the ſubſtance of the grain, and at laſt eat out the ſubſtance ſo completely that nothing could be got from the huſk, even by boiling it in water. It is certain, that though inſects can bear a great deal of cold, they are eaſily deſtroyed by a ſlight degree of heat; nor is the vegetative power of corn eaſily deſtroyed, even when kept for a long time in a pretty ſtrong heat. This method muſt therefore be very effectual for deſtroying all kinds of inſects with which grain is apt to be infected: but care muſt be taken not to apply too great a heat; and the adjuſting of the preciſe degree neceſſary to deſtroy the inſect, without hurting the corn, will be attended with ſome difficulty.

PART II. PRACTICE of AGRICULTURE.

SECT. I. *Inſtruments of Huſbandry.*

THE inſtruments employed in agriculture are various; as the plough, the harrow, the roller, &c. which are again greatly diverſified by differences ariſing from their conſtruction, and particular uſes.

1. OF PLOUGHS.

77 THE plough conſtructed in the folowing manner is ſtill the moſt common and the moſt generally underſtood in Scotland; and, if properly made, is the beſt for anſwering all purpoſes, when only one is uſed; though others are, perhaps, more proper on ſome particular occaſions.

78 Deſcription of the Scots plough. The parts of which this plough is compoſed, are, the head, the beam, the ſheath, the wreſt, the mould-board, the two handles, the two rungs, the ſock, and the coulter; the two laſt are made of iron, and all the reſt of wood.

Plate IV. fig. 1. The HEAD, is deſigned for opening the ground below. The length of the head from A to B is about 20 inches, and the breadth from A to D about five inches; C is the point upon which the ſock is driven, and the length from B to C is about ſix inches; *a* is the mortoiſe into which the larger handle is fixed, and *b* is the mortoiſe into which the ſheath is fixed.

The head is that part of the plough which goes in the ground; therefore the ſhorter and narrower it is, the friction will be the leſs, and the plough more eaſily drawn; but the longer the head is, the plough goes more ſteadily, and is not ſo eaſily put out of its direction by any obſtructions that occur. Twenty inches is conſidered as a mean length; and five inches as the moſt convenient breadth.

Fig. 2. The SHEATH, E, is driven into the mortoiſe *b*, and thus fixed to the head A B. It is not perpendicular to the head, but placed obliquely, ſo as to make the angle formed by the lines A B and E B about 60 degrees. The ſheath is about 13 inches long, beſides what is driven into the mortoiſe *b*; about three inches broad, and one inch thick. Fig. 1.

The ſheath is fixed to the mould-board, as in fig. 11. E, in the ſame manner as the wreſt is fixed to the head in fig. 7.

The MOULD-BOARD, is deſigned to turn over the earth of the furrow made by the plough; and it is obvious, that, according to the poſition of the ſheath, the mould-board will turn over the earth of the furrow more or leſs ſuddenly. Beſides, when it forms a leſs angle with the head than 60 degrees, the plough is in great danger of being *choked*, as the farmers term it.

Fig. 3. Fig. 1. The Larger HANDLE, F A, is fixed to the head, by driving it into the mortoiſe *a*. It is placed in the ſame plane

Fig. 3. plane with the head; and its length from A F is about five feet four inches, and its diameter at the place where it is fixed to the beam is about two inches and an half, and tapers a little to the top F. About ten inches from A, there is a curve in the handle, which, when F is raiſed to its proper height, makes the lower part of it nearly parallel to the ſheath E B. This curve is deſigned to ſtrengthen the handle. The proper poſition of the handle is, when the top F is about three feet two inches higher than the bottom of the head A B.

The longer the handles, the plough is the more eaſily managed, becauſe the levers are more diſtant from the centre of motion. The higher the top of the handles, the plough is more eaſily raiſed out of the ground, provided they be no higher than the lower part of a man's breaſt.

Fig. 4. The Beam, is fixed to the larger handle and the ſheath, all of which are placed in the ſame plane with the head. The length of it, from H to I, is about ſix feet; its diameter is about four inches. When the plough is in the ground, the beam ſhould be juſt high enough not to be incommoded by any thing on the ſurface.

The poſition of the beam depends on the number of cattle in the plough. When two horſes are yoked, the beam ſhould be placed in ſuch a manner as to make the perpendicular diſtance betwixt the bolt-hole of the beam and the plane of the head about 21 inches; when four horſes are yoked, two a-breaſt, this diſtance ſhould only be about 18 inches.

Fig. 5. The Sock, BP, is fixed to the end of the head, and is about two feet long. In fitting the ſock to the head, the point ought to be turned a little to the land or left ſide; becauſe otherwiſe it is apt to come out of the land altogether. When turned to the left, it likewiſe takes off more land; when turned upwards, the plough goes ſhallow; and when downwards, it goes deeper.

Fig. 6. The Coulter, is fixed to the beam, and is about two feet ten inches long, two inches and a half broad, ſharp at the point and before, and thick on the back, like a knife. It is fixed and directed by wedges, ſo as to make the point of it equal to, or rather a little before the point of the ſock, and upon a line with the left ſide of the head. This oblique poſition enables it to throw roots, &c. out of the land, which requires leſs force than cutting or puſhing them forward.

Fig. 7. The Wreſt, BD, is fixed to the head, and is about 26 inches long, two broad, and one thick. It is fixed to the head at B, in ſuch a manner as to make the angle contained between the lines A B and B D about 25 degrees. The wreſt is ſeldom or never placed in the ſame plane with the head, but gradually raiſed from the place where it is fixed to it; that is, from B to K, as in fig. 8. The poſition of the wreſt determines the nature of the furrow. When the wreſt is wide and low ſet, the furrow is wide; and when it is narrow and high ſet, the furrow is narrow.

Fig. 9. repreſents the two Handles, fixed together by the two rungs. The larger handle has already been deſcribed; the leſſer one is a few inches ſhorter, and does not require to be quite ſo ſtrong. The diſtance of the handles at the little rung depends on the poſition of the wreſt. Their diſtance at M and P is about two feet ſix inches. The leſſer handle is fixed to the mould board at M, fig 10. and to the wreſt K B, at L.

Fig 11. repreſents the plough complete, by joining together figures 6. and 10. in the ſheath E B. The wreſt B K is ſuppoſed to make an angle with the head A B as in fig. 7. and the handles joined together as in fig. 9.

After having given ſuch a particular deſcription of all the parts and proportions of the Scots plough, it will eaſily appear how it ſeparates, raiſes, and turns over the earth of the furrow. If it had no coulter, the earth would open above the middle of the ſock, and in a line before the ſheath; but as the coulter opens the earth in a line with the left ſide of the head, if the ſoil has any coheſion, the earth of the furrow will be wholly raiſed from the left ſide, and, as the ſock moves forward, will be thrown on the right ſide of the ſheath, and by the caſting out of the mould-board, or the raiſing of the wreſt, will be turned over.

The Bridle, or Muzzle, is another article belonging to the plough. It is fixed to the end of the beam, and the cattle are yoked by it. The muzzle commonly uſed is a curved piece of iron, fixed to the beam by a bolt through it. A B C is the muzzle, A C the bolt Fig. 12.
by which it is fixed to the beam; D is the ſwingle-tree or croſs-tree, to which the traces are fixed; and B is a hook, or *cleek*, as it is commonly called, which joins the muzzle and ſwingle-tree.

Some uſe another kind of muzzle, ABCD. It is Fig. 13.
fixed to the beam by two bolts, and has notches by which the cleek of the ſwingle-tree may be fixed either to the right or the left of the beam. There are alſo different holes for the hind-bolt to paſs thro', by which the draught may be fixed either above or below the beam. A D is the fore-bolt upon which the muzzle turns; on B C are four notches, betwixt any two of which the cleek of the ſwingle-tree may be fixed. When the cleek is fixed at B, the plough is turned towards the firm land, and takes off a broader furrow; and when fixed at C, it is turned towards the ploughed land, and takes of a narrower furrow. E and F are the holes on each ſide thro' which the hindmoſt bolt paſſes. When the bolt is put thro' the higheſt two, theſe holes being thereby brought to the middle of the beam, the fore-part of the muzzle is raiſed above the beam, and the plough is made to go deeper; and when put through the loweſt two, the fore-part of the muzzle is ſunk below the beam, and the plough is made to go ſhallower. This muzzle may be ſo conſtructed as to have the ſame play with the common one. A is the Fig. 16.
end of the beam; B a plate of iron ſunk into it, and, with a ſimilar one in the other ſide, is rivetted into it by bolts; C is the muzzle fixed to theſe plates of iron by the bolt D, which bolt may be put through any of the holes E E. From the conſtruction of this muzzle it is plain, that it has the ſame play with the common one, and that by it the land of the plough may be altered at pleaſure.

79
Properties of the Scots plough.

Of all forms, that of the Scotch plough is the fitteſt for breaking up ſtiff and rough land, eſpecially where ſtones abound; and no leſs fit for ſtrong clays hardened by drought. The length of its head gives it a firm hold of the ground; its weight prevents it from being thrown out by ſtones; the length of the handles gives the ploughman great command to direct its motion; and by the length of its head, and of its mould-board, it lays the furrow-ſlice cleverly over. This plough was contrived during the infancy of agriculture, and was well contrived: in the ſoils above deſcribed, it has not an equal.

80 In what ſoil improper.

But in tender ſoil it is improper, becauſe it adds greatly to the expence of ploughing, without any counterbalancing benefit. The length of the head and mould-board increaſes the friction, and conſequently it requires a greater number of oxen or horſes than are neceſſary in a ſhorter plough. There is another particular in its form, that reſiſts the draught: the mould-board makes an angle with the ſock, inſtead of making a line with it gently curving backward. There is an objection againſt it no leſs ſolid, that it does not ſtir the ground perfectly: the hinder part of the wreſt riſes a foot above the ſole of the head; and the earth that lies immediately below that hinder part, is left unſtirred. This is ribbing land below the ſurface, ſimilar to what is done by ignorant farmers on the ſurface.

Theſe defects muſt be ſubmitted to in a ſoil that requires a ſtrong heavy plough; but may be avoided in a cultivated ſoil by a plough differently conſtructed. Of all the ploughs fitted for a cultivated ſoil free of ſtones, that introduced into Scotland about 12 years ago, by James Small in Blackadder Mount, Berwickſhire, is the beſt. It is now in great requeſt; and with reaſon, as it avoids all the defects of the Scotch plough.

80 Chain-plough. Plate V. fig. 1.

The ſhortneſs of its head and of its mouldboard leſſen the friction greatly: from the point of the ſock to the back part of the head it is only 30 inches; and the whole length, from the point of the beam to the end of the handles, between eight and nine feet. The ſock and mouldboard make one line gently curving; and conſequently gather no earth. Inſtead of a wreſt, the under edge of the mouldboard is in one plain with the ſole of the head; which makes a wide furrow, without leaving any part unſtirred. It is termed the *chain-plough*, becauſe it is drawn by an iron chain fixed to the back part of the beam immediately before the coulter. This has two advantages: firſt, by means of a muzzle, it makes the plough go deep, or ſhallow; and, next, it ſtreſſes the beam leſs than if fixed to the point, and therefore a ſlenderer beam is ſufficient.

This plough may well be conſidered as a capital improvement; not only by ſaving expence, but by making better work. It is proper for loams; for carſe-clays; and, in general, for every ſort of tender ſoil free of ſtones. It is even proper for opening up paſture-ground, where the ſoil has been formerly well cultivated.

82 Of the Sock. Plate IV.

A ſpiked ſock is uſed in the Scotch plough. The difference between it and the feathered ſock will be beſt underſtood by comparing their figures. Fig. 14. is the common ſock, and fig. 15. the feathered one.

From the conſtruction of the feathered ſock, it is obvious, that it muſt meet with greater reſiſtance than the common ſock. However, when the plough takes off the earth of the furrow broader than that part of the ſock which goes upon the head, it is more eaſily drawn than the plough with the common ſock; for the earth which the common ſock leaves to be opened by the wreſt, is more eaſily opened by the feather of the other ſock. In lea, the feathered ſock makes the plough go more eaſily, becauſe the roots of the graſs, which go beyond the reach of the plough, are more eaſily cut by the feather, than they can be torn aſunder by the common ſock. The feathered ſock is alſo of great uſe in cutting and deſtroying root-weeds. The common ſock, however, anſwers much better in ſtrong land.

It is proper here to add, that in fitting the feathered ſock to the head, the point of it ſhould be turned a little from the land, or a little to the right hand.

83 Wheel-plough.

Some ploughs are made with two ſmall wheels running in the furrow, in order to take off the friction of the head; and this plough is recommended in a book, intitled, *The complete Farmer*. But all complicated ploughs are baubles; and this as much as any. The pivots of ſuch wheels are always going wrong; and, beſide, they are choked ſo with earth, as to increaſe the friction inſtead of diminiſhing it.

84 Ignorance o farmers in Scotland bu a few year ago.

If we look back 30 years, ploughs of different conſtructions did not enter even into a dream. The Scotch plough was univerſally uſed; and no other was known. There was no leſs ignorance as to the number of cattle neceſſary for this plough. In the ſouth of Scotland, ſix oxen and two horſes were univerſal; and in the north, 10 oxen, ſometimes 12. The firſt attempt to leſſen the number of oxen, was in Berwickſhire. The low part of that county abounds with ſtone, clay, and marl, the moſt ſubſtantial of all manures, which had been long uſed by one or two gentlemen. About 25 years ago it acquired reputation, and ſpread rapidly. As two horſes and two oxen were employed in every marl-cart; the farmer, in ſummer-fallowing, and in preparing land for marl, was confined to four oxen and two horſes. And as that manure afforded plenty of ſucculent ſtraw for oxen, the farmer was ſurpriſed to find that four oxen did better now than ſix formerly. Marling, however, a laborious work, proceeded ſlowly, till people were taught by a noted farmer in that country, what induſtry can perform by means of power properly applied. It was reckoned a mighty taſk to marl five or ſix acres in a year. That gentleman, by plenty of red clover for his working-cattle, accompliſhed the marling 50 acres in a ſummer, once 54. Having ſo much occaſion for oxen, he tried with ſucceſs two oxen and two horſes in a plough; and that practice became general in Berwickſhire.

85 Advantag of the chai plough pa ticularly i luſtrated.

Now here appears with luſtre the advantage of the chain-plough. The great friction occaſioned in the Scotch plough by a long head, and by the angle it makes with the mould-board, neceſſarily requires two oxen and two horſes, whatever the ſoil be. The friction is ſo much leſs in the chain-plough, that two good horſes are found ſufficient in every ſoil that is proper for it. Beſides, the reducing the draught to a couple of horſes has another advantage, that of rendering a driver unneceſſary. This ſaving on every plough, where two horſes and two oxen were formerly uſed, will, by the ſtricteſt computation, be £15 ſterling yearly; and where four horſes were uſed, no leſs than £20 ſterl. There is now ſcarce to be ſeen in the low country of Berwickſhire a plough with more than two horſes; which undoubtedly in time will become general. We know but of one further improvement, that of uſing two oxen inſtead of two horſes. That draught has been employed with ſucceſs in ſeveral places; and the ſaving is ſo great, that it muſt force its way every where. It may be confidently affirmed, no ſoil ſtirred in a proper ſeaſon, can ever require more than two horſe

Plate IV.

Fig. 1.

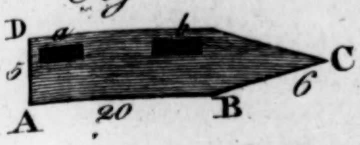
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Fig. 2.

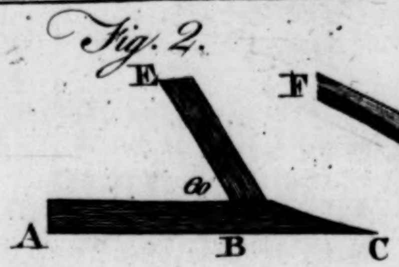

Fig. 5.

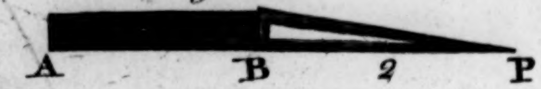

Fig. 3.

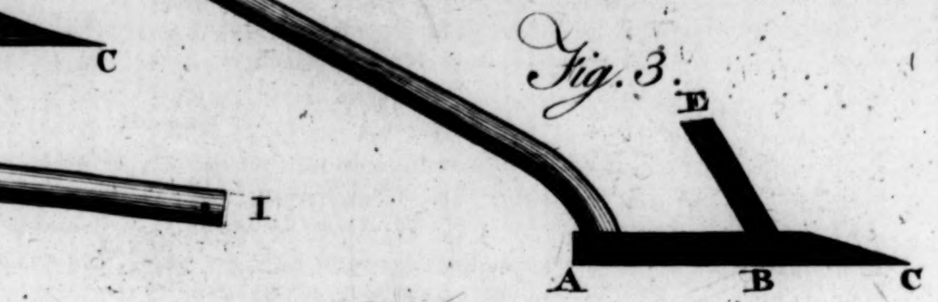

Fig. 4.

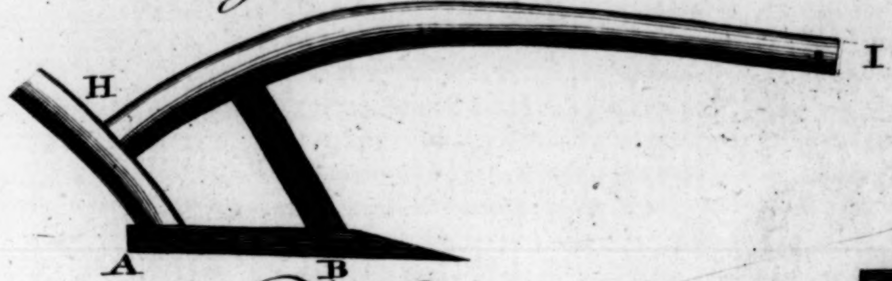

Fig. 7.

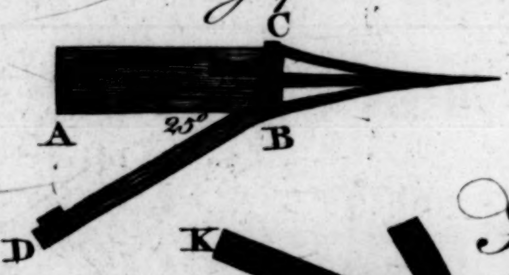

Fig. 6.

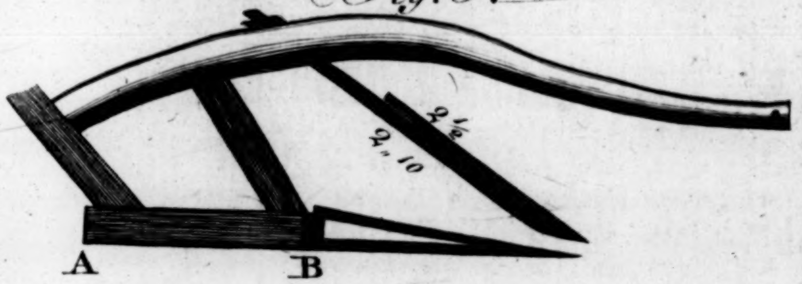

Fig. 8.

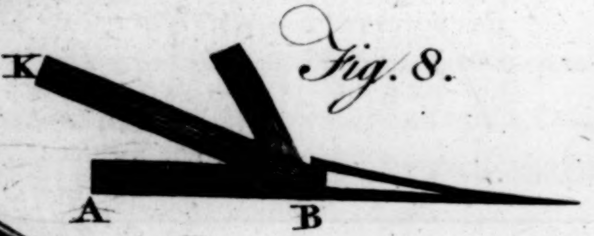

Fig. 9.

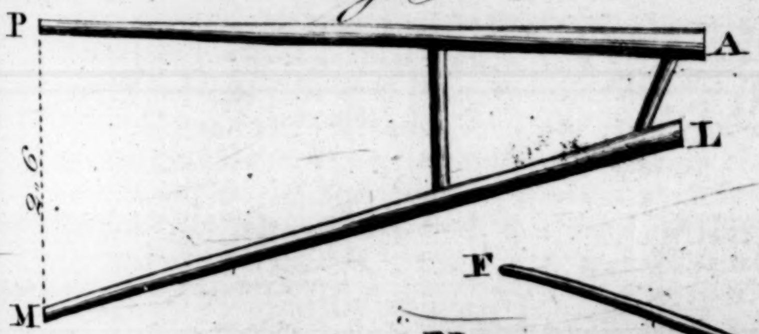

Fig. 10.

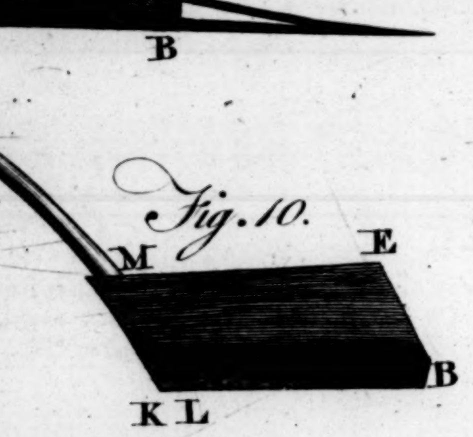

Fig. 13.

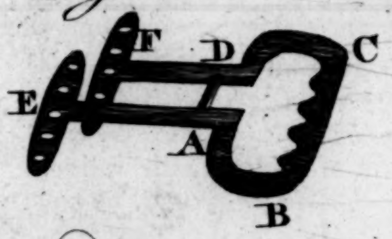

Fig. 11.

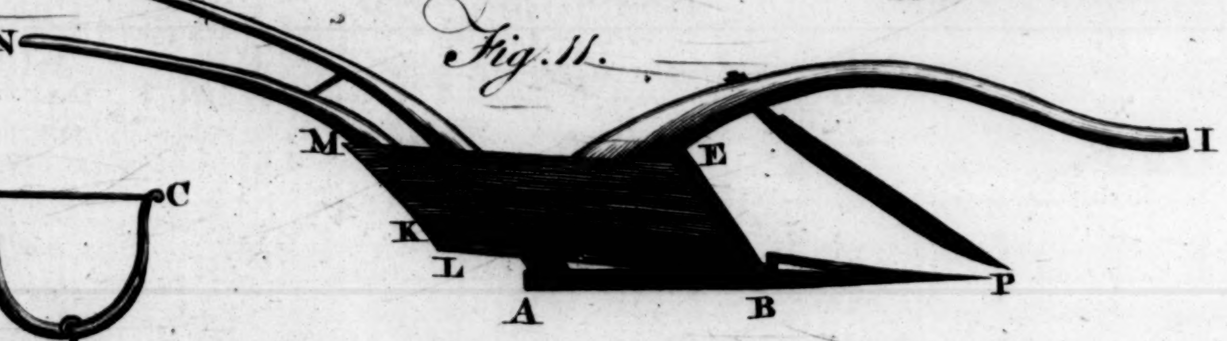
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Fig. 12.

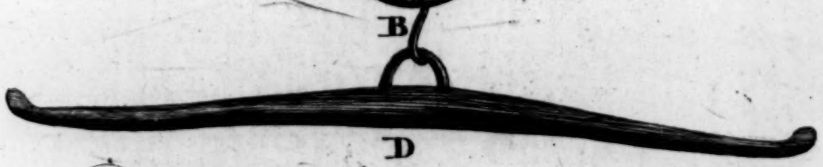


Fig. 14.

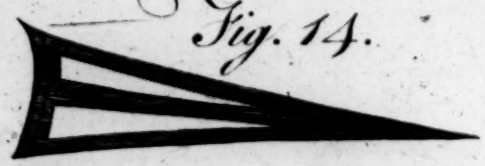


Fig. 15.

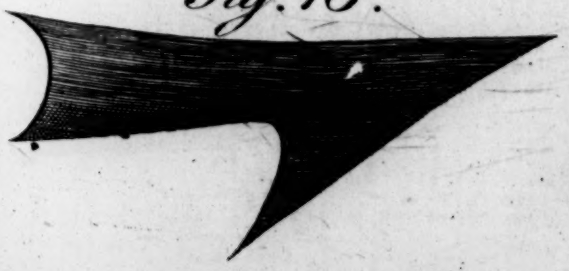
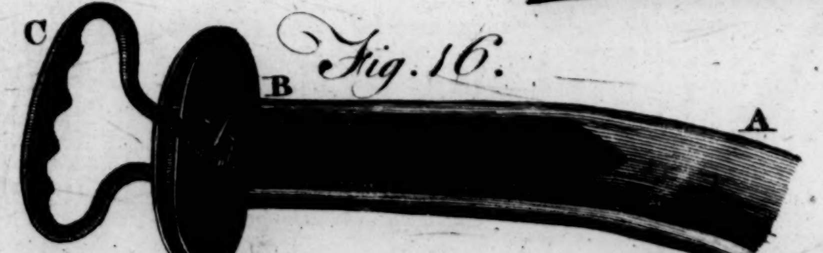


Fig. 16.



A. Bell Sculp.

3 MA 53.

horſes and two oxen, in a plough, even ſuppoſing the ſtiffeſt clay. In all other ſoils, two good horſes, or two good oxen abreaſt, may be relied on for every operation of the chain-plough.

A chain-plough of a ſmaller ſize than ordinary, drawn by a ſingle horſe, is of all the moſt proper for horſe-hoeing, ſuppoſing the land to be mellow, which it ought to be for that operation. It is ſufficient for making furrows to receive the dung, for ploughing the drills after dunging, and for hoeing the crop.

86
A ſmall ſingle-horſe plough recommended for various purpoſes.

A ſtill ſmaller plough of the ſame kind may be recommended for a kitchen-garden. It can be reduced to the ſmalleſt ſize, by being made of iron; and where the land is properly dreſſed for a kitchen-garden, an iron plough drawn by a horſe of the ſmalleſt ſize will ſave much ſpade-work.—In Scotland, thirty years ago, a kitchen-garden was an article of luxury merely, becauſe at that time there could be no cheaper food than oatmeal. At preſent, the farmer maintains his ſervants at double expence, as the price of oat-meal is doubled; and yet he has no notion of a kitchen-garden, more than he had thirty years ago. He never thinks, that living partly on cabbage, kail, turnip, carrot, would ſave much oat-meal: nor does he ever think, that change of food is more wholeſome, than vegetables alone, or oat-meal alone. We need not recommend potatoes, which in ſcanty crops of corn have proved a great bleſſing: without them, the labouring poor would frequently have been reduced to a ſtarving condition. Would the farmer but cultivate his kitchen-garden with as much induſtry as he beſtows on his potatoe-crop, he needed never fear want; and he can cultivate it with the iron plough at a very ſmall expence. It may be held by a boy of 12 or 13; and would be a proper education for a ploughman. But it is the landlord who ought to give a beginning to the improvement. A very ſmall expence would incloſe an acre for a kitchen-garden to each of his tenants; and it would excite their induſtry, to beſtow an iron plough on thoſe who do beſt.

Nor is this the only caſe where a ſingle-horſe plough may be profitably employed. It is ſufficient for ſeed-furrowing barley, where the land is light and well-dreſſed. It may be uſed in the ſecond or third ploughing of fallow, to encourage annual weeds, which are deſtroyed in ſubſequent ploughings.

2. The Brake.

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. 2.

The brake is a large and weighty harrow, the purpoſe of which is to reduce a ſtubborn ſoil, where an ordinary harrow makes little impreſſion. It conſiſts of four ſquare bulls, each ſide five inches, and ſix feet and a half in length. The teeth are 17 inches long, bending forward like a coulter. Four of them are inſerted into each bull, fixed above with a ſcrew-nut, having 12 inches free below, with a heel cloſe to the under part of the bull, to prevent it from being puſhed back by ſtones. The nut above makes it eaſy to be taken out for ſharping. This brake requires four horſes or four oxen. One of a leſſer ſize will not fully anſwer the purpoſe: one of a larger ſize will require ſix oxen; in which caſe the work may be performed at leſs expence with the plough.

88
Uſes.

This inſtrument may be applied to great advantage in the following circumſtances. In the fallowing ſtrong clay that requires frequent ploughings, a brakeing between every ploughing will pulverize the ſoil, and render the ſubſequent ploughings more eaſy. In the month of March or April, when ſtrong ground is ploughed for barley, eſpecially if bound with couch-graſs, a croſs brakeing is preferable to a croſs-ploughing, and is done at half the expence. When ground is ploughed from the ſtate of nature, and after a competent time is croſs-ploughed, the brake is applied with great ſucceſs, immediately after the croſs-ploughing, to reduce the whole to proper tilth.

Let it be obſerved, that a brake with a greater number of teeth than above-mentioned, is improper for ground that is bound together by the roots of plants, which is always the caſe of ground new broken up from its natural ſtate. The brake is ſoon choked, and can do no execution till freed from the earth it holds. A leſs number of teeth would be deficient in pulverizing the ſoil.

3. The Harrow.

Harrows are commonly conſidered as of no uſe but to cover the ſeed. But they have another uſe ſcarce leſs eſſential, which is to prepare land for the ſeed. This is an article of importance for producing a good crop. But how imperfectly either of theſe purpoſes is performed by the common harrow, will appear from the following account of it.

89
Imperfection of the common harrow.

The harrow commonly uſed is of different forms. The firſt we ſhall mention has two bulls, four feet long and 18 inches aſunder, with four wooden teeth in each. A ſecond has three bulls and 12 wooden teeth. A third has four bulls, and 20 teeth, of wood or iron, 10, 11, or 12 inches aſunder. Now, in fine mould, the laſt may be ſufficient for covering the ſeed; but none of them are ſufficient to prepare for the ſeed any ground that requires ſubduing. The only tolerable form is that with iron teeth; and the bare deſcription of its imperfections will ſhew the neceſſity of a more perfect form. In the firſt place, this harrow is by far too light for ground new taken up from the ſtate of nature, for clays hardened with ſpring-drought, or for other ſtubborn ſoils: it floats on the ſurface; and after frequent returns in the ſame tract, nothing is done effectually. In the next place, the teeth are too thick ſet, by which the harrow is apt to be choked, eſpecially where the earth is bound with roots, which is commonly the caſe. At the ſame time, the lightneſs and number of teeth keep the harrow upon the ſurface, and prevent one of its capital purpoſes, that of dividing the ſoil. Nor will fewer teeth anſwer for covering the ſeed properly. In the third place, the teeth are too ſhort for reducing a coarſe ſoil to proper tilth; and yet it would be in vain to make them longer, becauſe the harrow is too light for going deep into the ground. Further, the common harrows are ſo ill conſtructed, as to ride at every turn one upon another. Much time is loſt in diſengaging them. Laſtly, it is equally unfit for extirpating weeds. The ground is frequently ſo bound with couch-graſs, as to make the furrow-ſlice ſtand upright, as when old lea is ploughed: notwithſtanding much labour, the graſs-roots keep the field, and gain the victory.

A little reflection, even without experience, will make it evident, that the ſame harrows, whatever be the form, can never anſwer all the different purpoſes of harrowing, nor can operate equally in all different ſoils, rough or ſmooth, firm or looſe. The following, therefore, have been recommended; which are of three different forms, adapted for different purpoſes. They are all of the ſame weight, drawn each by two horſes. Birch is the beſt wood for them, becauſe it is cheap, and not apt to ſplit. The firſt is compoſed of four bulls, each four feet ten inches long, three and a quarter inches broad, and three and a half deep; the interval between the bulls 11 and three-fourths inches; ſo that the breadth of the whole harrow is four feet. The bulls are connected by four ſheths, which go thro' each bull, and are fixed by timber-nails driven through both. In each bull five teeth are inſerted, ten inches free under the bull, and ten inches aſunder. They are of the ſame form with thoſe of the brake, and inſerted into the wood in the ſame manner. Each of theſe teeth is three pounds weight; and where the harrow is made of birch, the weight of the whole is ſix ſtone 14 pounds Dutch. An erect bridle is fixed at a corner of the harrow, three inches high, with four notches for drawing higher or lower. To this bridle a double tree is fixed for two horſes drawing abreaſt, as in a plough. And to ſtrengthen the harrow, a flat rod of iron is nailed upon the harrow from corner to corner in the line of the draught.

90
Improved harrows.

Plate V. fig. 3.

Fig. 4.

The ſecond harrow conſiſts of two parts, connected together by a crank or hinge in the middle, and two chains of equal length, one at each end, which keep the two parts always parallel, and at the ſame diſtance from each other. The crank is ſo contrived, as to allow the two parts to ply to the ground like two unconnected harrows; but neither of them to riſe above the other, more than if they were a ſingle harrow without a joint. In a word, they may form an angle downward, but not upward. Thus they have the effect of two harrows in curved ground, and of one weighty harrow in a plain. This harrow is compoſed of ſix bulls, each four feet long, three inches broad, and three and a half deep. The interval between the bulls nine and a half inches; which makes the breadth of the whole harrow, including the length of the crank, to be five feet five inches. Each bull has five teeth, nine inches free under the wood, and ten inches aſunder. The weight of each tooth is two pounds; the reſt as in the former.

Fig. 5.

The third conſiſts alſo of two parts, connected together like that laſt mentioned. It has eight bulls, each four feet long, two and a half inches broad, and three deep. The interval between the bulls is eight inches; and the breadth of the whole harrow, including the length of the crank, is ſix feet four inches. In each bull are inſerted five teeth, ſeven inches free under the wood, and ten and a half inches aſunder, each tooth weighing one pound. The reſt as in the two former harrows.

91
Properties of theſe harrows.

Theſe harrows are a conſiderable improvement. They ply to curved ground like two unconnected harrows; and when drawn in one plain, they are in effect one harrow of double weight, which makes the teeth pierce deep into the ground. The imperfection of common harrows, mentioned above, will ſuggeſt the advantages of the ſet of harrows here recommended. The firſt is proper for harrowing land that has lain long after ploughing, as where oats are ſown on a winter-furrow, and in general for harrowing ſtiff land: it pierces deep into the ſoil by its long teeth, and divides it minutely. The ſecond is intended for covering the ſeed: its long teeth lays the ſeed deeper than the common harrow can do; which is no ſlight advantage. By placing the ſeed conſiderably under the ſurface, the young plants are, on the one hand, protected from too much heat, and, on the other, have ſufficiency of moiſture. At the ſame time, the ſeed is ſo well covered that none of it is loſt. Seed ſlightly covered by the common harrows, wants moiſture, and is burnt up by the ſun; beſide, that a proportion of it is left upon the ſurface uncovered. The third harrow ſupplies what may be deficient in the ſecond, by ſmoothing the ſurface, and covering the ſeed more accurately. The three harrows make the ground finer and finer, as heckles do lint; or, to uſe a different compariſon, the firſt harrow makes the bed, the ſecond lays the ſeed in it, the third ſmooths the cloaths. They have another advantage not inferior to any mentioned: they mix manure with the ſoil more intimately than can be done by common harrows; and upon ſuch intimate mixture depends greatly the effect of manure, as has already been explained. To conclude, theſe harrows are contrived to anſwer an eſtabliſhed principle in agriculture, That fertility depends greatly on pulverizing the ſoil, and on an intimate mixture of manure with it, whether dung, lime, marl, or any other.

4. The Roller.

92
The roller.

The roller is an inſtrument of capital uſe in huſbandry, tho' ſcarcely known in ordinary practice; and, where introduced, it is commonly ſo ſlight as to have very little effect.

Rollers are of different kinds; ſtone, yetling, wood. Each of theſe has its advantages. We would recommend the laſt, conſtructed in the following manner. Take the body of a tree, ſix feet ten inches long, the larger the better, made as near a perfect cylinder as poſſible. Surround this cylinder with three rows of fillies, one row in the middle, and one at each end. Line theſe fillies with planks of wood equally long with the roller, and ſo narrow as to ply into a circle. Bind them faſt together with iron rings. Beech-wood is the beſt, being hard and tough. The roller thus mounted, ought to have a diameter of three feet ten inches. It has a double pair of ſhafts for two horſes abreaſt. Theſe are ſufficient in level ground: in ground not level, four horſes may be neceſſary. The roller without the ſhafts ought to weigh two hundred ſtone Dutch; and the large diameter makes this great weight eaſy to be drawn.

93
Seaſon for rolling.

Rolling wheat in the month of April, is an important article in looſe ſoil; as the winter-rains preſſing down the ſoil leave many roots in the air. Barley ought to be rolled immediately after the ſeed is ſown; eſpecially where graſs-ſeeds are ſown with it. The beſt time for rolling a gravelly ſoil, is as ſoon as the mould is ſo dry as to bear the roller without clinging to it. A clay ſoil ought neither to be tilled, harrowed, nor rolled, till the field be perfectly dry. And as rolling a clay ſoil is chiefly intended for ſmoothing the ſurface, a dry ſeaſon may be patiently waited for, even till the crop be three inches high. There is the greater reaſon for this precaution, becauſe much rain immediately after rolling is apt to cake the ſurface when drought follows. Oats in a light ſoil may be rolled immediately after the ſeed is ſown, unleſs the ground be ſo wet as to cling to the roller. In a clay ſoil, delay rolling till the grain be above ground. The proper time for ſowing graſs-ſeeds in an oat-field, is when the grain is three inches high; and rolling ſhould immediately ſucceed, whatever the ſoil be. Flax ought to be rolled immediately after ſowing. This ſhould never be neglected; for it makes the ſeed puſh equally, and prevents after-growth, the bad effect of which is viſible in every ſtep of the proceſs for dreſſing flax. The firſt year's crop of ſown graſſes ought to be rolled as early the next ſpring as the ground will bear the horſes. It fixes all the roots preciſely as in the caſe of wheat. Rolling the ſecond and third crops in looſe ſoil is an uſeful work; though not ſo eſſential as rolling the firſt crop.

94 Effects of rolling. In the firſt place, rolling renders a looſe ſoil more compact and ſolid; which encourages the growth of plants, by making the earth clap cloſe to every part of every root. Nor need we be afraid of rendering the ſoil too compact; for no roller that can be drawn by two or four horſes will have that effect. In the next place, rolling keeps in the moiſture, and hinders drought to penetrate. This effect is of great moment. In a dry ſeaſon, it may make the difference of a good crop, or no crop, eſpecially where the ſoil is light. In the third place, the rolling graſs-ſeeds, beſide the foregoing advantages, facilitates the mowing for hay; and it is to be hoped, that the advantage of this practice will lead farmers to mow their corn alſo, which will increaſe the quantity of ſtraw, both for food and for the dunghill.

There is a ſmall roller for breaking clods in land intended for barley. The common way is, to break clods with a mell; which requires many hands, and is a laborious work. This roller performs the work more effectually, and at much leſs expence: let a harrowing precede, which will break the clods a little; and after lying a day, or a day and a half to dry, this roller will diſſolve them into powder. This however does not ſuperſede the uſe of the great roller after all the other articles are finiſhed, in order to make the ſoil compact, and to keep out the ſummer-drought. A ſtone roller four feet long, and fifteen inches diameter, drawn by one horſe, is ſufficient to break clods that are eaſily diſſolved by preſſure. The uſe of this roller in preparing land for barley is gaining ground daily, even among ordinary tenants, who have become ſenſible both of the expence and toil of uſing wooden mells. But in a clay ſoil, the clods are ſometimes too firm, or too tough, to be ſubdued by ſo light a machine. In that caſe, a roller of the ſame ſize, but of a different conſtruction, is neceſſary. It ought to be ſurrounded with circles of iron, ſix inches aſunder, and ſeven inches deep; which will cut even the moſt ſtubborn clods, and reduce them to powder. Let not this inſtrument be conſidered as a finical refinement. In a ſtiff clay, it may make the difference of a plentiful or ſcanty crop.

5. The Fanner.

95 The fanner. This inſtrument for winnowing corn was introduced into Scotland not many years ago. Formerly wind being our only reſource, the winnowing of corn was no leſs precarious than the grinding it at a windmill: people often were reduced to famine in the midſt of plenty. There was another bad effect: it was neceſſary to place a barn open to the weſt wind, however irregular or inconvenient the ſituation might be with regard to the other buildings. But it is needleſs to be particular upon that uſeful inſtrument; becauſe every farmer conſiders it now as no leſs eſſential than a plough or a harrow.

Sect. II. *Preparing Land for Cropping.*

1. Obstructions to Cropping.

96 Obſtructions, *viz.* In preparing land for cropping, the firſt thing that occurs, is to conſider the obſtructions to regular ploughing.

97 Stones. The moſt formidable of theſe, are *ſtones* lying above or below the ſurface, which are an impediment to a plough, as rocks are to a ſhip. Stones above the ſurface may be avoided by the ploughman, though not without loſs of ground; but ſtones below the ſurface are commonly not diſcovered till the plough be ſhattered to pieces, and perhaps a day's work loſt. The clearing land of ſtones is therefore neceſſary to prevent miſchief. And to encourage the operation, it is attended with much actual profit. In the firſt place, the ſtones are uſeful for fences: when large they muſt be blown, and commonly fall into parts proper for building. And as the blowing, when gunpowder is furniſhed, does not exceed a halfpenny for each inch that is bored, theſe ſtones come generally cheaper than to dig as many out of the quarry. In the next place, as the ſoil round a large ſtone is commonly the beſt in the field, it is purchaſed at a low rate by taking out the ſtone. Nor is this a trifle; for not only is the ground loſt that is occupied by a large ſtone, but alſo a conſiderable ſpace round it, to which the plough has not acceſs without danger. A third advantage is greater than all the reſt; which is, that the ploughing can be carried on with much expedition, when there is no apprehenſion of ſtones: in ſtony land, the plough muſt proceed ſo ſlow, as not to perform half of its work.

To clear land of ſtones, is in many inſtances an undertaking too expenſive for a tenant who has not a very long leaſe. As it is profitable both to him and to his landlord, it appears reaſonable that the work ſhould be divided, where the leaſe exceeds not nineteen years. It falls naturally upon the landlord to be at the expence of blowing the ſtones, and upon the tenant to carry them off the field.

98 Wetneſs. Another obſtruction is *wet ground*. Water may improve gravelly or ſandy ſoils; but it ſours (A) a clay ſoil, and converts low ground into a moraſs, unfit for any purpoſe that can intereſt the huſbandman.

A great deal has been written upon different methods of draining land, moſtly ſo expenſive as to be ſcarce fit for the landlord, not to mention the tenant.

(A) By this expreſſion it is not meant that the ground really becomes acid, but only that it becomes unfit for the purpoſes of vegetation. The natural products of ſuch a ſoil are ruſhes, and *ſour graſs*: which laſt appears in the furrows, but ſeldom in the crown of the ridge; is dry, and taſteleſs, like a chip of wood; and feels rough when ſtroked backwards.

One way of draining without expence when land is to be incloſed with hedge and ditch, is to direct the ditches ſo as to carry off the water. But this method is not always practicable, even where the diviſions lie convenient for it. If the run of water be conſiderable, it will deſtroy the ditches, and lay open the fences, eſpecially where the ſoil is looſe or ſandy.

If ditches will not anſwer, hollow drains are ſometimes made, and ſometimes open drains, which muſt be made ſo deep as to command the water. The former is filled up with looſe ſtones, with bruſh-wood, or with any other porous matter that permits the water to paſs. The latter is left open, and not filled up. To make the former effectual, the ground muſt have ſuch a ſlope as to give the water a briſk courſe. To execute them in level ground is a groſs error: the paſſages are ſoon ſtopped up with ſand and ſediment, and the work is rendered uſeleſs. This inconvenience takes not place in open drains; but they are ſubject to other inconveniences: They are always filling up, to make a yearly reparation neceſſary; and they obſtruct both ploughing and paſturing.

The following is the beſt in all views. It is an open drain made with the plough, cleaving the ſpace intended for the drain over and over, till the furrow be made of a ſufficient depth for carrying off the water. The ſlope on either ſide may, by repeated ploughings, be made ſo gentle as to give no obſtruction either to the plough or to the harrow. There is no occaſion for a ſpade, unleſs to ſmooth the ſides of the drain, and to remove accidental obſtructions in the bottom. The advantages of this drain are manifold. It is executed at much leſs expence than either of the former; and it is perpetual, as it never can be obſtructed. In level ground, it is true, graſs may grow at the bottom of the drain; but to clear off the graſs once in four or five years, will reſtore it to its original perfection. A hollow drain may be proper between the ſpring-head and the main drain, where the diſtance is not great; but in every other caſe the drain recommended is the beſt.

Where a level field is infeſted with water from higher ground, the water ought to be intercepted by a ditch carried along the foot of the high ground, and terminating in ſome capital drain.

The only way to clear a field of water that is hollow in the middle, is to carry it off by ſome drain ſtill lower. This is commonly the caſe of a moraſs fed with water from higher ground, and kept on the ſurface by a clay bottom.

A clay ſoil of any thickneſs is never peſtered with ſprings; but it is peſtered with rain, which ſettles on the ſurface as in a cup. The only remedy is high narrow ridges, well rounded. And to clear the furrows, the furrow of the foot-ridge ought to be conſiderably lower, in order to carry off the water cleverly. It cannot be made too low, as nothing hurts clay ſoil more than the ſtagnation of water on it; witneſs the hollows at the end of crooked ridges, which are abſolutely barren. Some gravelly ſoils have a clay bottom; which is a ſubſtantial benefit to a field when in graſs, as it retains moiſture. But when in tillage, ridges are neceſſary to prevent rain from ſettling at the bottom; and this is the only caſe where a gravelly ſoil ought to be ridged.

Clay ſoils that have little or no level, have ſometimes a gravelly bottom. For diſcharging the water, the beſt method is, at the end of every ridge to pierce down to the gravel, which will abſorb the water. But if the furrow of the foot-ridge be low enough to receive all the water, it will be more expeditious to make a few holes in that furrow. In ſome caſes, a field may be drained, by filling up the hollows with earth taken from higher ground. But as this method is expenſive, it will only be taken where no other method anſwers. Where a field happens to be partly wet, partly dry, there ought to be a ſeparation by a middle ridge, if it can be done conveniently. And the dry part may be ploughed, while the other is drying.

The low part of Berwickſhire is generally a brick clay extremely wet and poachy during winter. This in a good meaſure may be prevented by proper incloſing, as there is not a field but can be drained into lower ground, all the way down to the river Tweed. But as this would leſſen the quantity of rain in a dry climate, ſuch as is all the eaſt-ſide of Britain, it may admit of ſome doubt whether the remedy would not be as bad as the diſeaſe. (*See the article* Draining.)

2. Bringing into CULTURE, LAND from the STATE OF NATURE.

99 Mooriſh ground. To improve a moor, let it be opened in winter when it is wet; which has one convenience, that the plough cannot be employed at any other work. In ſpring, after froſt is over, a ſlight harrowing will fill up the ſeams with mould, to keep out the air, and rot the ſod. In that ſtate let it lie the following ſummer and winter, which will rot the ſod more than if laid open to the air by ploughing. Next April, let it be croſs-ploughed, braked, and harrowed, till it be ſufficiently pulverized. Let the manure laid upon it, whether lime or dung, be intimately mixed with the ſoil by repeated harrowings. This will make a fine bed for turnip-ſeed if ſown broad-caſt. But if drills be intended, the method muſt be followed that is directed afterward in treating more directly of the culture of turnip.

A ſucceſsful turnip-crop, fed on the ground with ſheep, is a fine preparation for laying down a field with graſs-ſeeds. It is an improvement upon this method, to take two or three ſucceſſive crops of turnip, which will require no dung for the ſecond and following crops. This will thicken the ſoil, and enrich it greatly.

100 Swampy ground. The beſt way of improving ſwampy ground after draining, is paring and burning. But where the ground is dry, and the ſoil ſo thin as that the ſurface cannot be pared, the beſt way of bringing it into tilth from the ſtate of nature, as mentioned above, is to plough it with a feathered ſock, laying the graſſy ſurface under. After the new ſurface is mellowed with froſt, fill up all the ſeams by harrowing croſs the field, which by excluding the air will effectually rot the ſod. In this ſtate let it lie ſummer and winter. In the begining of May after, a croſs-ploughing will reduce all to ſmall ſquare pieces, which muſt be pulverized with the brake, and make it ready for a May or June crop. If theſe ſquare pieces be allowed to lie long in the ſap without breaking, they will become tough and not be eaſily reduced.

3. Forming Ridges.

101 Of ridges. The firſt thing that occurs on this head, is to con-

ſider what grounds ought to be formed into ridges, and what ought to be tilled with a flat ſurface. Dry ſoils, which ſuffer by lack of moiſture, ought to be tilled flat, which tends to retain moiſture. And the method for ſuch tilling, is to go round and round from the circumference to the centre, or from the centre to the circumference. This method is advantageous in point of expedition, as the whole is finiſhed without once turning the plough. At the ſame time, every inch of the ſoil is moved, inſtead of leaving either the crown or the furrow unmoved, as is commonly done in tilling ridges. Clay ſoil, which ſuffers by water ſtanding on it, ought to be laid as dry as poſſible by proper ridges. A loamy ſoil is the middle between the two mentioned. It ought to be tilled flat in a dry country, eſpecially if it incline to the ſoil firſt mentioned. In a moiſt country, it ought to be formed into ridges, high or low according to the degree of moiſture and tendency to clay.

In grounds that require ridging, an error prevails, that ridges cannot be raiſed too high. High ridges labour under ſeveral diſadvantages. The ſoil is heaped upon the crown, leaving the furrows bare: the crown is too dry, and the furrows too wet: the crop, which is always beſt on the crown, is more readily ſhaken with the wind, than where the whole crop is of an equal height: the half of the ridge is always covered from the ſun, a diſadvantage which is far from being ſlight in a cold climate. High ridges labour under another diſadvantage in ground that has no more level than barely ſufficient to carry off water: they ſink the furrows below the level of the ground; and conſequently retain water at the end of every ridge. The furrows ought never to be ſunk below the level of the ground. Water will more effectually be carried off, by leſſening the ridges both in height and breadth: a narrow ridge, the crown of which is but 18 inches higher than the furrow, has a greater ſlope than a very broad ridge where the difference is three or four feet.

Next, of forming ridges where the ground hangs conſiderably. Ridges may be too ſteep as well as too horizontal; and if to the ridges be given all the ſteepneſs of a field, a heavy ſhower may do irreparable miſchief. To prevent ſuch miſchief, the ridges ought to be ſo directed croſs the field, as to have a gentle ſlope for carrying off water ſlowly, and no more. In that reſpect, a hanging field has greatly the advantage of one that is nearly horizontal; becauſe in the latter, there is no opportunity of a choice in forming the ridges. A hill is of all the beſt adapted for directing the ridges properly. If the ſoil be gravelly, it may be ploughed round and round, beginning at the bottom and aſcending gradually to the top in a ſpiral line. This method of ploughing a hill, requires no more force than ploughing on a level; and at the ſame time removes the great inconvenience of a gravelly hill, that rains go off too quickly; for the rain is retained in every furrow. If the ſoil be ſuch as to require ridges, they may be directed to any ſlope that is proper.

In order to form a field into ridges, that has not been formerly cultivated, the rules mentioned are eaſily put in execution. But what if ridges be already formed, that are either crooked or too high? After ſeeing the advantage of forming a field into ridges, people were naturally led into an error, that the higher the better. But what could tempt them to make their ridges crooked? Certainly this method did not originate from deſign; but from the lazineſs of the driver ſuffering the cattle to turn too haſtily, inſtead of making them finiſh the ridge without turning. There is more than one diſadvantage in this ſlovenly practice. Firſt, the water is kept in by the curve at the end of every ridge, and ſours the ground. Next, as a plough has the leaſt friction poſſible in a ſtraight line, the friction muſt be increaſed in a curve, the back part of the mouldboard preſſing hard on the one hand, and the coulter preſſing hard on the other. In the third place, the plough moving in a ſtraight line, has the greateſt command in laying the earth over. But where the ſtraight line of the plough is applied to the curvature of a ridge in order to heighten it by gathering, the earth moved by the plough is continually falling back, in ſpite of the moſt ſkilful ploughman.

The inconveniencies of ridges high and crooked are ſo many, that one would be tempted to apply a remedy at any riſk. And yet, if the ſoil be clay, it would not be adviſeable for a tenant to apply the remedy upon a leaſe ſhorter than two nineteen years. In a dry gravelly ſoil, the work is not difficult, nor hazardous. When the ridges are cleaved two or three years ſucceſſively in the courſe of cropping, the operation ought to be concluded in one ſummer. The earth, by reiterated ploughings, ſhould be accumulated upon the furrows, ſo as to raiſe them higher than the crowns: they cannot be raiſed too high, for the accumulated earth will ſubſide by its own weight. Croſs-ploughing once or twice, will reduce the ground to a flat ſurface, and give opportunity to form ridges at will. The ſame method brings down ridges in clay ſoil: only let care be taken to carry on the work with expedition; becauſe a hearty ſhower, before the new ridges are formed, would ſoak the ground in water, and make the farmer ſuſpend his work for the remainder of that year at leaſt. In a ſtrong clay, we would not venture to alter the ridges, unleſs it can be done to perfection in one ſeaſon.—On this ſubject Mr Anderſon has the following obſervations *.

103 Inconveniencies in the common methods of levelling.

"The difficulty of performing this operation properly with the common implements of huſbandry, and the obvious benefit that accrues to the farmer from having his fields level, has produced many new inventions of ploughs, harrows, drags, &c. calculated for ſpeedily reducing the fields to that ſtate; none of which have as yet been found fully to anſwer the purpoſe for which they were intended, as they all indiſcriminately carry the earth that was on the high places into thoſe that were lower; which, although it may, in ſome caſes, render the ſurface of the ground tolerably ſmooth and level, is uſually attended with inconveniencies far greater, for a conſiderable length of time, than that which it was intended to remove.

105 Vegetable mould becomes inert by being long buried.

"For experience ſufficiently ſhows, that even the beſt vegetable mould, if buried for any length of time ſo far beneath the ſurface as to be deprived of the benign influences of the atmoſphere, loſes its *vis vitæ*, if I may be allowed that expreſſion; becomes an inert, lifeleſs maſs, little fitted for nouriſhing vegetables; and conſtitutes a ſoil very improper for the purpoſes of the farmer. It therefore behoves him, as much as in him lies, to preſerve, on every part of his fields, an equal covering of that vegetable mould that has long been uppermoſt, and rendered fertile by the meliorating influence of the atmoſphere. But, if he ſuddenly levels his high ridges by any of theſe mechanical contrivances, he of neceſſity buries all the good mould that was on the top of the ridges, in the old furrows; by which he greatly impoveriſhes one part of his field, while he too much enriches another; inſomuch that it is a matter of great difficulty, for many years thereafter, to get the field brought to an equal degree of fertility in different places; which makes it impoſſible for the farmer to get an equal crop over the whole of his field by any management whatever: and he has the mortification frequently, by this means, to ſee the one half of his crop rotted by an over-luxuriance, while other parts of it are weak and ſickly, or one part ripe and ready for reaping, while the other is not properly filled; ſo that it were, on many occaſions, better for him to have his whole field reduced at once to the ſame degree of poorneſs as the pooreſt of it, than have it in this ſtate. An almoſt impracticable degree of attention in ſpreading the manures may indeed in ſome meaſure get the better of this; but it is ſo difficult to perform this properly, that I have frequently ſeen fields that had been thus levelled, in which, after thirty years of continued culture and repeated dreſſings, the marks of the old ridges could be diſtinctly traced when the corn was growing, altho' the ſurface was ſo level that no traces of them could be perceived when the corn was off the ground.

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* *Eſſays on Agriculture*, Vol. I. p. 146.

" But this is a degree of perfection in levelling that cannot be uſually attained by following this mode of practice; and, therefore, is but ſeldom ſeen. For all that can be expected to be done by any levelling machine, is to render the ſurface perfectly ſmooth and even in every part, at the time that the operation is performed: but as, in this caſe, the old hollows are ſuddenly filled up with looſe mould to a great depth, while the earth below the ſurface upon the heights of the old ridges remain firm and compact, the new-raiſed earth after a ſhort time ſubſides very much, while the other parts of the field do not ſink at all; ſo that, in a ſhort time, the old furrows come to be again below the level of the other parts of the field, and the water of courſe is ſuffered in ſome degree to ſtagnate upon them; in ſo much that, in a few years, it becomes neceſſary once more to repeat the ſame levelling proceſs, and thus renew the damage that the farmer ſuſtains by this pernicious operation.

104 Levelling ſometimes not to be attempted.

" On theſe accounts, if the farmer has not a long leaſe, it will be found in general to be much his intereſt to leave the ridges as he found them, rather than to attempt to alter their direction: and, if he attends with due caution to moderate the height of theſe old ridges, he may reap very good crops, although perhaps at a ſomewhat greater expenſe of labour than he would have been put to upon the ſame field, if it had been reduced to a proper level ſurface, and divided into ſtraight and parallel ridges.

" But, where a man is ſecure of poſſeſſing his ground for any conſiderable length of time, the advantages that he will reap from having level and well laid-out fields, are ſo conſiderable as to be worth purchaſing, if it ſhould even be at a conſiderable expence. But the loſs that is ſuſtained at the beginning, by this mechanical mode of levelling ridges, if they are of conſiderable height, is ſo very great, that it is perhaps doubtful if any future advantages can ever fully compenſate it. I would therefore adviſe, that all this levelling apparatus ſhould be laid aſide; and the following more efficacious practice be ſubſtituted in its ſtead: A practice that I have long followed with ſucceſs, and can ſafely recommend as the very beſt that has yet come to my knowledge.

105 Beſt metho of levellin

" If the ridges have been raiſed to a very great height, as a preparation for the enſuing operations, they may be firſt *cloven*, or *ſcaled* out, as it is called in different places; that is, ploughed ſo as to lay the earth on each ridge from the middle towards the furrows. But, if they are only of a moderate degree of height, this operation may be omitted. When you mean to proceed to level the ground, let a number of men be collected, with ſpades, more or fewer as the nature of the ground requires, and then ſet a plough to draw a furrow directly acroſs the ridges of the whole field intended to be levelled. Divide this line into as many parts as you have labourers, allotting to each one ridge or two, or more or leſs, according to their number, height, and other circumſtances. Let each of the labourers have orders, as ſoon as the plough has paſſed that part aſſigned him, to begin to dig in the bottom or the furrow that the plough has juſt made, about the middle of the ſide of the old ridge, keeping his face towards the old furrow, working backwards till he comes to the height of the ridge, and then turn towards the other furrow, and repeat the ſame on the other ſide of the ridge, always throwing the earth that he digs up into the deep old furrow between the ridges, that is directly before him; taking care not to dig deep where he firſt begins, but to go deeper and deeper as he advances to the height of the ridge, ſo as to leave the bottom of the trench he thus makes acroſs the ridge entirely level, or as nearly ſo as poſſible. And when he has finiſhed that part of the furrow allotted to him that the plough has made in going, let him then go and finiſh in the ſame manner his own portion of the furrow that the plough makes in returning. In this manner, each man performs his own taſk through the whole field, gradually raiſing the old furrows as the old heights are depreſſed. And, if an attentive overſeer is at hand, to ſee that the whole is equally well done, and that each furrow is raiſed to a greater height than the middle of the old ridges, ſo as to allow for the ſubſiding of that looſe earth, the operation will be entirely finiſhed at once, and never again need to be repeated.

" In performing this operation, it will always be proper to make the ridges, formed for the purpoſe of levelling, which go acroſs the old ridges, as broad as poſſible; becauſe the deep trench that is thus made in each of the furrows are an impediment in the future operations, as well as the height that is accumulated in the middle of each of theſe ridges; ſo that the fewer there are of theſe, the better it is. The farmer, therefore, will do well to advert to this in time, and begin by forming a ridge by always turning the plough to the right hand, till it becomes of ſuch a breadth as makes it very inconvenient to turn longer in that manner; and then, at the diſtance of twice the breadth of this new-formed ridge from the middle of it, mark off a furrow for the middle of another ridge, turning round it to the right hand, in the ſame manner as was done in the former, till it becomes of the ſame breadth with it; and then, turning to the left hand, plough out the interval that was left between the two new-formed ridges. By this mode of ploughing, each ridge may be made of 40, or 50 or 60 yards in breadth, without any great inconvenience; for although ſome time will be loſt in turning at the ends of theſe broad ridges, yet, as this operation is only to be once performed in this manner, the advantage that is reaped by having few open furrows, is more than ſufficient to counterbalance it. And, in order to moderate the height that would be formed in the middle of each of theſe great ridges, it will always be proper to mark out the ridges, and draw the furrow that is to be the middle of each, ſome days before you collect your labourers to level the field; that you may, without any hurry or loſs of labour, clear out a good trench through the middle of each of the old ridges; as the plough at this time going and returning nearly in the ſame track, prevents the labourers from working properly without this precaution.

"If theſe rules are attended to, your field will be at once reduced to a proper level, and the rich earth that formed the ſurface of the old ridges be ſtill kept upon the ſurface of your field; ſo that the only loſs that the poſſeſſor of ſuch ground can ſuſtain by this operation, is merely the expence of performing it."

He afterwards makes a calculation of the different expences of levelling by the plough and by the ſpade, in which he finds the latter by far the cheapeſt method.

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107 row ridges an advantage. It is a great advantage in agriculture, to form ridges ſo narrow, and ſo low, as to admit the crowns and furrows to be changed alternately every crop. The ſoil neareſt the ſurface is the beſt; and by ſuch ploughing, it is always kept near the ſurface, and never buried. In high ridges, the ſoil is accumulated at the crown and the furrows left bare. Such alteration of crown and furrow, is eaſy where the ridges are no more but ſeven or eight feet broad. This mode of ploughing anſwers perfectly well in ſandy and gravelly ſoils, and even in loam. But it is not ſafe in clay ſoil. In that ſoil, the ridges ought to be 12 feet wide, and 20 inches high; to be preſerved always in the ſame form by caſting, that is, by ploughing two ridges together, beginning at the furrow that ſeparates them, and ploughing round and round till the two ridges be finiſhed. By this method, the ſeparating furrow is raiſed a little higher than the furrows that bound the two ridges. But at the next ploughing, that inequality is corrected, by beginning at the bounding furrows, and going round and round till the ploughing of the two ridges be completed at the ſeparating furrow.

4. CLEARING GROUND of WEEDS.

108 ning ow. e V. 5. FOR this purpoſe a new inſtrument, termed a *cleaning harrow*, has been introduced by Lord Kaimes, and is ſtrongly recommended (B.) It is one entire piece like the firſt of thoſe mentioned above, conſiſting of ſeven bulls, four feet long each, two and one-fourth inches broad, two and three-fourths deep. The bulls are united together by ſheths, ſimilar to what are mentioned above. The intervals between the bulls being three and three-fourths inches, the breadth of the whole harrow is three feet five inches. In each bull are inſerted eight teeth, each nine inches free below the wood, and diſtant from each other ſix inches. The weight of each tooth is a pound, or near it. The whole is firmly bound by an iron plate from corner to corner in the line of the draught. The reſt as in the harrows mentioned above. The ſize, however, is not invariable. The cleaning harrow ought to be larger or leſs according as the ſoil is ſtiff or free.

To give this inſtrument its full effect, ſtones of ſuch a ſize as not to paſs freely between the teeth ought to be carried off, and clods of that ſize ought to be broken. The ground ought to be dry, which it commonly is in the month of May.

In preparing for barley, turnip, or other ſummer-crop, begin with ploughing and croſs-ploughing. If the ground be not ſufficiently pulverized, let the great brake be applied, to be followed ſucceſſively with the 1st and 2d harrows*. In ſtiff ſoil, rolling may be proper, or twice between the acts. Theſe operations will looſen every root, and bring ſome of them to the ſurface. This is the time for the 3d harrow†, conducted by a boy mounted on one of the horſes, who trots ſmartly along the field, and brings all the roots to the ſurface: there they are to lie for a day or two, till perfectly dry. If any ſtones or clods remain, they muſt be carried off in a cart. And now ſucceeds the operation of the cleaning harrow. It is drawn by a ſingle horſe, directed by reins, which the man at the oppoſite corner puts over his head, in order to have both hands free. In this corner is fixed a rope, with which the man from time to time raiſes the harrow from the ground, to let the weeds drop. For the ſake of expedition, the weeds ought to be dropt in a ſtraight line croſs the field, whether the harrow be full or not; and ſeldom is a field ſo dirty but that the harrow may go 30 yards before the teeth are filled. The weeds will be thus laid in parallel rows, like thoſe of hay raked together for drying. A harrow may be drawn ſwiftly along the rows, in order to ſhake out all the duſt; and then the weeds may be carried clean off the field in carts. But we are not yet done with theſe weeds: inſtead of burning, which is the ordinary practice, they may be converted into uſeful manure, by laying them in a heap with a mixture of hot dung to begin fermentation. At firſt view, this way of cleaning land will appear operoſe; but upon trial, neither the labour nor expence will be found immoderate. At any rate, the labour and expence ought not to be grudged; for if a field be once thoroughly cleaned, the ſeaſons muſt be very croſs, or the farmer very indolent, to make it neceſſary to renew the operation in leſs than 20 years. In the worſt ſeaſons, a few years paſture is always under command; which effectually deſtroys triennial plants, ſuch as thiſtles and couch-graſs.

SECT. III. *Culture of particular Plants.*

THE articles hitherto inſiſted on, are all of them preparatory to the capital object of a farm, that of raiſing 109 covering of that vegetable mould that has long been uppermoſt, and rendered fertile by the meliorating influence of the atmoſphere. But, if he ſuddenly levels his high ridges by any of theſe mechanical contrivances, he of neceſſity buries all the good mould that was on the top of the ridges, in the old furrows; by which he greatly impoveriſhes one part of his field, while he too much enriches another; inſomuch that it is a matter of great difficulty, for many years thereafter, to get the field brought to an equal degree of fertility in different places; which makes it impoſſible for the farmer to get an equal crop over the whole of his field by any management whatever: and he has the mortification frequently, by this means, to ſee the one half of his crop rotted by an over-luxuriance, while other parts of it are weak and ſickly, or one part ripe and ready for reaping, while the other is not properly filled; ſo that it were, on many occaſions, better for him to have his whole field reduced at once to the ſame degree of poorneſs as the pooreſt of it, than have it in this ſtate. An almoſt impracticable degree of attention in ſpreading the manures may indeed in ſome meaſure get the better of this; but it is ſo difficult to perform this properly, that I have frequently ſeen fields that had been thus levelled, in which, after thirty years of continued culture and repeated dreſſings, the marks of the old ridges could be diſtinctly traced when the corn was growing, altho' the ſurface was ſo level that no traces of them could be perceived when the corn was off the ground.

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* Plate V. fig. 3, 4.

† Fig. 5.

(B) In his *Gentleman Farmer;* to which performance the practical part of this article is materially indebted.

" But this is a degree of perfection in levelling that cannot be uſually attained by following this mode of practice; and, therefore, is but ſeldom ſeen. For all that can be expected to be done by any levelling machine, is to render the ſurface perfectly ſmooth and even in every part, at the time that the operation is performed: but as, in this caſe, the old hollows are ſuddenly filled up with looſe mould to a great depth, while the earth below the ſurface upon the heights of the old ridges remain firm and compact, the new-raiſed earth after a ſhort time ſubſides very much, while the other parts of the field do not ſink at all; ſo that, in a ſhort time, the old furrows come to be again below the level of the other parts of the field, and the water of courſe is ſuffered in ſome degree to ſtagnate upon them; in ſo much that, in a few years, it becomes neceſſary once more to repeat the ſame levelling proceſs, and thus renew the damage that the farmer ſuſtains by this pernicious operation.

104
Levelling ſometimes not to be attempted.

" On theſe accounts, if the farmer has not a long leaſe, it will be found in general to be much his intereſt to leave the ridges as he found them, rather than to attempt to alter their direction: and, if he attends with due caution to moderate the height of theſe old ridges, he may reap very good crops, although perhaps at a ſomewhat greater expenſe of labour than he would have been put to upon the ſame field, if it had been reduced to a proper level ſurface, and divided into ſtraight and parallel ridges.

" But, where a man is ſecure of poſſeſſing his ground for any conſiderable length of time, the advantages that he will reap from having level and well laid-out fields, are ſo conſiderable as to be worth purchaſing, if it ſhould even be at a conſiderable expence. But the loſs that is ſuſtained at the beginning, by this mechanical mode of levelling ridges, if they are of conſiderable height, is ſo very great, that it is perhaps doubtful if any future advantages can ever fully compenſate it. I would therefore adviſe, that all this levelling apparatus ſhould be laid aſide; and the following more efficacious practice be ſubſtituted in its ſtead: A practice that I have long followed with ſucceſs, and can ſafely recommend as the very beſt that has yet come to my knowledge.

105
Beſt metho of levellin

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4. Clearing Ground of Weeds.

108 For this purpoſe a new inſtrument, termed a *cleaning harrow*, has been introduced by Lord Kaimes, and is ſtrongly recommended (b.) It is one entire piece like the firſt of thoſe mentioned above, conſiſting of ſeven bulls, four feet long each, two and one-fourth inches broad, two and three-fourths deep. The bulls are united together by ſheths, ſimilar to what are mentioned above. The intervals between the bulls being three and three-fourths inches, the breadth of the whole harrow is three feet five inches. In each bull are inſerted eight teeth, each nine inches free below the wood, and diſtant from each other ſix inches. The weight of each tooth is a pound, or near it. The whole is firmly bound by an iron plate from corner to corner in the line of the draught. The reſt as in the harrows mentioned above. The ſize, however, is not invariable. The cleaning harrow ought to be larger or leſs according as the ſoil is ſtiff or free.

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In preparing for barley, turnip, or other ſummer-crop, begin with ploughing and croſs-ploughing. If the ground be not ſufficiently pulverized, let the great brake be applied, to be followed ſucceſſively with the 1st and 2d harrows*. In ſtiff ſoil, rolling may be proper, or twice between the acts. Theſe operations will looſen every root, and bring ſome of them to the ſurface. This is the time for the 3d harrow†, conducted by a boy mounted on one of the horſes, who trots ſmartly along the field, and brings all the roots to the ſurface: there they are to lie for a day or two, till perfectly dry. If any ſtones or clods remain, they muſt be carried off in a cart. And now ſucceeds the operation of the cleaning harrow. It is drawn by a ſingle horſe, directed by reins, which the man at the oppoſite corner puts over his head, in order to have both hands free. In this corner is fixed a rope, with which the man from time to time raiſes the harrow from the ground, to let the weeds drop. For the ſake of expedition, the weeds ought to be dropt in a ſtraight line croſs the field, whether the harrow be full or not; and ſeldom is a field ſo dirty but that the harrow may go 30 yards before the teeth are filled. The weeds will be thus laid in parallel rows, like thoſe of hay raked together for drying. A harrow may be drawn ſwiftly along the rows, in order to ſhake out all the duſt; and then the weeds may be carried clean off the field in carts. But we are not yet done with theſe weeds: inſtead of burning, which is the ordinary practice, they may be converted into uſeful manure, by laying them in a heap with a mixture of hot dung to begin fermentation. At firſt view, this way of cleaning land will appear operoſe; but upon trial, neither the labour nor expence will be found immoderate. At any rate, the labour and expence ought not to be grudged; for if a field be once thoroughly cleaned, the ſeaſons muſt be very croſs, or the farmer very indolent, to make it neceſſary to renew the operation in leſs than 20 years. In the worſt ſeaſons, a few years paſture is always under command; which effectually deſtroys triennial plants, ſuch as thiſtles and couch-graſs.

* Plate V. fig. 3, 4.

† Fig. 5.

Sect. III. *Culture of particular Plants.*

109 The articles hitherto inſiſted on, are all of them preparatory to the capital object of a farm, that of raiſing

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(b) In his *Gentleman Farmer*; to which performance the practical part of this article is materially indebted.

raiſing plants for the nouriſhment of man, and of other animals. Theſe are of two kinds; culmiferous, and leguminous; differing widely from each other. Wheat, rye, barley, oats, rye-graſs, are of the firſt kind: of the other kind are peaſe, beans, clover, cabbage, and many others.

110 Culmiferous plants. Culmiferous plants, ſays Bonnet, have three ſets of roots. The firſt iſſue from the ſeed, and puſh to the ſurface an upright ſtem; another ſet iſſue from a knot in that ſtem; and a third, from another knot, nearer the ſurface. Hence the advantage of laying ſeed ſo deep in the ground as to afford ſpace for all the ſets.

111 Leguminous plants. Leguminous plants form their roots differently. Peaſe, beans, cabbage, have ſtore of ſmall roots, all iſſuing from the ſeed, like the undermoſt ſet of culmiferous roots; and they have no other roots. A potatoe and a turnip have bulbous roots. Red clover has a ſtrong tap-root. The difference between culmiferous and leguminous plants with reſpect to the effects they produce in the ſoil, will be inſiſted on afterward, in the ſection concerning rotation of crops. As the preſent ſection is confined to the propagation of plants, it falls naturally to be divided into three articles: firſt, Plants cultivated for fruit; ſecond, Plants cultivated for roots; third, Plants cultivated for leaves.

I. Plants Cultivated for Fruit.

1. Wheat and Rye.

112 Fallowing for wheat. Any time from the middle of April to the middle of May, the fallowing for wheat may commence. The moment ſhould be choſen, when the ground, beginning to dry, has yet ſome remaining ſoftneſs: in that condition, the ſoil divides eaſily by the plough, and falls into ſmall parts. This is an eſſential article, deſerving the ſtricteſt attention of the farmer. Ground ploughed too wet, riſes, as we ſay, *whole-fur*, as when paſture-ground is ploughed: where ploughed too dry, it riſes in great lumps, which are not reduced by ſubſequent ploughings; not to mention, that it requires double force to plough ground too dry, and that the plough is often broken to pieces. When the ground is in proper order, the farmer can have no excuſe for delaying a ſingle minute. This firſt courſe of fallow muſt, it is true, yield to the barley-ſeed; but as the barley-ſeed is commonly over the firſt week of May, or ſooner, the ſeaſon muſt be unfavourable if the fallow cannot be reached by the middle of May.

As clay ſoil requires high ridges, theſe ought to be cleaved at the firſt ploughing, begining at the furrow, and ending at the crown. This ploughing ought to be as deep as the ſoil will admit: and water-furrowing ought inſtantly to follow; for if rain happen before water-furrowing, it ſtagnates in the furrow, neceſſarily delays the ſecond ploughing till that part of the ridge be dry, and prevents the furrow from being mellowed and roaſted by the ſun. If this firſt ploughing be well executed, annual weeds will riſe in plenty.

About the firſt week of June, the great brake will looſen and reduce the ſoil, encourage a ſecond crop of annuals, and raiſe to the ſurface the roots of weeds moved by the plough. Give the weeds time to ſpring, which may be in two or three weeks. Then proceed to the ſecond ploughing about the beginning of July; which muſt be croſs the ridges, in order to reach all the ſlips of the former ploughing. By croſs-ploughing the furrows will be filled up, and water-furrowing be ſtill more neceſſary than before. Employ the brake again about the 10th of Auguſt, to deſtroy the annuals that have ſprung ſince the laſt ſtirring. The deſtruction of weeds is a capital article in fallowing: yet ſo blind are people to their intereſt, that nothing is more common than a fallow field covered with charlock and wild muſtard, all in flower, and ten or twelve inches high. The field having now received two harrowings and two breakings, is prepared for manure, whether lime or dung, which without delay ought to be incorporated with the ſoil, by a repeated harrowing and a gathering furrow. This ought to be about the beginning of September, and as ſoon after as you pleaſe the ſeed may be ſown.

As in ploughing a clay ſoil it is of importance to prevent poaching, the hinting furrows ought to be done with two horſes in a line. If four ploughs be employed in the ſame field, to one of them may be allotted the care of finiſhing the hinting furrows.

113 Dreſſing loam for wheat. Loam, being a medium between ſand and clay, is of all ſoils the fitteſt for culture, and the leaſt ſubject to chances. It does not hold water like clay; and when wet, it dries ſooner. At the ſame time, it is more retentive than ſand of that degree of moiſture which promotes vegetation. On the other hand, it is more ſubject to couch-graſs than clay, and to other weeds; to deſtroy which, fallowing is ſtill more neceſſary than in clay.

Beginning the fallow about the firſt of May, or as ſoon as barley-ſeed is over, take as deep a furrow as the ſoil will admit. Where the ridges are ſo low and narrow as that the crown and furrow can be changed alternately, there is little or no occaſion for water-furrowing. Where the ridges are ſo high as to make it proper to cleave them, water-furrowing is proper. The ſecond ploughing may be at the diſtance of five weeks. Two crops of annuals may be got in the interim, the firſt by the brake, and the next by the harrow; and by the ſame means eight crops may be got in the ſeaſon. The ground muſt be cleared of couch-graſs and knot-graſs roots, by the cleaning harrow deſcribed above. The time for this operation is immediately before the manure is laid on. The ground, at that time being in its looſeſt ſtate, parts with its graſs-roots more freely than at any other time. After the manure is ſpread, and incorporated with the ſoil by brakeing or harrowing, the ſeed may be ſown under furrow, if the ground hang ſo as eaſily to carry off the moiſture. To leave it rough without harrowing, has two advantages: it is not apt to cake with moiſture; and the inequalities make a ſort of ſhelter to the young plants againſt froſt. But if it lie flat, it ought to be ſmoothed with a ſlight harrow after the ſeed is ſown, which will facilitate the courſe of the rain from the crown to the furrow.

114 Dreſſing ſandy ſoil. A ſandy ſoil is too looſe for wheat. The only chance for a crop is after red clover, the roots of which bind the ſoil; and the inſtructions above given for loam are applicable here. Rye is a crop much fitter for ſandy ſoil than wheat; and like wheat it is generally ſown after a ſummer-fallow.

115 Time for ſowing. Laſtly, Sow wheat as ſoon in the month of October as the ground is ready. When ſown a month more early, it

is too forward in the ſpring, and apt to be hurt by froſt: when ſown a month later, it has not time to root before froſt comes on, and froſt ſpews it out of the ground.

2. Oats.

116 ffect of roſt upon lled land.

As winter-ploughing enters into the culture of oats, we muſt remind the reader of the effect of froſt upon tilled land. Providence has neglected no region intended for the habitation of man. If in warm climates the ſoil be meliorated by the ſun, it is no leſs meliorated by froſt in cold climates. Froſt acts upon water, by expanding it into a larger ſpace. Froſt has no effect upon dry earth; witneſs ſand, upon which it it makes no impreſſion. But upon wet earth it acts moſt vigorouſly: it expands the moiſture, which requiring more ſpace puts every particle of the earth out of its place, and ſeparates them from each other. In that view, froſt may be conſidered as a plough ſuperior to any that is made, or can be made, by the hand of man: its action reaches the minuteſt particles; and, by dividing and ſeparating them, it renders the ſoil looſe and friable. This operation is the moſt remarkable in tilled land, which gives free acceſs to froſt. With reſpect to clay-ſoil in particular, there is no rule in huſbandry more eſſential than to open it before winter in hopes of froſt. It is even adviſeable in a clay-ſoil to leave the ſtubble rank, which, when ploughed in before winter, keeps the clay looſe, and admits the froſt into every cranny.

To apply this doctrine, it is dangerous to plough clay-ſoil when wet; becauſe water is a cement for clay, and binds it ſo as to render it unfit for vegetation. It is, however, leſs dangerous to plough wet clay before winter, than after. A ſucceeding froſt corects the bad effects of ſuch ploughing; a ſucceeding drought increaſes them.

117 lture of ts.

The common method is, to ſow oats on new-ploughed land in the month of March, as ſoon as the ground is tolerably dry. If it continue wet all the month of March, it is too late to venture them after. It is much better to ſummer-fallow, and to ſow wheat in the autumn. But the preferable method, eſpecially in clay-ſoil, is to turn over the field after harveſt, and to lay it open to the influences of froſt and air, which leſſen the tenacity of clay, and reduce it to a free mould. The ſurface-ſoil by this means is finely mellowed for reception of the ſeed; and it would be a pity to bury it by a ſecond ploughing before ſowing. In general, the bulk of clay-ſoils are rich; and ſkilful ploughing without dung, will probably give a better crop, than unſkilful ploughing with dung.

Hitherto of natural clays. We muſt add a word of carſe-clays which are artificial, whether left by the ſea, or ſweeped down from higher grounds by rain. The method commonly uſed of dreſſing carſe-clay for oats, is, not to ſtir it till the ground be dry in the ſpring, which ſeldom happens before the firſt of March, and the ſeed is ſown as ſoon after as the ground is ſufficiently dry for its reception. Froſt has a ſtronger effect on ſuch clays than on natural clay. And if the field be laid open before winter, it is rendered ſo looſe by froſt as to be ſoon drenched in water. The particles at the ſame time are ſo ſmall, as that the firſt drought in ſpring makes the ſurface cake or cruſt. The difficulty of reducing this cruſt into mould for covering the oat-ſeed, has led farmers to delay ploughing till the month of March. But we are taught by experience, that this ſoil ploughed before winter, is ſooner dry than when the ploughing is delayed till ſpring; and as early ſowing is a great advantage, the objection of the ſuperficial cruſting is eaſily removed by the firſt harrow above deſcribed, which will produce abundance of mould for covering the ſeed. The ploughing before winter not only procures early ſowing, but has another advantage: the ſurface-ſoil that had been mellowed during winter by the ſun, froſt, and wind, is kept above.

The dreſſing a loamy ſoil for oats differs little from dreſſing a clay ſoil, except in the following particular, that being leſs hurt by rain, it requires not high ridges, and therefore ought to be ploughed crown and furrow alternately.

Where there is both clay and loam in a farm, it is obvious from what is ſaid above, that the ploughing of the clay after harveſt ought firſt to be diſpatched. If both cannot be overtaken that ſeaſon, the loam may be delayed till the ſpring with leſs hurt.

Next of a gravelly ſoil; which is the reverſe of clay, as it never ſuffers but from want of moiſture. Such a ſoil ought to have no ridges; but be ploughed circularly from the centre to the circumference, or from the circumference to the centre. It ought to be tilled after harveſt: and the firſt dry weather in ſpring ought to be laid hold of to ſow, harrow, and roll; which will preſerve it in ſap.

The culture of oats is the ſimpleſt of all. That grain is probably a native of Britain: it will grow on the worſt ſoil with very little preparation. For that reaſon, before turnip was introduced, it was always the firſt crop upon land broken up from the ſtate of nature.

Upon ſuch land, may it not be a good method, to build upon the crown of every ridge, in the form of a wall, all the ſurface-earth, one ſod above another, as in a fold for ſheep? After ſtanding in this form all the ſummer and winter, let the walls be thrown down, and the ground prepared for oats. This will ſecure one or two good crops; after which the land may be dunged for a crop of barley and graſs-ſeeds. This method may anſwer in a farm where manure is ſcanty.

3. Barley.

118 Culture of barley.

This is a culmiferous plant that requires a mellow ſoil. Upon that account, extraordinary care is requiſite where it is to be ſown in clay. The land ought to be ſtirred immediately after the foregoing crop is removed, which lays it open to be mellowed with the froſt and air. In that view, a peculiar ſort of ploughing has been introduced, termed *ribbing;* by which the greateſt quantity of ſurface poſſible is expoſed to the air and froſt. The obvious objection to this method is, that half of the ridge is left unmoved. And to obviate that objection, the following method is offered, which moves the whole ſoil, and at the ſame time expoſes the ſame quantity of ſurface to the froſt and air. As ſoon as the former crop is off the field, let the ridges be gathered with as deep a furrow as the ſoil will admit, beginning at the crown and ending at the furrows. This ploughing looſens the whole ſoil, giving free acceſs to the air and froſt. Soon after, begin a ſecond ploughing in the following manner. Let the field

119 Ribbing.

120 A better method.

field be divided by parallel lines croſs the ridges, with intervals of 30 feet or ſo. Plough once round an interval, beginning at the edges, and turning the earth toward the middle of the interval; which covers a foot or ſo of the ground formerly ploughed. Within that foot plough another round ſimilar to the former; and after that, other rounds, till the whole interval be finiſhed, ending at the middle. Inſtead of beginning at the edges, and ploughing toward the middle, it will have the ſame effect to begin at the middle and to plough toward the edges. Plough the other intervals in the ſame manner. As by this operation the furrows of the ridges will be pretty much filled up, let them be cleared and water-furrowed without delay. By this method, the field will be left waving like a plot in a kitchen-garden, ridged up for winter. In this form, the field is kept perfectly dry; for beſide the capital furrows that ſeparate the ridges, every ridge has a number of croſs furrows that carry the rain inſtantly to the capital furrows. In hanging grounds retentive of moiſture, the parallel lines above mentioned ought not to be perpendicular to the furrows of the ridges, but to be directed a little downward, in order to carry rain-water the more haſtily to theſe furrows. If the ground be clean, it may lie in that ſtate winter and ſpring, till the time of ſeed-furrowing. If weeds happen to riſe, they muſt be deſtroyed by ploughing, or brakeing, or both; for there cannot be worſe huſbandry, than to put ſeed into dirty ground.

121 Advantages of this method. This method reſembles common ribbing in appearance, but is very different in reality. As the common ribbing is not preceded by a gathering furrow, the half of the field is left untilled, compact as when the former crop was removed, impervious in a great meaſure to air or froſt. The common ribbing at the ſame time lodges the rain-water on every ridge, preventing it from deſcending to the furrows; which is hurtful in all ſoils, and poiſonous in a clay ſoil. The *ſtitching* here deſcribed, or *ribbing* if you pleaſe to call it ſo, prevents theſe noxious effects. By the two ploughings the whole ſoil is opened, admitting freely air and froſt; and the multitude of furrows lays the ſurface perfectly dry, giving an early opportunity for the barley-ſeed.—But further, as to the advantage of this method: When it is proper to ſow the ſeed, all is laid flat with the brake, which is an eaſy operation upon ſoil that is dry and pulverized; and the ſeed-furrow which ſucceeds, is ſo ſhallow as to bury little or none of the ſurface-earth: whereas the ſtirring for barley is commonly done with the deepeſt furrow; and conſequently buries all the ſurface-ſoil that was mellowed by the froſt and air. Nor is this method more expenſive; becauſe the common ribbing muſt always be followed with a ſtirring furrow, which is ſaved in the method recommended. Nay, it is leſs expenſive; for after common ribbing, which keeps in the rain-water, the ground is commonly ſo ſoured, as to make the ſtirring a laborious work.

122 Time of ſowing. Where the land is in good order, and free of weeds, April is the month for ſowing barley. Every day is proper, from the firſt to the laſt.

The dreſſing loamy ſoil and light ſoil for barley, is the ſame with that deſcribed; only that to plough dry is not altogether ſo eſſential as in dreſſing clay-ſoil. Loam or ſand may be ſtirred a little moiſt: better, however, delay a week or two, than to ſtir a loam when moiſt. Clay muſt never be ploughed moiſt, even tho' the ſeaſon ſhould eſcape altogether. But this will ſeldom be neceſſary; for not in one year of 20 will it happen, but that clay is dry enough for ploughing ſome time in May. Froſt may correct clay ploughed wet after harveſt; but ploughed wet in the ſpring, it unites into a hard maſs, not to be diſſolved but by very hard labour.

The foregoing culmiferous plants are what are ordinarily propagated for food in this country. What follow are leguminous plants.

4. BEANS.

123 Culture of beans. THE propereſt ſoil for beans is a deep and moiſt clay. There was lately introduced into Scotland a method of ſowing beans will a drill-plough, and horſe-hoeing the intervals; which, beſide affording a good crop, is a dreſſing to the ground. But as that method is far from being general, we keep in the common track.

As this grain is early ſown, the ground intended for it ſhould be ploughed before winter, to give acceſs to the froſt and air; beneficial in all ſoils, and neceſſary in a clay-ſoil. Take the firſt opportunity after January when the ground is dry, to looſen the ſoil with the harrow firſt deſcribed, till a mould be brought upon it. Sow the ſeed, and cover it with the ſecond harrow. The third will ſmooth the ſurface, and cover the ſeed equally. Theſe harrows make the very beſt figure in ſowing beans; which ought to be laid deep in the ground, not leſs than ſix inches. In clay ſoil, the common harrows are altogether inſufficient. The ſoil, which has reſted long after ploughing, is rendered compact and ſolid: the common harrows ſkim the ſurface: the ſeed is not covered; and the firſt hearty ſhower of rain lays it above ground. Where the farmer overtakes not the ploughing after harveſt, and is reduced to plough immediately before ſowing, the plough anſwers the purpoſe of the firſt harrow; and the other two will complete the work. But the labour of the firſt harrow is ill ſaved; as the ploughing before winter is a fine preparation, not only for beans, but for grain of every kind. If the ground ploughed before winter happen by ſuperfluity of moiſture to cake, the firſt harrow going along the ridges, and croſſing them, will looſen the ſurface, and give acceſs to the air for drying. As ſoon as the ground is dry, ſow without delaying a moment. If rain happen in the interim, there is no remedy but patience till a dry day or two come.

Carſe-clay, ploughed before winter, ſeldom fails to cake. Upon that account, a ſecond ploughing is neceſſary before ſowing; which ought to be performed with an ebb furrow, in order to keep the froſt-mould as near the ſurface as poſſible. To cover the ſeed with the plough is expreſſed by the phraſe *to ſow under furrow*. The clods raiſed in this ploughing, are a ſort of ſhelter to the young plants in the chilly ſpring-months.

The foregoing method will anſwer for loam. And as for a ſandy or gravelly ſoil, it is altogether improper for beans.

Though we cannot approve the horſe-hoeing of beans, with the intervals that are commonly allotted for turnip, yet we would ſtrongly recommend the drilling them at the diſtance of 10 or 12 inches, and keeping the intervals clean of weeds. This may be done by hand-hoeing, taking opportunity at the ſame time to lay freſh ſoil to the roots of the plants. But as this is an expenſive operation, and hands are not always to be got, a narrow plough, drawn by a ſingle horſe, might be uſed, with a mould-board on each ſide to ſcatter the earth upon the roots of the plants. This is a cheap and expeditious method: it keeps the ground clean; and nouriſhes the plants with freſh ſoil.

As beans delight in a moiſt ſoil, and have no end of growing in a moiſt ſeaſon, they cover the ground totally when ſown broadcaſt, keep in the dew, and exclude the ſun and air: the plants grow to a great height; but carry little ſeed, and that little not well ripened. This diſplays the advantage of drilling; which gives free acceſs to the ſun and air, dries the ground, and affords plenty of ripe ſeed.

5. PEASE.

124 Culture of peaſe.

PEASE are of two kinds; the white, and the gray. The cultivation of the latter only belongs to this place.

There are two ſpecies of the gray kind, diſtinguiſhed by their time of ripening. One ripens ſoon, and for that reaſon is termed *hot ſeed:* the other, which is ſlower in ripening, is termed *cold ſeed*.

Peaſe, a leguminous crop, is proper to intervene between two culmiferous crops; leſs for the profit of a peaſe-crop, than for meliorating the ground. Peaſe however, in a dry ſeaſon, will produce ſix or ſeven bolls each acre; but, in an ordinary ſeaſon, they ſeldom reach above two, or two and a half. Hence, in a moiſt climate, which all the weſt of Britain is, red clover ſeems a more beneficial crop than peaſe; as it makes as good winter-food as peaſe, and can be cut green thrice during ſummer.

A field, intended for cold ſeed, ought to be ploughed in October or November; and in February, as ſoon as the ground is dry, the ſeed ought to be ſown on the winter-furrow. A field intended for hot ſeed, ought to be ploughed in March or April, immediately before ſowing. But if infeſted with weeds, it ought to be alſo ploughed in October or November.

Peaſe laid a foot below the ſurface will vegetate; but the moſt approved depth is ſix inches in light ſoil, and four inches in clay ſoil; for which reaſon, they ought to be ſown under furrow when the ploughing is delayed till ſpring. Of all grain, beans excepted, they are the leaſt in danger of being buried.

Peaſe differ from beans, in loving a dry ſoil and a dry ſeaſon. Horſe-hoeing would be a great benefit, could it be performed to any advantage; but peaſe grow expeditiouſly, and ſoon fall over and cover the ground, which bars ploughing. Horſe-hoeing has little effect when the plants are new ſprung; and when they are advanced to be benefited by that culture, their length prevents it. Faſt growing at the ſame time is the cauſe of their carrying ſo little ſeed: the ſeed is buried among the leaves; and the ſun cannot penetrate to make it grow and ripen. The only practicable remedy to obtain grain, is thin ſowing; but thick ſowing produces more ſtraw, and mellows the ground more. Half a boll for an Engliſh acre may be reckoned thin ſowing; three firlots, thick ſowing.

Notwithſtanding what is ſaid above, Mr Hunter, a noted farmer in Berwickſhire, began ſome time ago to ſow all his peaſe in drills; and never failed to have great crops of corn as well as of ſtraw. He ſowed double rows at a foot interval, and two feet and an half between the double rows, which admit horſe-hoeing. By that method, he had alſo good crops of beans on light land.

Peaſe and beans mixed are often ſown together, in order to catch different ſeaſons. In a moiſt ſeaſon, the beans make a good crop; in a dry ſeaſon, the peaſe.

The growth of plants is commonly checked by drought in the month of July; but promoted by rain in Auguſt. In July, graſs is parched; in Auguſt, it recovers verdure. Where peaſe are ſo far advanced in the dry ſeaſon as that the ſeed begins to form, their growth is indeed checked, but the ſeed continues to fill. If only in the bloſſom at that ſeaſon, their growth is checked a little; but they become vigorous again in Auguſt, and continue growing without filling till ſtopped by froſt. Hence it is, that cold ſeed, which is early ſown, has the beſt chance to produce corn: hot ſeed, which is late ſown, has the beſt chance to produce ſtraw.

The following method is practiſed in Norfolk, for ſowing peaſe upon a dry light ſoil, immediately opened from paſture. The ground is pared with a plough extremely thin, and every ſod is laid exactly on its back. In every ſod a double row of holes is made. A pea dropt in every hole lodges in the flay'd ground immediately below the ſod, thruſts its roots horizontally, and has ſufficient moiſture. This method enabled Norfolk farmers, in the barren year 1740, to furniſh white peaſe at 12 *s.* per boll.

II. Plants cultivated for Roots.

1. TURNIP.

125 Culture of turnip.

TURNIP delights in a gravelly ſoil; and there it can be raiſed to the greateſt perfection, and with the leaſt hazard of miſcarrying. At the ſame time, there is no ſoil but will bear turnip when well prepared.

No perſon ever deſerved better of a country, than he who firſt cultivated turnip in the field. No plant is better fitted for the climate of Britain, no plant proſpers better in the coldeſt part of it, and no plant contributes more to fertility. In a word, there has not for two centuries been introduced into Britain a more valuable improvement.

Of all roots, turnip requires the fineſt mould; and to that end, of all harrows froſt is the beſt. In order to give acceſs to froſt, the land ought to be prepared by ribbing after harveſt, as above directed in preparing land for barley. If the field be not ſubject to annuals, it may lie in that ſtate till the end of May; otherwiſe the weeds muſt be deſtroyed by a brakeing about the middle of April; and again in May, if weeds riſe. The firſt week of June, plough the field with a ſhallow furrow. Lime it if requiſite, and harrow the lime into the ſoil. Draw ſingle furrows with intervals of three feet, and lay dung in the furrows. Cover the dung ſufficiently, by going round it with the plough, and forming the three-feet ſpaces into ridges. The dung comes thus to lie below the crown of every ridge.

126 Seaſon and method of ſowing.

The ſeaſon of ſowing muſt be regulated by the time intended for feeding. Where intended for feeding in

November, December, January, and February, the ſeed ought to be ſown from the 1st to the 20th of June. Where the feeding is intended to be carried on to March, April, and May, the ſeed muſt not be ſown till the end of July. Turnip ſown earlier than above directed, flowers that very ſummer, and runs faſt to ſeed; which renders it in a good meaſure unfit for food. If ſown much later, it does not apple, and there is no food but from the leaves.

Though by a drill-plough the ſeed may be ſown of any thickneſs, the ſafeſt way is to ſow thick. Thin ſowing is liable to many accidents, which are far from being counterbalanced by the expence that is ſaved in thinning. Thick-ſowing can bear the ravage of the black fly, and leave a ſufficient crop behind. It is a protection againſt drought, gives the plants a rapid progreſs, and eſtabliſhes them in the ground before it is neceſſary to thin them.

The ſowing turnip broadcaſt is univerſal in England, and common in Scotland, though a barbarous practice. The eminent advantage of turnip is, that beſide a profitable crop, it makes a moſt complete fallow; and the latter cannot be obtained but by horſe-hoeing. Upon that account, the ſowing turnip in rows at three feet diſtance is recommended. Wider rows anſwer no profitable end, ſtraiter rows afford not room for a horſe to walk in. When the turnip is about four inches high, annual weeds will appear. Go round every interval with the ſlighteſt furrow poſſible, at the diſtance of two inches from each row, moving the earth from the rows toward the middle of the interval. A thin plate of iron muſt be fixed on the left ſide of the plough, to prevent the earth from falling back, and burying the turnip. Next, let women be employed to weed the rows with their fingers; which is better, and cheaper done, than with the hand-hoe. The hand-hoe, beſide, is apt to diſturb the roots of the turnip that are to ſtand, and to leave them open to drought by removing the earth from them. The ſtanding turnip are to be at the diſtance of twelve inches from each other: a greater diſtance makes them ſwell too much; a leſs diſtance affords them not ſufficient room. A woman ſoon comes to be expert in finger-weeding. The following hint may be neceſſary to a learner. To ſecure the turnip that is to ſtand, let her cover it with the left hand; and with the right pull up the turnip on both ſides. After thus freeing the ſtanding turnip, ſhe may ſafely uſe both hands. Let the field remain in this ſtate, till the appearance of new annuals make a ſecond ploughing neceſſary; which muſt be in the ſame furrow with the former, but a little deeper. As in this ploughing the iron plate is to be removed, part of the looſe earth will fall back on the roots of the plants: the reſt will fill the middle of the interval, and bury every weed. When weeds begin again to appear, then is the time for a third ploughing in an oppoſite direction, which lays the earth to the roots of the plants. This ploughing may be about the middle of Auguſt; after which, weeds riſe very faintly. If they do riſe, another ploughing will clear the ground of them. Weeds that at this time riſe in the row, may be cleared with a hand-hoe, which can do little miſchief among plants diſtant twelve inches from each other. It is certain however, that it may be done cheaper with the hand (c). And after the leaves of turnips in a row meet together, the hand is the only inſtrument that can be applied for weeding.

In ſwampy ground, the ſurface of which is beſt reduced by paring and burning, the ſeed may be ſown in rows with intervals of a foot. To ſave time, a drill-plough may be uſed that ſows three or four rows at once. Hand-hoeing is proper for ſuch ground; becauſe the ſoil under the burnt *ſtratum* is commonly full of roots, which digeſt and rot better under ground than when brought to the ſurface by the plough. In the mean time, while theſe are digeſting, the aſhes will ſecure a good crop.

2. POTATOES.

117 Culture of potatoes.

THE choice of ſoil is not of greater importance in any other plant than in a potato. This plant in clay ſoil, or in rank black loam lying low without ventilation, never makes palatable food. In a gravelly or ſandy ſoil, expoſed to the ſun and to free air, it thrives to perfection, and has a good reliſh. But a rank black loam, though improper to raiſe potatoes for the table, produces them in great plenty; and the product is, as already obſerved, a palatable food for horned cattle, hogs, and poultry.

The ſpade is a proper inſtrument for raiſing a ſmall quantity, or for preparing corners or other places inacceſſible to the plough; but for raiſing potatoes in quantities, the plough is the only inſtrument.

As two great advantages of a drilled crop, are, to deſtroy weeds, and to have a fallow at the ſame time with the crop, no judicious farmer will think of raiſing potatoes in any other way. In September or October, as ſoon as that year's crop is removed, let the field have a rouſing furrow, a croſs-brakeing next, and then be cleared of weeds by the cleaning harrow. Form it into three-feet ridges, in that ſtate to lie till April, which is the proper time for planting potatoes. Croſs-bake it, to raiſe the furrows a little. Then lay well-digeſted horſe-dung along the furrows, upon which lay the roots at eight inches diſtance. Cover up theſe roots with the plough, going once round every row. This makes a warm bed for the potatoes; hot dung below, and a looſe covering above, that admits every ray of the ſun. As ſoon as the plants appear above ground, go round every row a ſecond time with the plough, which will lay upon the plants an additional inch or two of mould, and at the ſame time bury all the annuals; and this will complete the ploughing of the ridges. When the potatoes are ſix inches high, the plough, with the deepeſt furrow, muſt go twice along the middle of each interval in oppoſite directions, laying earth firſt to one row, and next to the other. And to perform this work, a plough with a double mould-board will be more expeditious. But as the earth cannot be laid cloſe to the roots by the plough, the ſpade muſt ſucceed, with which four inches of the plants muſt be covered, leaving little more but the tops above ground; and this operation will at the ſame time bury all the weeds that have ſprung ſince the former ploughing. What weeds ariſe after, muſt be pulled up with the hand. A hoe is never to be uſed here: it cannot go ſo deep as to deſtroy the weeds without cutting the fibres of the plants; and if it ſkim the ſurface, it only cuts off the heads of the weeds, and does not prevent their puſhing again.

(c) Children under thirteen may be employed to weed turnip with the fingers. We have ſeen them go on in that work with alacrity; and a ſmall premium will have a good effect. For boys and girls above thirteen, a hand-hoe adapted to their ſize is an excellent inſtrument: it ſtrengthens the arms amazingly. In driving the plough, the legs only are exerciſed; but as the arms are chiefly employed in huſbandry, they ought to be prepared beforehand by gentle exerciſe.

128 method king up. The ſhorteſt and moſt perfect method of taking up potatoes, is to plough once round every row at the diſtance of four inches, removing the earth from the plants, and gathering up with the hand all the potatoes that appear. The diſtance is made four inches, to prevent cutting the roots, which are ſeldom found above that diſtance from the row on each ſide. When the ground is thus cleared by the plough, raiſe the potatoes with a fork having three broad toes or claws; which is better than a ſpade, as it does not cut the potatoes. The potatoes thus laid above ground, muſt be gathered with the hand. By this method ſcarce a potatoe will be left.

129 reſer- them. As potatoes are a comfortable food for the low people, it is of importance to have them all the year round. For a long time, potatoes in Scotland were confined to the kitchen-garden; and after they were planted in the field, it was not imagined at firſt that they could be uſed after the month of December. Of late years, they have been found to anſwer even till April; which has proved a great ſupport to many a poor family, as they are eaſily cooked, and require neither kiln nor mill. But there is no cauſe for ſtopping there. It is eaſy to preſerve them till the next crop: When taken out of the ground, lay in the corner of a barn a quantity that may ſerve till April, covered from froſt with dry ſtraw preſſed down: bury the remainder in a hole dug in dry ground, mixed with the huſks of dried oats, ſand, or the dry leaves of trees, over which build a ſtack of hay or corn. When the pit is opened for taking out the potatoes, the eyes of what have a tendency to puſh, muſt be cut out; and this cargo will ſerve all the month of June. To be ſtill more certain of making the old crop meet the new, the ſetting of a ſmall quantity may be delayed till June, to be taken up at the ordinary time before froſt. This cargo, having not arrived to full growth, will not be ſo ready to puſh as what are ſet in April.

If the old crop happen to be exhauſted before the new crop is ready, the interval may be ſupplied by the potatoes of the new crop that lie next the ſurface, to be picked up with the hand; which, far from hurting the crop, will rather improve it.

3. Carrot and Parsnip.

130 ue of t. Of all roots, a carrot requires the deepeſt ſoil. It ought at leaſt to be a foot deep, all equally good from top to bottom. If ſuch a ſoil be not in the farm, it may be made artificially by trench-ploughing, which brings to the ſurface what never had any communication with the ſun or air. When this new ſoil is ſufficiently improved by a crop or two with dung, it is fit for bearing carrots. Beware of dunging the year when the carrots are ſown; for with freſh dung they ſeldom eſcape rotten ſcabs.

The only ſoils proper for that root, are a loam and a ſandy ſoil.

The ground muſt be prepared by the deepeſt furrow that can be taken, the ſooner after harveſt the better; immediately upon the back of which, a ribbing ought to ſucceed, as directed for barley. At the end of March, or beginning of April, which is the time of ſowing the ſeed, the ground muſt be ſmoothed with a brake. Sow the ſeed in drills, with intervals of a foot for hand-hoeing: which is no expenſive operation where the crop is confined to an acre or two: but if the quantity of ground be greater, the intervals ought to be three feet, in order for horſe-hoeing.

In flat ground without ridges, it may be proper to make parallel furrows with the plough, ten feet from each other, in order to carry off any redundant moiſture.

At Parlington in Yorkſhire, from the end of September to the firſt of May, 20 work-horſes, four bullocks, and ſix milk-cows, were fed on the carrots that grew on three acres; and theſe animals never taſted any other food but a little hay. The milk was excellent: and, over and above, 30 hogs were fattened upon what was left by the other beaſts. We have this fact from undoubted authority.

The culture of parſnips is the ſame with that of carrots. 131 Parſnips.

III. Plants Cultivated for Leaves.

There are many garden-plants of this kind. The plants proper for the field are cabbage red and white, colewort plain and curled. As there is very little difference in the cultivation of theſe plants, we ſhall confine ourſelves to cabbage. The reader will eaſily apply to the other plants the directions to be given concerning cabbage.

Cabbage is an intereſting article in huſbandry. It is eaſily raiſed, is ſubject to few diſeaſes, reſiſts froſt more than turnip, is palatable to cattle, and ſooner fills them than turnip, carrot, or potatoes. 132 Culture of cabbage.

The ſeaſon for ſetting cabbage, depends on the uſe it is intended for. If intended for feeding in November, December, and January, plants procured from ſeed ſown the end of July the preceding year, muſt be ſet in March or April. If intended for feeding in March, April, and May, the plants muſt be ſet the firſt week of the preceding July, from ſeed ſown in the end of February or beginning of March the ſame year. The late ſetting of the plants retards their growth; by which means they have a vigorous growth the following ſpring. And this crop makes an important link in the chain that connects winter and ſummer green food. Where cabbage for ſpring-food happens to be neglected, a few acres of rye, ſown at Michaelmas, will ſupply the want. After the rye is conſumed, there is time ſufficient to prepare the ground for turnip.

And now to prepare a field for cabbage. Where the plants are to be ſet in March, the field muſt be made up after harveſt, in ridges three feet wide. In that form let it lie all winter, to be mellowed with air and froſt. In March, take the firſt opportunity, between wet and dry, to lay dung in the furrows. Cover the dung with a plough, which will convert the furrow into a crown, and conſequently the crown into a furrow. Set the plants upon the dung, diſtant from each other three feet. Plant them ſo as to make a ſtraight line croſs the ridges, as well as along the furrows, to which a gardener's line ſtretched perpendicularly croſs the furrows will be requiſite. This will ſet each plant at the diſtance preciſely of three feet from the plants that ſurround it. The purpoſe of this accuracy, is to give opportunity for ploughing, not only along the ridges, but croſs them. This mode is attended with three ſignal advantages: it ſaves hand-hoeing, it is a more complete dreſſing to the ſoil, and it lays earth neatly round every plant.

If the ſoil be deep and compoſed of good earth, a trench-ploughing after the preceding crop will not be amiſs; in which caſe, the time for dividing the field into three-feet ridges as above, ought to be immediately before the dunging for the plants.

If weeds happen to riſe ſo cloſe to the plants as not to be reached by the plough, it will require very little labour to deſtroy them with a hand-hoe.

Unleſs the ſoil be much infeſted with annuals, twice ploughing after the plants are ſet will be a ſufficient dreſſing. The firſt removes the earth from the plants; the next, at the diſtance of a month or ſo, lays it back.

Where the plants are to be ſet in July, the field muſt be ribbed as directed for barley. It ought to have a ſlight ploughing in June before the planting, in order to looſen the ſoil, but not ſo as to bury the ſurface-earth; after which the three-feet ridges muſt be formed, and the other particulars carried on as directed above with reſpect to plants that are to be ſet in March.

SECT. IV. *Culture of Graſs.*

THE graſſes commonly ſown for paſture, for hay, or to cut green for cattle, are red clover, white clover, yellow clover, ryegraſs, narrow-leaved plantain commonly called *ribwort*, ſaintfoin, and lucerne.

Red clover is of all the moſt proper to be cut green for ſummer-food. It is a biennial plant when ſuffered to perfect its ſeed; but when cut green, it will laſt three years, and in a dry ſoil longer. At the ſame time the ſafeſt courſe is to let it ſtand but a ſingle year: if the ſecond year's crop happen to be ſcanty, it proves, like a bad crop of peaſe, a great encourager of weeds by the ſhelter it affords them.

Here, as in all other crops, the goodneſs of ſeed is of importance. Chuſe plump ſeed of a purple colour, becauſe it takes on that colour when ripe. It is red when hurt in the drying, and of a faint colour when unripe.

133 Of red clover.

Red clover is luxuriant upon a rich ſoil, whether clay, loam, or gravel: it will grow even upon a moor, when properly cultivated. A wet ſoil is its only bane; for there it does not thrive.

To have red clover in perfection, weeds muſt be extirpated, and ſtones taken off. The mould ought to be made as fine as harrowing can make it; and the ſurface be ſmoothed with a light roller, if not ſufficiently ſmooth without it. This gives opportunity for diſtributing the ſeed evenly: which muſt be covered by a ſmall harrow with teeth no larger than of a garden-rake, three inches long, and ſix inches aſunder *. In harrowing, the man ſhould walk behind with a rope in his hand fixed to the back part of the harrow, ready to diſentangle it from ſtones, clods, turnip or cabbage roots, which would trail the ſeed, and diſplace it.

Nature has not determined any preciſe depth for the ſeed of red clover more than of other ſeed. It will grow vigorouſly from two inches deep, and it will grow when barely covered. Half an inch may be reckoned the moſt advantageous poſition in clay ſoil, a whole inch in what is light or looſe. It is a vulgar error, that ſmall ſeed ought to be ſparingly covered. Miſled by that error, farmers commonly cover their clover-ſeed with a buſhy branch of thorn; which not only covers it unequally, but leaves part on the ſurface to wither in the air.

The proper ſeaſon for ſowing red-clover, is from the middle of April to the middle of May. It will ſpring from the firſt of March to the end of Auguſt; but ſuch liberty ought not to be taken except from neceſſity.

There cannot be a greater blunder in huſbandry, than to be ſparing of ſeed. Ideal writers talk of ſowing an acre with four pounds. That quantity of ſeed, ſay they, will fill an acre with plants as thick as they ought to ſtand. This rule may be admitted where grain is the object; but it will not anſwer with reſpect to graſs. Graſs-ſeed cannot be ſown too thick: the plants ſhelter one another: they retain all the dew: and they muſt puſh upward, having no room laterally. Obſerve the place where a ſack of peaſe, or of other grain, has been ſet down for ſowing: the ſeed dropt there accidentally grows more quickly than in the reſt of the field ſown thin out of hand. A young plant of clover, or of ſaintfoin, according to Tull, may be raiſed to a great ſize where it has room; but the field will not produce half the quantity. When red clover is ſown for cutting green, there ought not to be leſs than 24 pounds to an acre. A field of clover is ſeldom too thick: the ſmaller a ſtem be, the more acceptable it is to cattle. It is often too thin; and when ſo, the ſtems tend to wood.

134 Of ſowi clover w grain.

Red clover is commonly ſown with grain; and the moſt proper grain has been found by experience to be flax. The ſoil muſt be highly cultivated for flax as well as for red clover. The proper ſeaſon of ſowing is the ſame for both: the leaves of flax being very ſmall, admit of free circulation of air; and flax being an early crop, is removed ſo early as to give the clover time for growing. In a rich ſoil it has grown ſo faſt, as to afford a good cutting that very year. Next to flax, barley is the beſt companion to clover. The ſoil muſt be looſe and free for barley; and ſo it ought to be for clover: the ſeaſon of ſowing is the ſame; and the clover is well eſtabliſhed in the ground, before it is overtopped by the barley. At the ſame time, barley commonly is ſooner cut than either oats or wheat. In a word, barley is rather a nurſe than a ſtepmother to clover during its infancy. When clover is ſown in ſpring upon wheat, the ſoil, which has lain five or ſix months without being ſtirred, is an improper bed for it; and the wheat, being in the vigour of growth, overtops it from the beginning. It cannot be ſown along with oats, becauſe of the hazard of froſt; and when ſown as uſual among the oats three inches high, it is over-topped, and never enjoys free air till the oats be cut. Add, that where oats are ſown upon the winter-furrow, the ſoil is rendered as hard as when under wheat.—Red clover is ſometimes ſown by itſelf, without

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* Plate V. fig. 7.

Plate V.

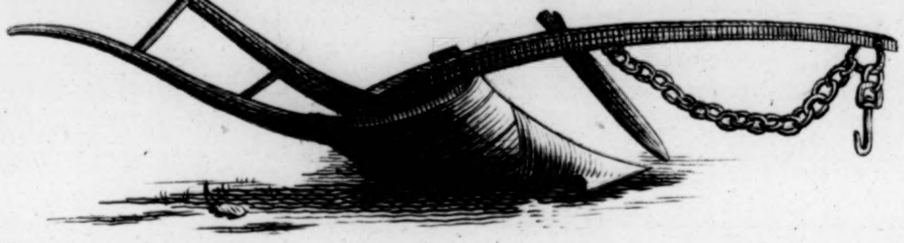


Fig. 1. Chain Plough

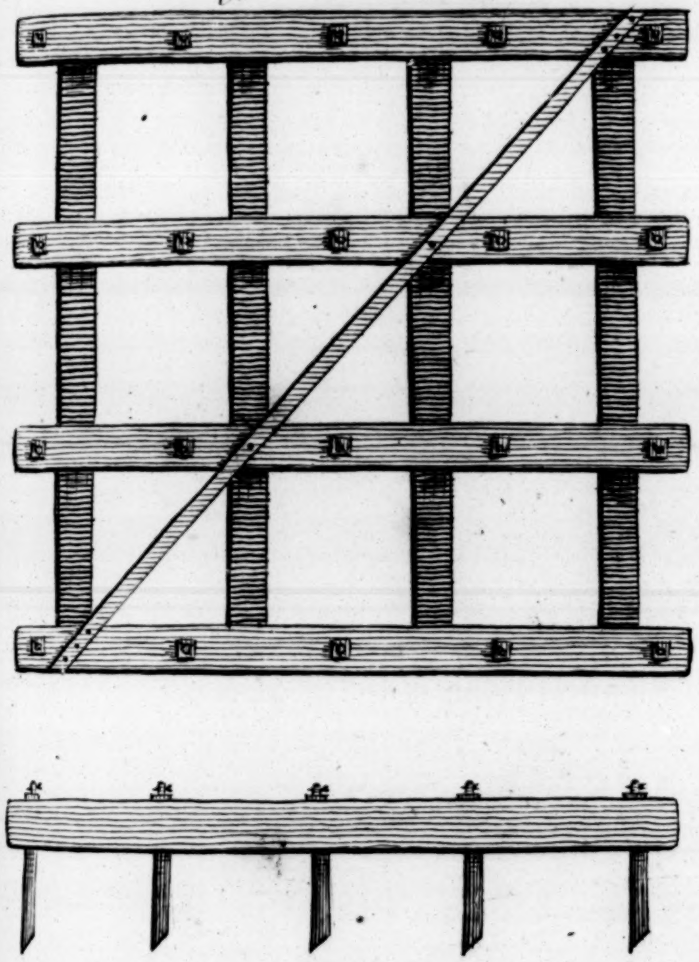
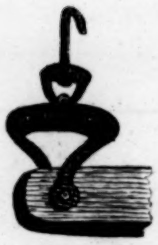


Fig. 2. Brake.



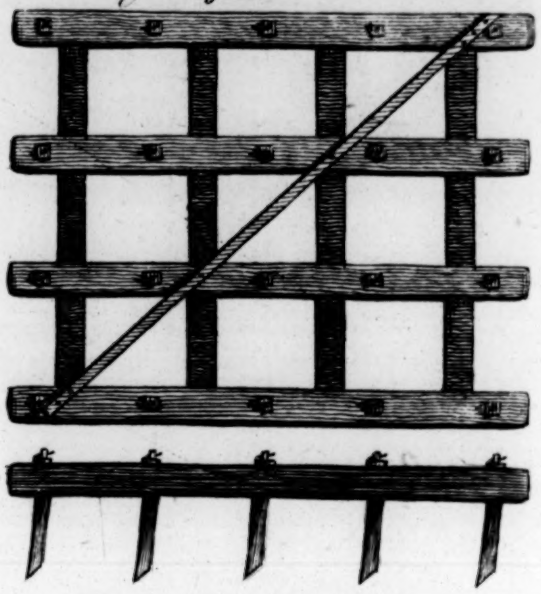


Fig. 3. first Harrow

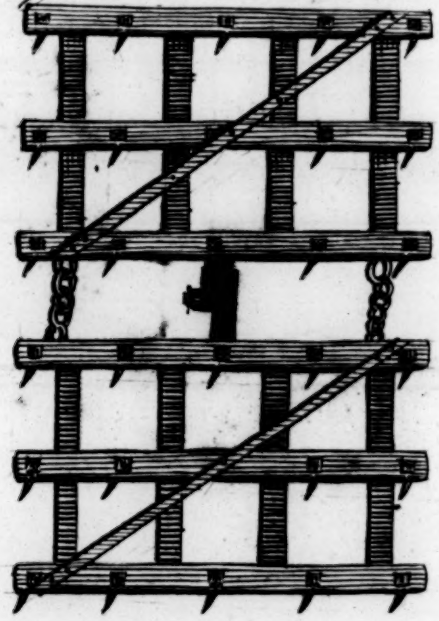


Fig. 4. second Harrow

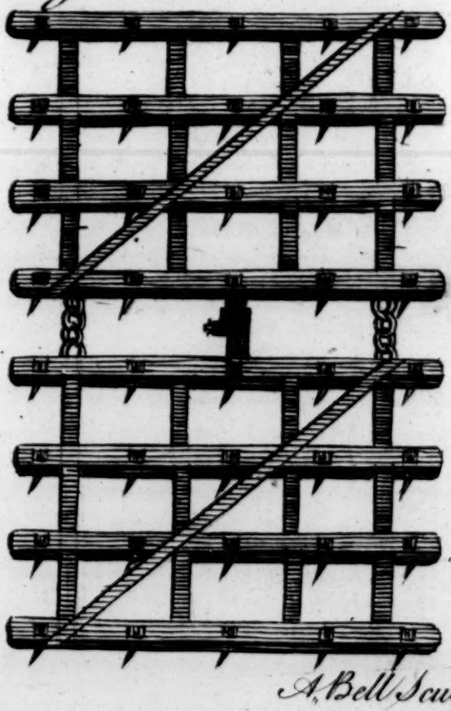


Fig. 5. third Harrow

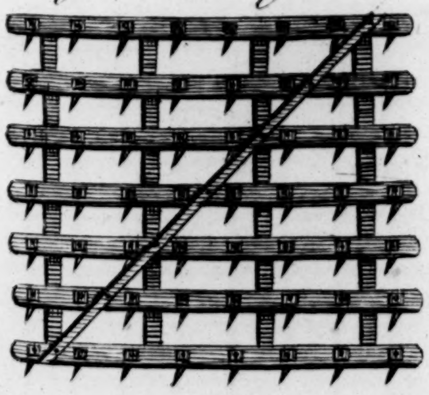


Fig. 6. Cleaning Harrow

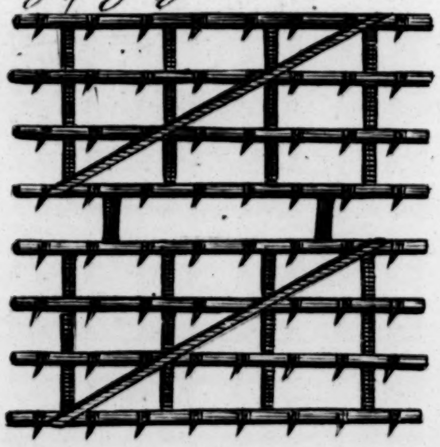


Fig. 7. Graſs Seed Harrow

A. Bell Sculpt.

3 MA 55

out other grain: but this method, beſide loſing a crop, is not ſalutary; becauſe clover in its infant ſtate requires ſhelter.

As to the quantity of grain proper to be ſown with clover: In a rich ſoil well pulverized, a peck of barley on an Engliſh acre is all that ought to be ventured; but there is not much ſoil in Scotland ſo rich. Two Linlithgow firlots make the proper quantity for an acre that produces commonly ſix bolls of barley; half a firlot for what produces nine bolls. To thoſe who are governed by cuſtom, ſo ſmall a quantity will be thought ridiculous, Let them only conſider, that a rich ſoil in perfect good order, will from a ſingle ſeed of barley produce 20 or 30 vigorous ſtems. People may flatter themſelves with the remedy of cutting barley green for food, if it happen to oppreſs the clover. This is an excellent remedy in a field of an acre or two; but the cutting an extenſive field for food muſt be ſlow; and while one part is cutting, the clover is ſmothered in other parts.

35 and clo- ib- &rye-

The culture of white clover, of yellow clover, of ribwort, of ryegraſs, is the ſame in general with that of red clover. We proceed to their peculiarities. Yellow clover, ribwort, ryegraſs, are all of them early plants, blooming in the end of April or beginning of May. The two latter are evergreens, and therefore excellent for winter-paſture. Ryegraſs is leſs hurt by froſt than any of the clovers, and will thrive in a moiſter ſoil: nor in that ſoil is it much affected by drought. In a rich ſoil, it grows four feet high: even in the dry ſummer 1775, it roſe to three feet eight inches; but it had gained that height before the drought came on. Theſe graſſes are generally ſown with red clover for producing a plentiful crop. The proportion of ſeed is arbitrary; and there is little danger of too much. When ryegraſs is ſown for procuring ſeed, five firlots wheat-meaſure may be ſown on an acre; and for procuring ſeed of ribwort, 40 pounds may be ſown. The roots of ryegraſs ſpread horizontally: they bind the ſoil by their number; and tho' ſmall, are yet ſo vigorous as to thrive in hard ſoil. Red clover has a large tap-root, which cannot penetrate any ſoil but what is open and free; and the largeneſs of the root makes the ſoil ſtill more open and free. Ryegraſs, once a great favourite, appears to be diſcarded in moſt parts of Britain. The common practice has been, to ſow it with red clover, and to cut them promiſcuouſly the beginning of June for green food, and a little later for hay. This indeed is the proper ſeaſon for cutting red clover, becauſe at that time it begins to flower; but as at that time the ſeed of the ryegraſs is approaching to maturity, its growth is ſtopped for that year, as much as of oats or barley cut after the ſeed is ripe. Oats or barley cut green before the ſeed forms, will afford two other cuttings; which is the caſe of ryegraſs, of yellow clover, and of ribwort. By ſuch management, all the profit will be drawn that theſe plants can afford.

When red clover is intended for ſeed, the ground ought to be cleared of weeds, were it for no other purpoſe than that the ſeed cannot otherwiſe be preſerved pure: what weeds eſcape the plough, ought to be taken out by the hand. In England, when a crop of ſeed is intended, the clover is always firſt cut for hay. This appears to be done, as in fruit-trees, to check the growth of the wood, in order to encourage the fruit. This practice will not anſwer in Scotland, as the ſeed would often be too late for ripening. It would do better to eat the clover with ſheep till the middle of May, which would allow the ſeed to ripen, The ſeed is ripe when, upon rubbing it between the hands, it parts readily from the huſk. Then apply the ſcythe, ſpread the crop thin, and turn it carefully. When perfectly dry, take the firſt opportunity of a hot day for threſhing it on boards covered with a coarſe ſheet. Another way leſs ſubject to riſk, is to ſtack the dry hay, and to threſh it the end of April. After the firſt threſhing, expoſe the huſks to the ſun, and threſh them over and over till no ſeed remain. Nothing is more efficacious than a hot ſun to make the huſk part with its ſeed; in which view it may be expoſed to the ſun by parcels, an hour or two before the flail is aplied.

White clover, intended for ſeed, is managed in the ſame manner. No plant ought to be mixed with ryegraſs that is intended for ſeed. In Scotland, much ryegraſs ſeed is hurt by tranſgreſſing that rule. The ſeed is ripe when it parts eaſily from the huſk. The yellowneſs of the ſtem is another indication of its ripeneſs; in which particular it reſembles oats, barley, and other culmiferous plants. The beſt manner to manage a crop of rye-graſs for ſeed, is to bind it looſely in ſmall ſheaves, widening them at the bottom to make them ſtand erect; as is done with oats in moiſt weather. In that ſtate they may ſtand till ſufficiently dry for threſhing. By this method they dry more quickly, and are leſs hurt by rain, than by cloſe binding and putting the ſheaves in ſhocks like corn. The worſt way of all is to ſpread the rye-graſs on the moiſt ground, for it makes the ſeed malten. The ſheaves, when ſufficiently dry, are carried into cloſe carts to where they are to be threſhed on a board, as mentioned above for clover. Put the ſtraw in a rick when a hundred ſtone or ſo are threſhed. Carry the threſhing-board to the place where another rick is intended; and ſo on till the whole ſeed be threſhed, and the ſtraw ricked. There is neceſſity for cloſe carts to ſave the ſeed, which is apt to drop out in a hot ſun; and, as obſerved above, a hot ſun ought always to be choſen for threſhing. Carry the ſeed in ſacks to the granary or barn, there to be ſeparated from the huſks by a fanner. Spread the ſeed thin upon a timber-floor, and turn it once or twice a-day till perfectly dry. If ſuffered to take a heat, it is uſeleſs for ſeed.

136 Culture of ſaintfoin.

The writers on agriculture reckon ſaintfoin preferable to clover in many reſpects: They ſay, that it produces a larger crop; that it does not hurt cattle when eaten green; that it makes better hay; that it continues four times longer in the ground; and that it will grow on land that will bear no other crop. Theſe are great advantages: But, as we have ſo little of that kind of graſs in Scotland, it cannot be expected that any directions can be given concerning the manner of cultivating it, founded upon experience. We muſt therefore confine ourſelves to ſuch facts as are mentioned by authors of the beſt credit.

Saintfoin has a very long tap-root, which is able to pierce very hard earth. The roots grow very large; and the larger they are, they penetrate to the greater depth; and hence it may be concluded, that this graſs, when it thrives well, receives a great part of its nouriſhment from below the *ſtaple* of the ſoil: of courſe, a deep dry ſoil is beſt for the culture of ſaintfoin. When plants draw their nouriſhment from that part of the ſoil that is near the ſurface, it is not of much conſequence whether their number be great or ſmall. But the caſe is very different when the plants receive their food, not only near, but alſo deep below, the ſurface. Beſides, plants that ſhoot their roots deep are often ſupplied with moiſture, when thoſe near the ſurface are parched with drought.

To render the plants of ſaintfoin vigorous, it is neceſſary that they be ſown thin. The beſt method of doing this is by a drill; becauſe, when ſown in this manner, not only the weeds, but alſo the ſupernumerary plants, can eaſily be removed. It is ſeveral years before ſaintfoin comes to its full ſtrength; and the number of plants ſufficient to ſtock a field, while in this imperfect ſtate, will make but a poor crop for the firſt year or two. It is therefore neceſſary that it be ſown in ſuch a manner as to make it eaſy to take up plants in ſuch numbers, and in ſuch order, as always to leave in the field the proper number in their proper places. This can only be done, with propriety, by ſowing the plants in rows by a drill. Suppoſing a field to be drilled in rows at ten inches diſtance, the partitions may be hand-hoed, and the rows dreſſed in ſuch a manner as to leave a proper number of plants. In this ſituation the field may remain two years; then one fourth of the rows may be taken out in pairs, in ſuch a manner as to make the beds of fifty inches, with ſix rows in each, and intervals of thirty inches, which may be ploughed. Next year, another fourth of the rows may be taken out in the ſame manner, ſo as to leave double rows with partitions of ten inches, and intervals of thirty: All of which may be hoed at once or alternately, as it may be found moſt convenient.

The great quantity of this graſs which the writers on this ſubject aſſure us may be raiſed upon an acre, and the excellency and great value of the hay made of it, ſhould induce farmers to make a complete trial of it, and even to uſe the ſpade in place of the hoe, or hoe-plough, if neceſſary.

The plants taken up from a field of ſaintfoin may be ſet in another field; and if the tranſplanting of this graſs ſucceeds as well as the tranſplanting of lucerne has done with Mr Lunin de Chateauvieux, the trouble and expence will be ſufficiently recompenſed by the largeneſs of the crops. In tranſplanting, it is neceſſary to cut off great part of the long tap-root: this will prevent it from ſtriking very deep into the ſoil, and make it puſh out large roots in a ſloping direction from the cut end of the tap-root. Saintfoin managed in this manner, will thrive even on ſhallow land that has a wet bottom, provided it be not overſtocked with plants.

Whoever inclines to try the culture of this graſs in Scotland, ſhould take great pains in preparing the land, and making it as free from weeds as poſſible.

137
Culture of lucerne.

The writers on agriculture, ancient as well as modern, beſtow the higheſt encomiums upon lucerne as affording excellent hay, and producing very large crops. Lucerne remains at leaſt 10 or 12 years in the ground, and produces about eight tons of hay upon the Scots acre. There is but little of it cultivated in Scotland. However, it has been tried in ſeveral parts of that country; and it is found, that, when the ſeed is good, it comes up very well, and ſtands the winter-froſt. But the chief thing which prevents this graſs from being more uſed in Scotland, is the difficulty of keeping the ſoil open, and free from weeds. In a few years the ſurface becomes ſo hard, and the turf ſo ſtrong, that it deſtroys the lucerne before the plants have arrived at their greateſt perfection: ſo that lucerne can ſcarce be cultivated with ſucceſs there, unleſs ſome method be fallen upon of deſtroying the natural graſs, and prevent the ſurface from becoming hard and impenetrable. This cannot be done effectually by any other means than horſe-hoeing. This method was firſt propoſed by Mr Tull, and afterwards practiſed ſucceſsfully by M. de Chateauvieux near Geneva. It may be of uſe therefore to give a view of that gentleman's method of cultivating lucerne.

He does not mention any thing particular as to the manner of preparing the land; but only obſerves in general, that no pains ſhould be ſpared in preparing it. He tried the ſowing of lucerne both in rows upon the beds where it was intended to ſtand, and likewiſe the ſowing it in a nurſery, and afterwards tranſplanting it into the beds prepared for it. He prefers tranſplanting; becauſe, when tranſplanted, part of the tap-root is cut off, and the plant ſhoots out a number of lateral branches from the cut part of the root, which makes it ſpread its roots nearer the ſurface, and conſequently renders it more eaſily cultivated: beſides, this circumſtance adapts it to a ſhallow ſoil, in which, if left in its natural ſtate, it would not grow.

The tranſplanting of lucerne is attended with many advantages. The land may be prepared in the ſummer for receiving the plants from the nurſery in autumn; by which means the field muſt be in a much better ſituation than if the ſeed had been ſown upon it in the ſpring. By tranſplanting, the rows can be made more regular, and the intended diſtances more exactly obſerved; and conſequently the hoeing can be performed more perfectly, and with leſs expence. Mr Chateauvieux likewiſe tried the lucerne in ſingle beds three feet wide, with ſingle rows; in beds three feet nine inches wide, with double rows; and in beds four feet three inches wide, with triple rows. The plants in the ſingle rows were ſix inches aſunder, and thoſe in the double and triple rows were about eight or nine inches. In a courſe of three years he found, that a ſingle row produced more than a triple row of the ſame length. The plants of lucerne, when cultivated by tranſplantation, ſhould be at leaſt ſix inches aſunder, to allow them room for extending their crowns.

He further obſerves, that the beds or ridges ought to be raiſed in the middle; that a ſmall trench, two or three inches deep, ſhould be drawn in the middle; and that the plants ought to be ſet in this trench, covered with earth up to the neck. He ſays, that if the lucerne be ſown in ſpring, and in a warm ſoil, it will be ready for tranſplanting in September; that, if the weather be too hot and dry, the tranſplanting ſhould be delayed till October; and that, if the weather be unfavourable during both theſe months, this operation muſt be delayed till ſpring. He further directs, that the plants ſhould be carefully taken out of the nurſery, ſo as not to damage the roots; that the roots be left only about ſix or ſeven inches long; that the green crops be cut off within about two inches of the crown;

that they be put into water as ſoon as taken up, there to remain till they are planted; and that they ſhould be planted with a planting-ſtick, in the ſame manner as cabbages.

He does not give particular directions as to the times of horſe-hoeing; but only ſays in general, that the intervals ſhould be ſtirred once in the month during the whole time that the lucerne is in a growing ſtate. He likewiſe obſerves, that great care ought to be taken not to ſuffer any weeds to grow among the plants, at leaſt for the firſt two or three years; and for this purpoſe, that the rows, as well as the edges of the intervals where the plough cannot go, ſhould be weeded by the hand.

Sect. V. *Rotation of Crops.*

138 ation of ps.

No branch of huſbandry requires more ſkill and ſagacity than a proper rotation of crops, ſo as to keep the ground always in heart, and yet to draw out of it the greateſt profit poſſible. Some plants rob the ſoil, others are gentle to it: ſome bind, others looſen. The nice point is, to intermix crops, ſo as to make the greateſt profit conſiſtently with keeping the ground in trim. In that view, the nature of the plants employed in huſbandry, muſt be accurately examined.

139 mife- s and le- minous nts. No 110,

The difference between culmiferous and leguminous plants, is occaſionally mentioned above *. With reſpect to the preſent ſubject, a cloſer inſpection is neceſſary. Culmiferous plants, having ſmall leaves and few in number, depend moſtly on the ſoil for nouriſhment, and little on the air. During the ripening of the ſeed, they draw probably their whole nouriſhment from the ſoil; as the leaves by this time, being dry and withered, muſt have loſt their power of drawing nouriſhment from the air. Now, as culmiferous plants are chiefly cultivated for their ſeed, and are not cut down till the ſeed be fully ripe, they may be pronounced all of them to be robbers, ſome more, ſome leſs. But ſuch plants, while young, are all leaves; and in that ſtate draw moſt of their nouriſhment from the air. Hence it is, that where cut green for food to cattle, a culmiferous crop is far from being a robber. A hay-crop accordingly, even where it conſiſts moſtly of ryegraſs, is not a robber, provided it be cut before the ſeed is formed; which at any rate it ought to be, if one would have hay in perfection. And the foggage, excluding the froſt by covering the ground, keeps the roots warm. A leguminous plant, by its broad leaves, draws much of its nouriſhment from the air. A cabbage, which has very broad leaves, and a multitude of them, owes its growth more to the air than to the ſoil. One fact is certain, that a cabbage cut and hung up in a damp place, preſerves its verdure longer than other plants. At the ſame time, a ſeed is that part of a plant which requires the moſt nouriſhment; and for that nouriſhment a culmiferous plant muſt be indebted entirely to the ſoil. A leguminous crop, on the contrary, when cut green for food, muſt be very gentle to the ground. Peaſe and beans are leguminous plants; but being cultivated for ſeed, they ſeem to occupy a middle ſtation: their ſeed makes them more ſevere than other leguminous crops cut green; their leaves, which grow till reaping, make them leſs ſevere than a culmiferous plant left to ripen.

Theſe plants are diſtinguiſhed no leſs remarkably by the following circumſtance. All the ſeeds of a culmiferous plant ripen at the ſame time. As ſoon as they begin to form, the plant becomes ſtationary, the leaves wither, the roots ceaſe to puſh, and the plant when cut down is blanched and ſapleſs. The ſeeds of a leguminous plant are formed ſucceſſively: flowers and fruit appear at the ſame time in different parts of the plant. This plant accordingly is continually growing, and puſhing its roots. Hence the value of bean or peaſe ſtraw above that of wheat or oats: the latter is withered and dry when the crop is cut; the former, green and ſucculent. The difference therefore, with reſpect to the ſoil, between a culmiferous and leguminous crop, is great. The latter, growing till cut down, keeps the ground in conſtant motion, and leaves it to the plough looſe and mellow. The former gives over growing long before reaping; and the ground, by want of motion, turns compact and hard. Nor is this all. Dew falling on a culmiferous crop after the ground begins to harden, reſts on the ſurface, and is ſucked up by the next ſun. Dew that falls on a leguminous crop, is ſhaded from the ſun by the broad leaves, and ſinks at leiſure into the ground. The ground accordingly, after a culmiferous crop, is not only hard, but dry: after a leguminous crop, it is not only looſe, but ſoft and unctuous.

Of all culmiferous plants, wheat is the moſt ſevere, by the long time it occupies the ground without admitting a plough. And as the grain is heavier than that of barley or oats, it probably requires more nouriſhment than either. It is obſerved above, that as peaſe and beans draw part of their nouriſhment from the air by their green leaves while allowed to ſtand, they draw the leſs from the ground; and by their conſtant growing they leave it in good condition for ſubſequent crops. In both reſpects they are preferable to any culmiferous crop.

Culmiferous crops, as obſerved above, are not robbers when cut green: the ſoil, far from hardening, is kept in conſtant motion by the puſhing of the roots, and is left more tender than if it had been left at reſt without any bearing crop.

Bulbous-rooted plants are above all ſucceſsful in dividing and pulveriſing the ſoil. Potatoe-roots grow ſix, eight, or ten, inches under the ſurface; and, by their ſize and number, they divide and pulverize the ſoil better than can be done by the plough; conſequently, whatever be the natural colour of the ſoil, it is black when a potato-crop is taken up. The potato, however, with reſpect to its quality of dividing the ſoil, muſt yield to a carrot or parſnip; which are large roots, and pierce often to the depth of 18 inches. The turnip, by its tap-root, divides the ſoil more than can be done by a fibrous-rooted plant; but as its bulbous root grows moſtly above ground, it divides the ſoil leſs than the potato, the carrot, or the parſnip. Red clover, in that reſpect, may be put in the ſame claſs with turnip.

Whether potatoes or turnip be the more gentle crop, appears a puzzling queſtion. The former bears ſeed, and probably draws more nouriſhment from the ſoil than the latter, when cut green. On the other hand, potatoes divide the ſoil more than turnip, and leave it more looſe and friable. It appears no leſs puzzling, to determine between cabbage and turnip: the former draws more of its nouriſhment from the air, the latter leaves the ſoil more free and open.

The reſult of the whole is what follows: Culmiferous plants are robbers; ſome more, ſome leſs: they at the ſame time bind the ſoil; ſome more, ſome leſs. Leguminous plants in both reſpects are oppoſite: if any of them rob the ſoil, it is in a very ſlight degree; and all of them without exception looſen the ſoil. A culmiferous crop, however, is generally the more profitable: but few ſoils can long bear the burden of ſuch crops, unleſs relieved by interjected leguminous crops. Theſe, on the other hand, without a mixture of culmiferous crops, would ſoon render the ſoil too looſe.

Theſe preliminaries will carry the farmer ſome length in directing a proper rotation of crops. Where dung, lime, or other manure, can be procured in plenty to recruit the ſoil after ſevere cropping, no rotation is more proper or profitable in a ſtrong ſoil, than wheat, peaſe or beans, barley, oats, fallow. The whole farm may be brought under this rotation, except ſo far as hay is wanted. But as ſuch command of manure is rare, it is of more importance to determine what ſhould be the rotation when no manure can be procured but the dung collected in the farm. Conſidering that culmiferous crops are the more profitable in rich land, it would be proper to make them more frequent than the other kind. But as there are few ſoils in Scotland that will admit ſuch frequent culmiferous crops without ſuffering, it may be laid down as a general rule, that alternate crops, culmiferous and leguminous, ought to form the rotation. Nor are there many ſoils that will ſtand good, even with this favourable rotation, unleſs relieved from time to time by paſturing a few years. If ſuch extended rotation be artfully carried on, crops without end may be obtained in a tolerable good ſoil, without any manure but what is produced in the farm.

140
The nature of ſoil conſidered with regard to the rotation of crops.

It is ſcarce neceſſary to be mentioned, being known to every farmer, that clay anſwers beſt for wheat, moiſt clay for beans, loam for barley and peaſe, light ſoil for turnip, ſandy ſoil for rye and buck-wheat; and that oats thrive better in coarſe ſoil than any other grain. Now, in directing a rotation, it is not ſufficient that a culmiferous crop be always ſucceeded by a leguminous: attention muſt be alſo given, that no crop be introduced that is unfit for the ſoil. Wheat, being a great binder, requires more than any other crop a leguminous crop to follow. But every ſuch crop is not proper: potatoes are the greateſt openers of ſoil; but they are improper in a wheat-ſoil. Neither will turnip anſwer, becauſe it requires a light ſoil. A very looſe ſoil, after a crop of rye, requires ryegraſs to bind it, or the treading of cattle in paſturing: but to bind the ſoil, wheat muſt not be ventured; for it ſucceeds ill in looſe ſoil.

Another conſideration of moment in directing the rotation, is to avoid crops that encourage weeds. Peaſe is the fitteſt of all crops for ſucceeding to wheat, becauſe it renders the ground looſe and mellow, and the ſame ſoil agrees with both. But beware of peaſe, unleſs the ſoil be left by the wheat perfectly free of weeds; becauſe peaſe, if not an extraordinary crop, foſter weeds. Barley may be ventured after wheat, if the farmer be unwilling to loſe a crop. It is indeed a robber; better, however, any crop, than run the hazard of poiſoning the ſoil with weeds. But to prevent the neceſſity of barley after wheat, the land ought to be fallowed before the wheat: it cleans the ground thoroughly, and makes peaſe a ſecure crop after wheat. And after a good crop of peaſe, barley never fails. A horſe-hoed crop of turnip is equal to a fallow for rooting out weeds; but turnip does not ſuit land that is proper for wheat. Cabbage does well in wheat-ſoil; and a horſe-hoed crop of cabbage, which eradicates weeds, is a good preparation for wheat to be ſucceeded by peaſe; and a crop of beans diligently hand-hoed, is in that view little inferior. As red clover requires the ground to be perfectly clean, a good crop of it enſures wheat, and next peaſe. In loam, a drilled crop of turnip or potatoes prepares the ground, equal to a fallow, for the ſame ſucceſſion.

Another rule is, to avoid a frequent repetition of the ſame ſpecies; for to produce good crops, change of ſpecies is no leſs neceſſary than change of ſeed. The ſame ſpecies returning every ſecond or third year, will infallibly degenerate, and be a ſcanty crop. This is remarkably the caſe of red clover. Nor will our fields bear pleaſantly perpetual crops of wheat after fallow, which is the practice of ſome Engliſh farmers.

Hitherto of rotation in the ſame field. We add one rule concerning rotation in different fields; which is, to avoid crowding crops one after another in point of time; but to chuſe ſuch as admit intervals ſufficient for leiſurely dreſſing, which gives opportunity to manage all with the ſame hands, and with the ſame cattle; for example, beans in January or February, peaſe and oats in March, barley and potatoes in April, turnip in June or July, wheat and rye in October.

14
Excepti
able
tions.

For illuſtrating the foregoing rules, a few inſtances of exceptionable rotations will not be thought amiſs. The following is an uſual rotation in Norfolk. Firſt, wheat after red clover. Second, barley. Third, turnip. Fourth, barley with red clover. Fifth, clover cut for hay. Sixth, a ſecond year's crop of clover commonly paſtured. Dung is given to the wheat and turnip.—Againſt this rotation ſeveral objections lie. Barley after wheat is improper. The two crops of barley are too near together. The ſecond crop of clover muſt be very bad, if paſturing be the beſt way of conſuming it; and if bad, it is a great encourager of weeds. But the ſtrongeſt objection is, that red clover repeated ſo frequently in the ſame field cannot fail to degenerate; and of this the Norfolk farmers begin to be ſenſible.—Salton in Eaſt Lothian is a clay ſoil; and the rotation there is, Wheat after fallow and dung. Second, barley after two ploughings; the one before winter, the other immediately before the ſeed is ſown. Third, oats. Fourth, peaſe. Fifth, barley. Sixth, oats: and then fallow. This rotation conſiſts chiefly of robbing crops. Peaſe are the only leguminous crop, which even with the fallow is not ſufficient to looſen a ſtiff ſoil. But the ſoil is good, which in ſome meaſure hides the badneſs of the rotation.—About Seaton, and all the way from Preſton to Goſsford, the ground is ſtill more ſeverely handled: wheat after fallow and dung, barley, oats, peaſe, wheat, barley, oats, and then another fallow. The ſoil is excellent; and it ought indeed to be ſo, to ſupport many rounds of ſuch cropping.

In the pariſhes of Tranent, Aberlady, Dirleton, North-Berwick, and Athelſtonefoord, the following rotations were formerly-univerſal, and to this day are much more frequent than any other mode.

1. After fallow with dung, wheat, barley, oats, peaſe and beans, barley, oats, wheat.

2. After fallow and dung, barley, oats, peaſe and beans, wheat, barley, oats, peaſe, wheat.

3. After fallow and dung, wheat, oats, peaſe, barly, oats, wheat.

4. After fallow and dung, barley, oats, beans, wheat, peaſe, barley, oats.

In the ſeveral Tours of Young the itinerant farmer, are found, in the beſt counties of England, examples without end, of rotations no leſs exceptionable than many of thoſe mentioned.

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be kept
long in
ture.

Where a field is laid down for paſture in order to be recruited, it is commonly left in that ſtate many years; for it is the univerſal opinion, that the longer it lies, the richer it becomes for bearing corn. This may be true; but in order to determine the mode of cropping, the important point is, what upon the whole is the moſt profitable rotation; not what may produce luxuriant crops at a diſtant period. Upon that point, it may be affirmed, that the farmer who keeps a field in paſture beyond a certain time, loſes every year conſiderably; and that a few luxuriant crops of corn, after twenty years of paſture, and ſtill more after thirty, will not make up the loſs.

Paſture-graſs, while young, maintains many animals; and the field is greatly recruited by what they drop; it is even recruited by hay-crops, provided the graſs be cut before ſeeding. But as old graſs yields little profit, the field ought to be taken up for corn when the paſture begins to fail; and after a few crops, it ought to be laid down again with graſs-ſeeds. Seduced by a chimerical notion, that a field, by frequent corn-crops, is fatigued and requires reſt like a labouring man or animal, careful farmers give long reſt to their fields by paſture, never adverting that it affords little profit. It ought to be their ſtudy, to improve their ſoil, by making it free, and alſo retentive of moiſture; If they accompliſh theſe ends, they need not be afraid of exhauſting the ſoil by cropping.

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otations.

Where a farmer has acceſs to no manure but what is his own production, the caſe under conſideration, there are various rotations of crops, all of them good though perhaps not equally ſo. We ſhall begin with two examples, one in clay, and one in free ſoil, each of the farms ninety acres. Six acres are to be incloſed for a kitchen-garden, in which there muſt be annually a crop of red clover, for ſummer-food to the working cattle. As there are annually twelve acres in hay, and twelve in paſture, a ſingle plough with good cattle will be ſufficient to command the remaining ſixty acres.

Rotation in a clay ſoil.

Inclos.	1775.	1776.	1777.	1778.	1779.	1780.
1.	Fallow.	Wheat.	Peaſe.	Barley.	Hay.	Oats.
2.	Wheat.	Peaſe.	Barley.	Hay.	Oats.	Fallow.
3.	Peaſe.	Barley.	Hay.	Oats.	Fallow.	Wheat.
4.	Barley.	Hay.	Oats.	Fallow.	Wheat.	Peaſe.
5.	Hay.	Oats.	Fallow.	Wheat.	Peaſe.	Barley.
6.	Oats.	Fallow.	Wheat.	Peaſe.	Barley.	Hay.
7.	Paſture.	Paſture.	Paſture.	Paſture.	Paſture.	Paſture.

When the rotation is completed, the ſeventh incloſure having been ſix years in paſture, is ready to be taken up for a rotation of crops which begins with oats in the year 1781, and proceeds as in the ſixth incloſure. In the ſame year 1781, the fifth incloſure is made paſture, for which it is prepared by ſowing paſture graſs ſeeds with the barley of the year 1780. And in this manner may the rotation be carried on without end. Here the labour is equally diſtributed; and there is no hurry nor confuſion. But the chief property of this rotation is, that two culmiferous or white-corn crops are never found together; by a due mixture of crops, the ſoil is preſerved in good heart without any adventitious manure. At the ſame time, the land is always producing plentiful crops: neither hay nor paſture get time to degenerate. The whole dung is laid upon the fallow.

Every farm that takes a graſs-crop into the rotation muſt be incloſed, which is peculiarly neceſſary in a clay ſoil, as nothing is more hurtful to clay than poaching.

Rotation in a free ſoil.

Inclos.	1775.	1776.	1777.	1778.	1779.	1780.
1.	Turnip.	Barley.	Hay.	Oats.	Fallow.	Wheat.
2.	Barley.	Hay.	Oats.	Fallow.	Wheat.	Turnip.
3.	Hay.	Oats.	Fallow.	Wheat.	Turnip.	Barley.
4.	Oats.	Fallow.	Wheat.	Turnip.	Barley.	Hay.
5.	Fallow.	Wheat.	Turnip.	Barley.	Hay.	Oats.
6.	Wheat.	Turnip.	Barley.	Hay.	Oats.	Fallow.
7.	Paſture.	Paſture.	Paſture.	Paſture.	Paſture.	Paſture.

For the next rotation, the ſeventh incloſure is taken up for corn, beginning with an oat-crop, and proceeding in the order of the fourth incloſure; in place of which, the third incloſure is laid down for paſture by ſowing paſture-graſſes with the laſt crop in that incloſure, being barley. This rotation has all the advantages of the former. Here the dung is employed on the turnip-crop.

We proceed to conſider what rotation is proper for carſe clay. The farm we propoſe conſiſts of ſeventy-three acres. Nine are to be incloſed for a kitchen garden, affording plenty of red clover to be cut green for the farm-cattle. The remaining ſixty-four acres are divided into four incloſures, ſixteen acres each, to be cropped as in the following table.

Inclos.	1775.	1776.	1777.	1778.
1.	Beans.	Barley.	Hay.	Oats.
2.	Barley.	Hay.	Oats.	Beans.
3.	Hay.	Oats.	Beans.	Barley.
4.	Oats.	Beans.	Barley.	Hay.

Here the dung ought to be applied to the barley.

Many other rotations may be contrived, keeping to the rules above laid down. Fallow, for example, wheat, peaſe and beans, barley, cabbage, oats, for clay. Here dung muſt be given both to the wheat and cabbage. For free ſoil, drilled turnip, barley, red clover, wheat upon a ſingle furrow, drilled potatoes, oats. Both the turnip and potatoes muſt have dung. Another for free ſoil: turnip drilled and dunged, red clover, wheat on a ſingle furrow with dung, peaſe, barley, potatoes, oats. The following rotation has proved ſucceſsful in a ſoil proper for wheat. 1. Oats with red clover, after fallow, without dung. 2. Hay. The clover-ſtubble dunged, and wheat ſown the end of October with a ſingle furrow. 3. Wheat. 4. Peaſe. 5. Barley. Fallow again. Oats are taken the firſt crop, to ſave the dung for the wheat. Oats always thrive on a fallow, though without dung, which is not the caſe of barley. But barley ſeldom fails after peaſe. In ſtrong clay ſoil, the following rotation anſwers. 1. Wheat after fallow and dung. 2. Beans ſown under furrow as early as poſſible. Above the beans, ſow peaſe end of March, half a boll per acre, and harrow them in. The two grains will ripen at the ſame time. 3. Oats or barley on a winter-furrow with graſs-ſeeds. 4. Hay for one year or two; the ſecond growth paſtured. Lay what dung can be ſpared on the hay-ſtubble, and ſow wheat with a ſingle furrow. 5. Wheat. 6. Beans or peaſe. 7. Oats. Fallow again.

Sect. VI. *Of Reaping Corn and Hay Crops, and Storing them up for uſe.*

144 Of ripeneſs.

Culmiferous plants are ripe when the ſtem is totally white: they are not fully ripe if any green ſtreaks remain. Some farmers are of opinion, that wheat ought to be cut before it is fully ripe. Their reaſons are, firſt, that ripe wheat is apt to ſhake; and next, that the flour is not ſo good. With reſpect to the laſt, it is contrary to nature, that any ſeed can be better in an unripe ſtate, than when brought to perfection: nor will it be found ſo upon trial. With reſpect to the firſt, wheat, at the point of perfection, is not more apt to ſhake than for ſome days before: the huſk begins not to open till after the ſeed is fully ripe; and then the ſuffering the crop to ſtand becomes ticklish: after the minute of ripening, it ſhould be cut down in an inſtant, if poſſible.

145 Of reapers.

This leads to the hands that are commonly engaged to cut down corn. In Scotland, the univerſal practice was, to provide a number of hands, in proportion to the extent of the crop, without regard to the time of ripening. By this method, the reapers were often idle for want of work; and what is much worſe, they had often more work than they could overtake, and ripe fields were laid open to ſhaking winds. The Lothians have long enjoyed weekly markets for reapers, where a farmer can provide himſelf with the number he wants; and this practice is creeping into neighbouring ſhires. Where there is no opportunity of ſuch markets, neighbouring farmers ought to agree in borrowing and lending their reapers.

One ſhould imagine, that a caution againſt cutting corn when wet, is unneceſſary; yet from the impatience of farmers to prevent ſhaking, no caveat is more ſo. Why do they not conſider, that corn ſtanding dries in half a day; when, in a cloſe ſheaf, the weather muſt be favourable if it dry in a month? in moiſt weather it will never dry.

146 Manner of cutting.

With reſpect to the manner of cutting, we muſt premiſe, that barley is of all the moſt difficult grain to be dried for keeping. Having no huſk, rain has eaſy acceſs; and it has a tendency to malten when wet. Where the ground is properly ſmoothed by rolling, it ſeems beſt to cut it down with the ſythe. This manner being more expeditious than the ſickle, removes it ſooner from danger of wind; and gives a third more ſtraw, which is a capital article for dung, where a farm is at a diſtance from other manure. We except only corn that has lodged; for there the ſickle is more convenient than the ſythe. As it ought to be dry when cut, bind it up directly: if allowed to lie any time in the ſwath, it is apt to be diſcoloured.—Barley ſown with graſs-ſeeds, red clover eſpecially, requires a different management. Where the graſs is cut along with it, the difficulty is great of getting it ſo dry as to be ventured in a ſtack. The beſt way is, to cut the barley with a ſickle above the clover, ſo as that nothing but clean barley is bound up. Cut with a ſythe the ſtubble and graſs: they make excellent winter-food. The ſame method is applicable to oats; with this only difference, that when the field is expoſed to the ſouth-weſt wind, it is leſs neceſſary to bind immediately after mowing. As wheat commonly grows higher than any other grain, it is difficult to manage it with the ſythe; for which reaſon the ſickle is preferred in England. Peaſe and beans grow ſo irregularly, as to make the ſickle neceſſary.

147 Drying of peaſe.

The beſt way for drying peaſe, is to keep ſeparate the handfuls that are cut: though in this way they wet eaſily, they dry as ſoon. In the common way of heaping peaſe together for compoſing a ſheaf, they wet as eaſily, and dry not near ſo ſoon. With reſpect to beans, the top of the handful laſt cut, ought to be laid on the bottom of the former; which gives ready acceſs to the wind. By this method peaſe and beans are ready for the ſtack in half the ordinary time.

148 Size of ſheaves.

A ſheaf commonly is made as large as can be contained in two lengths of the corn made into a rope. To ſave frequent tying, the binder preſſes it down with his knee, and binds it ſo hard as totally to exclude the air. If there be any moiſture in the crop, which ſeldom fails, a proceſs of fermentation and putrefaction commences in the ſheaf; which is perfected in the ſtack, to the deſtruction both of corn and ſtraw. How ſtupid is it, to make the ſize of a ſheaf depend on the height of the plants! By that rule, a wheat-ſheaf is commonly ſo weighty, as to be unmanageable by ordinary arms: it requires an effort to move it, that frequently burſts the knot, and occaſions loſs of grain, beſide the trouble of a ſecond tying. Sheaves ought never to be larger than can be contained in one length of the plant, cut cloſe to the ground; without admitting any exception, if the plants be above eighteen inches high. The binder's arm can then compreſs the ſheaf ſufficiently, without need of his knee. The additional hands that this way of binding may require, are not to be regarded, compared with the advantage of drying ſoon. Corn thus managed may be ready for the ſtack in a week: it ſeldom in the ordinary way requires leſs than a fortnight, and frequently longer. Of a ſmall ſheaf compreſſed by the arm only, the air pervades every part; nor is it ſo apt to be unlooſed as a large ſheaf, however firmly bound. We omit the gathering of ſheaves into ſhocks, becauſe the common method is good, which is to place the ſhocks directed to the ſouth-weſt, in order to reſiſt the force of the wind. Five ſheaves on each ſide make a ſufficient ſtay; and a greater number cannot be covered with two head-ſheaves.

149 Carrying of the victual

Every article is of importance that haſtens the operation in a country, like Scotland, ſubjected to unequal harveſt-weather; for which reaſon, the moſt expeditious method ſhould be choſen for carrying corn from the field to the ſtack-yard. Our carriages are generally too ſmall or too large. A ſledge is a very aukward machine: many hands are required, and little progreſs made. Waggons and large carts are little leſs dilatory, as they muſt ſtand in the yard till unloaded ſheaf by ſheaf. The beſt way is, to uſe long carts moveable upon the axle, ſo as at once to throw the whole load on the ground; which is forked up to the ſtack by a hand appointed for that purpoſe. By this method, two carts will do the work of four or five.

150
Of ſtacking.

Building round ſtacks in the yard is undoubtedly preferable to houſing corn. There it is ſhut up from the air; and it muſt be exceedingly dry, if it contract not a muſtineſs, which is the firſt ſtep to putrefaction. Add to this, that in the yard, a ſtack is preſerved from rats and mice by being ſet on a pedeſtal; whereas no method has hitherto been invented for preſerving corn in a houſe from ſuch deſtructive vermin. The proper manner of building, is to make every ſheaf incline downward from its top to its bottom. Where the ſheaves are laid horizontally, the ſtack will take in rain both above and below. The beſt form of a ſtack is that of a cone placed on a cylinder; and the top of the cone ſhould be formed with three ſheaves drawn to a point. If the upper part of the cylinder be a little wider than the under, ſo much the better.

151
Covering the ſtacks.

The delaying to cover a ſtack for two or three weeks, though common, is, however, exceedingly abſurd; for if much rain fall in the interim, it is beyond the power of wind to dry the ſtack. Vegetation begun in the external parts, ſhuts out the air from the internal; and to prevent a total putrefaction, the ſtack muſt be thrown down, and expoſed to the air, every ſheaf. In order to have a ſtack covered the moment it is finiſhed, ſtraw and ropes ought to be ready; and the covering ought to be ſo thick as to be proof againſt rain.

Scotland is ſubject not only to floods of rain, but to high winds. Good covering guards againſt the former, and ropes artfully applied guards againſt the latter. The following is a good mode. Take a hay-rope well twiſted, and ſurround the ſtack with it, two feet or ſo below the top. Surround the ſtack with another ſuch rope immediately below the eaſing. Connect theſe two with ropes in an up-and-down poſition, diſtant from each other at the eaſing about five or ſix feet. Then ſurround the ſtack with other circular ropes parallel to the two firſt mentioned, giving them a twiſt round every one of thoſe that lie up-and-down, by which the whole will be connected together in a ſort of net-work. What remains is, to finiſh the two feet at the top of the ſtack. Let it be covered with bunches of ſtraw laid regularly up and down; the under part to be put under the circular rope firſt mentioned, which will keep it faſt, and the upper part be bound by a ſmall rope artfully twiſted, commonly called *the crown of the ſtack*. This method is preferable to the common way of laying long ropes over the top of the ſtack, and tying them to the belting-rope; which flattens the top, and makes it take in rain. A ſtack covered in the way here deſcribed, will ſtand two years ſecure both againſt wind and rain; a notable advantage in this variable climate.

152
Hay-making.

The great aim in making hay is, to preſerve as much of the ſap as poſſible. All agree in this; and yet differ widely in the means of making that aim effectual. To deſcribe all the different means would be equally tedious and unprofitable. We ſhall confine ourſelves to two, which appear preferable to all others. A crop of rye-graſs and yellow clover ought to be ſpread as cut. A day or two after, when the dew is evaporated, rake it into a number of parallel rows along the field, termed *wind-rows*, for the convenience of putting it up into ſmall cocks. After turning the rows once and again, make ſmall cocks weighing a ſtone or two. At the diſtance of two days or ſo, put two cocks into one, obſerving always to mix the tops and bottoms together, and to take a new place for each cock, that the leaſt damage poſſible may be done to the graſs. Proceed in putting two cocks into one, till ſufficiently dry for tramp-ricks of 100 ſtone each. The eaſieſt way of erecting tramp-ricks, is to found a rick in the middle of the row of cocks that are to compoſe it. The cocks may be carried to the rick by two perſons joining arms together. When all the cocks are thus carried to the rick within the diſtance of forty yards or ſo, the reſt of the cocks will be more expeditiouſly carried to the rick, by a rope wound about them and dragged by a horſe. Two ropes are ſufficient to ſecure the ricks from wind, the ſhort time they are to ſtand in the field. In the year 1775, 10,000 ſtone were put into tramp-ricks the fourth day after cutting. In a country ſo wet as many parts of Scotland are, expedition is of mighty conſequence in the drying both of hay and corn. With reſpect to hay intended for horned cattle, it is by the generality held an improvement, that it be heated a little in the ſtack. But we violently ſuſpect this doctrine to have been invented for excuſing indolent management. An ox, it is true, will eat ſuch hay; but it will always be found that he prefers ſweet hay; and it cannot well be doubted, but that ſuch hay is the moſt ſalutary and the moſt nouriſhing.

153
Hay of red clover.

The making hay conſiſting chiefly of red clover, requires more care. The ſeaſon of cutting is the laſt week of June, when it is in full bloom: earlier it may be cut, but never later. To cut it later, would indeed produce a weightier crop; but a late firſt cutting makes the ſecond alſo late, perhaps too late for drying. At the ſame time, the want of weight in an early firſt cutting, is amply compenſated by the weight of the ſecond.

When the ſeaſon is too variable for making hay of the ſecond growth, mix ſtraw with that growth, which will be a ſubſtantial food for cattle during winter. This is commonly done by laying ſtrata of the ſtraw and clover alternately in the ſtack. But by this method, the ſtrata of clover, if they do not heat, turn mouldy at leaſt, and unpalatable. The better way is, to mix them carefully with the hand before they be put into the ſtack. The dry ſtraw imbibes moiſture from the clover and prevents heating.

154
Other method.

But the beſt method of hay-making ſeems to be that recommended by Mr Anderſon *. "Inſtead," ſays he, "of allowing the hay to lie, as uſual in moſt places, for ſome days in the ſwathe after it is cut, and afterwards alternately putting it up into cocks and ſpreading it out, and tedding it in the ſun, which tends greatly to bleach the hay, exhales its natural juices, and ſubjects it very much to the danger of getting rain, and thus runs a great riſk of being good for little, I make it a general rule, if poſſible, never to cut hay but when the graſs is quite dry; and then make the gatherers follow cloſe upon the cutters,—putting it up immediately into ſmall cocks about three feet high each when new put up, and of as ſmall a diameter as they can be made to ſtand with; always giving each of them a ſlight kind of thatching, by drawing a few handfuls of the hay from the bottom of the cock all around, and laying it lightly upon the top with one of the ends hanging downwards. This is done with the utmoſt eaſe and expedition; and when it is once in that ſtate, I conſider my hay as in a great meaſure out of danger: for unleſs a violent wind ſhould ariſe immediately after the cocks are put up, ſo as to overturn them, nothing elſe can hurt the hay; as I have often experienced, that no rain, however violent, ever penetrates into theſe cocks but for a very little way. And, if they are dry put up, they never ſit together ſo cloſely as to heat; although they acquire, in a day or two, ſuch a degree of firmneſs, as to be in no danger of being overturned by wind after that time, unleſs it blows a hurricane.

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* *Eſſays on Agriculture*, vol. I. p. 186.

“ In theſe cocks, I allow the hay to remain, until, upon inſpection, I judge that it will keep in pretty large tramp-cocks, (which is uſually in one or two weeks, according as the weather is more or leſs favourable, when two men, each with a long pronged pitchfork, lift up one of theſe ſmall cocks between them with the greateſt eaſe, and carry them one after another to the place where the tramp-cock is to be built (D): and in this manner, they proceed over the field till the whole is finiſhed.

155
Advantages of this method.

“ The advantages that attend this method of making hay, are, That it greatly abridges the labour; as it does not require above the one half of the work that is neceſſary in the old method of turning and tedding it: That it allows the hay to continue almoſt as green as when it is cut, and preſerves its natural juices in the greateſt perfection; for, unleſs it be the little that is expoſed to the ſun and air upon the ſurface of the cocks, which is no more bleached than every ſtraw of hay ſaved in the ordinary way, the whole is dried in the moſt ſlow and equal manner that could be deſired: and, laſtly, That it is thus in a great meaſure ſecured from almoſt the poſſibility of being damaged by rain. This laſt circumſtance deſerves to be much more attended to by the farmer than it uſually is at preſent; as I have ſeen few who are ſufficiently aware of the loſs that the quality of their hay ſuſtains by receiving a ſlight ſhower after it is cut, and before it is gathered; the generality of farmers ſeeming to be very well ſatisfied if they get in their hay without being abſolutely rotted; never paying the leaſt attention to its having been ſeveral times wetted while the hay was making. But, if theſe gentlemen will take the trouble at any time to compare any parcel of hay that has been made perfectly dry, with another parcel from the ſame field that has received a ſhower while in the ſwathe, or even a copious dew, they will ſoon be ſenſible of a very manifeſt difference between them; nor will their horſes or cattle ever commit a miſtake in chuſing between the two.

156
Particular caution requiſite in this method.

“ Let it be particularly remarked, that in this manner of making hay, great care muſt be taken that it be dry when firſt put into the cocks; for, if it is in the leaſt degree wet at that time, it will turn inſtantly mouldy, and ſit together ſo as to become totally impervious to the air, and will never afterwards become dry till it is ſpread out to the ſun. For this reaſon, if at any time during a courſe of good ſettled weather you ſhould begin to cut in the morning before the dew is off the graſs, keep back the gatherers till the dew is evaporated; allowing that which was firſt cut to lie till it is dry before it is cocked. In this caſe, you will almoſt always find that the uncut graſs will dry ſooner than that which has been cut when wet; and, therefore, the gatherers may always begin to put up that which is freſh cut before the other; which will uſually require two or three hours to dry after the new-cut hay may be cocked. And if, at any time, in caſe of neceſſity, you ſhould be obliged to cut your hay before it is dry, the ſame rule muſt be obſerved, always to allow it to remain in the ſwathe till it is quite dry: but, as there is always a great riſk of being long in getting it up, and as it never in this caſe *wins* (E) ſo kindly as if it had been dry cut, the farmer ought to endeavour, if poſſible, in all caſes, to cut his hay only when dry; even if it ſhould coſt him ſome additional expence to the cutters, by keeping them employed at any other work, or even allowing them to remain idle, if the weather ſhould be variable or rainy.

“ But if there is a great proportion of clover, and the weather ſhould chance be cloſe and calm at the time, it may, on ſome occaſions, be neceſſary to open up theſe cocks a little, to admit ſome freſh air into them; in which caſe, after they have ſtood a day or two, it may be of great uſe to turn theſe cocks and open them up a little, which ought to be done in the drieſt time of the day; the operator taking that part of each cock which was the top, and with it forming the baſe of a new one, ſo that the part which was moſt expoſed to the air becomes excluded from it, and that which was undermoſt comes to be placed upon the top, ſo as to make it all dry as equally as poſſible.

“ If the hay has not been damp when it was firſt put up, the cock may be immediately finiſhed out at once; but if it is at all wet, it will be of great uſe to turn over only a little of the top of the cock at firſt, and leaving it in that ſtate to dry a little, proceed to another, and a third, and fourth, *&c.* treating each in the ſame way; going on in that manner till you find that the inſide of the firſt opened cock is ſufficiently dried, when it will be proper to return to it, turning over a little more of it till you come to what is ſtill damp, when you leave it and proceed to another, and ſo

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(D) If the hay is to be carried to any conſiderable diſtance, this part of the labour may be greatly abridged, by cauſing the carriers take two long ſticks of a ſufficient ſtrength, and having laid them down by the ſmall cocks parallel to one another, at the diſtance of one and a half, or two feet aſunder, let them lift three or four cocks, one after another, and place them carefully above the ſticks, and then carry them all together, as if upon a hand-barrow, to the place where the large rick is to be built.

(E) By *winning* hay, is meant the operation by which it is brought from the ſucculent ſtate of graſs to that of a dry fodder.

ſo on round the whole; always returning afreſh till the cocks are entirely finiſhed. This is the beſt way of ſaving your hay, if you have been under the neceſſity of cutting it while damp; but, it is always beſt to guard againſt this inconvenience, if poſſible."

157 Hay-ſtacks. In the yard, a ſtack of hay ought to be an oblong ſquare, if the quantity be greater than to be eaſily ſtowed in a round ſtack; becauſe a ſmaller ſurface is expoſed to the air, than in a number of round ſtacks. For the ſame reaſon, a ſtack of peaſe ought to have the ſame form, the ſtraw being more valuable than that of oats, wheat, or barley. The moment a ſtack is finiſhed, it ought to be covered; becauſe the ſurface-hay is much damaged by withering in dry weather, and moiſtening in wet weather. Let it have a pavilion-roof; for more of it can be covered with ſtraw in that ſhape, than when built perpendicular at the ends. Let it be roped as directed above for corn-ſtacks; with this difference only, that in an oblong ſquare the ropes muſt be thrown over the top, and tied to the belt-rope below. This belt-rope ought to be fixed with pins to the ſtack: the reaſon is, that the ropes thrown over the ſtack will bag by the ſinking of the ſtack, and may be drawn tight by lowering the belt-rope, and fixing it in its new poſition with the ſame pins.

The ſtems of hopes, being long and tough, make excellent ropes; and it will be a ſaving article, to propagate a few plants of that kind for that very end.

A ſtack of ryegraſs hay, a year old, and of a moderate ſize, will weigh, each cubic yard, 11 Dutch ſtone. A ſtack of clover-hay in the ſame circumſtances weighs ſomewhat leſs.

SECT. VII. *Manures.*

The manures commonly uſed are dung, lime, ſhell-marl, clay-marl, and ſtone-marl. Many other ſubſtances are uſed; ſhavings of horn, for example, refuſe of malt, and even old rags: but as the quantity that can be procured is inconſiderable, and as their application is ſimple, we ſhall conſume no time upon them.

158 Dung. Dung is the chief of all manures; becauſe a quantity of it may be collected in every farm, and becauſe it makes the quickeſt return. A field ſufficiently dunged, will produce good crops four or five years.

Dung of animals that chew the cud, being more thoroughly putrefied than that of others, is fit to be mixed with the ſoil without needing to be collected into a dunghill. A horſe does not chew the cud; and in horſe-dung may be perceived ſtraw or ryegraſs broken into ſmall parts, but not diſſolved: it is proper therefore that the putrefaction be completed in a dunghill. It ought to be mixed there with cool materials: ſo hot it is, that, in a dunghill by itſelf, it ſinges and burns inſtead of putrefying. The difference between the dung of a horſe and of a horned animal, is viſible in a paſture-field: the graſs round the former is withered; round the latter, it is ranker and more verdant than in the reſt of the field. A mixture of dry and moiſt ſtuff, ought to be ſtudied: the former attracting moiſture from the latter, they become equally moiſt.

159 a dung- To prevent ſap from running out of a dunghill, its ſituation ſhould be a little below the ſurface; and to prevent rain from running into it, it ſhould be ſurrounded with a ring of ſod. If the ſoil on which the dunghill ſtands be porous, let it be paved, to prevent the ſap from ſinking into the ground. If moiſture happen to ſuperabound, it may be led off by a ſmall gutter to impregnate a quantity of rich mould laid down to receive it, which will make it equal to good dung.

Straw ſhould be prepared for the dunghill, by being laid under cattle, and ſufficiently moiſtened. When laid dry into a dunghill, it keeps it open, admits too much air, and prevents putrefaction.

Dung from the ſtable ought to be carefully ſpread on the dunghill, and mixed with the former dung. When left in heaps upon the dunghill, fermentation and putrefaction go on unequally.

Complete putrefaction is of importance with regard to the ſeed of weeds that are in the dunghill: if they remain ſound, they are carried out with the dung, and infeſt the ground. Complete putrefaction is of ſtill greater importance by pulveriſing the dung; in which condition it mixes intimately with the ſoil, and operates the moſt powerfully. In land intended for barley, undigeſted dung has a very bad effect: it keeps the ground open, admits drought, and prevents the ſeed from ſpringing. On the other hand, when thoroughly rotted, it mixes with the ſoil, and enables it to retain moiſture. It follows, that the propereſt time for dunging a field, is in its higheſt pulveriſation; at which time the earth mixes intimately with the dung. Immediately before ſetting cabbage, ſowing turnip, or wheat, is a good time. Dung divides and ſpreads the moſt accurately when moiſt. Its intimate mixture with the ſoil is of ſuch importance, that hands ſhould be employed to divide and ſpread any lumps that may be in it. 160 Time for dunging.

Dung ſhould be ſpread, and ploughed into the ground, without delay. When a heap lies two or three weeks, ſome of the moiſture is imbibed into the ground, which will produce tufts of corn more vigorous than in the reſt of the field. There cannot be a worſe practice than to lead out dung before winter, leaving it expoſed to froſt and ſnow. The whole ſpirit of the dung is extracted by rain, and carried off with it. The dung diveſted of its ſap becomes dry in ſpring, and incapable of being mixed with the mould. It is turned over whole by the plough, and buried in the furrow. 161 Manner of dunging.

As dung is an article of the utmoſt importance in huſbandry, one ſhould imagine, that the collecting it would be a capital article with an induſtrious farmer. Yet an ingenious writer, obſerving that the Jamaicans are in this particular much more induſtrious than the Britiſh, aſcribes the difference to the difficulty of procuring dung in Jamaica. "In England, where the " long winter enables a farmer to raiſe what quantity " he pleaſes, it is not collected with any degree of " induſtry. But in Jamaica, where there is no win- " ter, and where the heat of the ſun is a great ob- " ſtruction, the farmer muſt be indefatigable, or he " will never raiſe any dung." Cool intereſt is not alone a ſufficient motive with the indolent, to be active. As dung is of great importance in huſbandry, a farmer cannot be too aſſiduous in collecting animal and vegetable ſubſtances that will rot. One article of that kind there is, to collect which there is a double motive, and yet is neglected almoſt every where. A farm full of weeds is a nuiſance to the neighbourhood: it poiſons the fields around; and the poſſeſſor ought to be diſ- 162 Of collecting dung.

graced as a peſt to ſociety. Now the cutting down every weed before the ſeed is formed, anſwers two excellent purpoſes. Firſt, it encourages good crops, by keeping the ground clean. Next, theſe weeds mixed with other materials in a dunghill, may add conſiderably to the quantity of dung.

163 Of lime.

Next of lime, which is a profitable manure, and greatly ſo when it can be got in plenty within a moderate diſtance. The benefit of lime is ſo viſible, that the uſe of it has become general, where the price and carriage are in any degree moderate.

164 Its operation.

However people may differ in other particulars, all agree, that the operation of lime depends on its intimate mixture with the ſoil; and therefore that the proper time of applying it, is when it is perfectly powdered and the ſoil at the ſame time in the higheſt degree of pulveriſation. Lime of itſelf is abſolutely barren; and yet it enriches a barren ſoil. Neither of the two produces any good effect without the other: and conſequently, the more intimately they are mixed, the effect muſt be the greater.

Hence it follows, that lime ought always to be ſlaked with a proper quantity of water, becauſe by that means it is reduced the moſt effectually into powder. Lime left to be ſlaked by a moiſt air, or accidental rain, is ſeldom or never thoroughly reduced into powder; and therefore can never be intimately mixed with the ſoil. Sometimes an opportunity offers to bring home ſhell-lime before the ground is ready for it; and it is commonly thrown into a heap without cover, truſting to rain for ſlaking. The proper way is, to lay the ſhell-lime in different heaps on the ground where it is to be ſpread, to reduce theſe heaps into powder by ſlaking with water, and to cover the ſlaked lime with ſod ſo as to defend it from rain. One however would avoid as much as poſſible the bringing home lime before the ground be ready for it. Where allowed to lie long in a heap, there are two bad conſequences: firſt, lime attracts moiſture, even though well covered, and runs into clots, which prevents an intimate mixture; and, next, we know, that burnt limeſtone, whether in ſhells or in powder, returns gradually into its original ſtate of limeſtone; and upon that account alſo, is leſs capable of being mixt with the ſoil. And this is verified by a fact, that, after lying long, it is ſo hard bound together as to require a pick to ſeparate the parts.

For the ſame reaſon, it is a bad practice, though common, to let ſpread lime lie on the ſurface all winter. The bad effects abovementioned take place here in part: and there is another; that rain waſhes the lime down to the furrows, and in a hanging field carries the whole away.

165 Time of liming.

As the particles of powdered lime are both ſmall and heavy, they quickly ſink to the bottom of the furrow, if care be not taken to prevent it. In that view, it is a rule, that lime be ſpread, and mixed with the ſoil, immediately before ſowing, or along with the ſeed. In this manner of application, there being no occaſion to move it till the ground be ſtirred for a new crop, it has time to incorporate with the ſoil, and does not readily ſeparate from it. Thus, if turnip-ſeed is to be ſown broadcaſt, the lime ought to be laid on immediately before ſowing, and harrowed in with the ſeed. If a crop of drilled turnip or cabbage be intended, the lime ought to be ſpread immediately before forming in drills. With reſpect to wheat, the line ought to be ſpread immediately before ſeed-furrowing. If ſpread more early, before the ground be ſufficiently broken, it ſinks to the bottom. If a light ſoil be prepared for barley, the lime ought to be ſpread after ſeed-furrowing, and harrowed in with the ſeed. In a ſtrong ſoil, it ſinks not ſo readily to the bottom; and therefore, before ſowing the barley, the lime ought to be mixed with the ſoil by a brake. Where moor is ſummer-fallowed for a crop of oats next year, the lime ought to be laid on immediately before the laſt ploughing, and braked in as before. It has ſufficient time to incorporate with the ſoil before the land be ſtirred again.

166 Quantity.

The quantity to be laid on, depends on the nature of the ſoil. Upon a ſtrong ſoil, ſeventy or eighty bolls of ſhells are not more than ſufficient, reckoning four ſmall firlots to the boll, termed *wheat-meaſure;* nor will it be an overdoſe to lay on an hundred bolls. Between fifty and ſixty may ſuffice upon medium ſoils; and upon the thin or gravelly, between thirty and forty. It is not ſafe to lay a much greater quantity on ſuch ſoils.

167 Liming paſture-fields.

It is common to lime a paſture-field immediately before ploughing. This is an unſafe practice; it is thrown to the bottom of the furrow, from which it is never fully gathered up. The proper time for liming a paſture field, intended to be taken up for corn, is a year at leaſt, or two, before ploughing. It is waſhed in by rain among the roots of plants, and has time to incorporate with the ſoil.

168 Beat limeſtone.

Limeſtone beat ſmall, makes an excellent manure; and ſupplies the want of powdered lime, where there is no feuel to burn the limeſtone. Limeſtone beat ſmall has not hitherto been much uſed as a manure; and the proportion between it and powdered lime has not been aſcertained. What follows may give ſome light. Three pounds of raw lime is by burning reduced to two pounds of ſhell-lime. Yet nothing is expelled by the fire but the air that was in the limeſtone: the calcareous earth remains entire. *Ergo*, two pounds of ſhell-lime contain as much calcareous earth as three pounds of raw limeſtone. Shell-lime of the beſt quality, when ſlaked with water, will meaſure out to thrice the quantity. But as limeſtone loſes none of its bulk by being burnt into ſhells, it follows, that three buſhels of raw limeſtone contain as much calcareous earth as ſix buſhels of powdered lime; and conſequently, if powdered lime poſſeſs not ſome virtue above raw limeſtone, three buſhels of the latter beat ſmall ſhould equal as a manure ſix buſhels of the former.

169 Of ſhell-marl.

Shell-marl, as a manure, is managed in every reſpect like powdered lime; with this only difference, that a fifth or a fourth part more in meaſure ought to be given. The reaſon is, that ſhell-marl is leſs weighty than lime; and that a boll of it contains leſs calcareous earth, which is the fructifying part of both.

Clay and ſtone marls, with reſpect to huſbandry, are the ſame, though in appearance different.

170 Of clay and ſtone marls.

The goodneſs of marl depends on the quantity of calcareous earth in it: which has been known to amount to a half or more. It is too expenſive if the quantity be leſs than a third or a fourth part. Good marl is the moſt ſubſtantial of all manures; becauſe it improves the weakeſt ground to equal the beſt borough-acres. The low part of Berwickſhire termed *the Merſe*, abounds every where with this marl; and is the only county in Scotland where it is in plenty.

Land ought to be cleared of weeds before marling; and it ought to be ſmoothed with the brake and harrow, in order that the marl may be equally ſpread. Marl is a foſſil on which no vegetable will grow; its efficacy depends, like that of lime, on its pulveriſation, and intimate mixture with the ſoil. Toward the former, alternate drought and moiſture contribute greatly, as alſo froſt. Therefore, after being evenly ſpread, it ought to lie on the ſurface all winter. In the month of October, it may be rouſed with a brake; which will bring to the ſurface, and expoſe to the air and froſt, all the hard parts, and mix with the ſoil all that is powdered. In that reſpect it differs widely from dung and lime, which ought to be ploughed into the ground without delay. Oats is a hardy grain, which will anſwer for being the firſt crop after marling, better than any other; and it will ſucceed though the marl be not thoroughly mixed with the ſoil. In that caſe, the marl ought to be ploughed in with an ebb furrow immediately before ſowing, and braked thoroughly. It is tickliſh to make wheat the firſt crop: if ſown before winter, froſt ſwells the marl, and is apt to throw the ſeed out of the ground; if ſown in ſpring, it will ſuffer more than oats by want of due mixture.

Summer is the proper ſeaſon for marling; becauſe in that ſeaſon the marl, being dry, is not only lighter, but is eaſily reduced to powder. Froſt however is not improper for marling, eſpecially as in froſt there is little opportunity for any other work.

Marl is a heavy body, and ſinks to the bottom of the furrow, if indiſcreetly ploughed. Therefore the firſt crop ſhould always have an ebb furrow. During the growing of that crop, the marl has time to incorporate with the ſoil, and to become a part of it; after which it does not readily ſeparate.

Sect. VIII. *Principles and Operations of the New or Horſe-hoeing Huſbandry.*

The general properties attributed to the new huſbandry may be reduced to two, *viz.* the promoting the growth of plants by hoeing, and the ſaving of ſeed; both of which are equally profitable to the farmer.

171 vantages ibed to ſe hoe-

The advantages of tillage before ſowing have already been pointed out. In this place we muſt confine ourſelves to the utility of tillage after ſowing. This kind of tillage is moſt generally known by the name of *horſe-hoeing*.

Land ſowed with wheat, however well it may be cultivated in autumn, ſinks in the winter; the particles get nearer together, and the weeds riſe; ſo that in ſpring, the land is nearly in the ſame ſituation as if it never had been ploughed. This, however, is the ſeaſon when it ſhould branch and grow with moſt vigour; and conſequently ſtands moſt in need of ploughing or hoeing, to deſtroy the weeds, to ſupply the roots with freſh earth, and, by dividing anew the particles of the ſoil, to allow the roots to extend and collect nouriſhment.

It is well known, that, in gardens, plants grow with double vigour after being hoed or tranſplanted. If plants growing in arable land could be managed with eaſe and ſafety in this manner, it is natural to expect, that their growth would be promoted accordingly. Experience ſhows, that this is not only practicable, but attended with many advantages.

In the operation of hoeing wheat, though ſome of the roots be moved or broken, the plants receive no injury; for this very circumſtance makes them ſend forth a greater number of roots than formerly, which enlarge their paſture, and conſequently augment their growth.

Sickly wheat has often recovered its vigour after a good hoeing, eſpecially when performed in weather not very hot or dry.

Wheat, and ſuch grain as is ſown before winter, requires hoeing more than oats, barley, or other grain ſown in the ſpring; for, if the land has been well ploughed before the ſowing of ſpring-corn, it neither has time to harden, nor to produce many weeds, not having been expoſed to the winter's ſnow and rain.

Of Sowing.

172 Method of ſowing in the New Huſbandry.

As, in the practice of the new huſbandry, plants grow with greater vigour than by the old method, the land ſhould be ſowed thinner. It is this principle of the new huſbandry that has been chiefly objected to; for, upon obſerving the land occupied by a ſmall number of plants, people are apt to look upon all the vacant ſpace as loſt. But this prejudice will ſoon be removed, when it is conſidered, that, in the beſt land cultivated in the common method, and ſown very thick, each ſeed produces but one or two ears; that, in the ſame land ſown thinner, every ſeed produces two or three ears; and that a ſingle ſeed ſometimes produces 18 or 21 ears.

In the common method, as there are many more plants than can find ſufficient nouriſhment, and as it is impoſſible to aſſiſt them by hoeing, numbers die before they attain maturity, the greateſt part remain ſickly and drooping; and thus part of the ſeed is loſt. On the contrary, in the new method, all the plants have as much food as they require; and as they are, from time to time, aſſiſted by hoeing, they become ſo vigorous as to equal in their production the numerous but ſickly plants cultivated in the common method.

Of Hoeing.

The new huſbandry is abſolutely impracticable in lands that are not eaſily ploughed. Attempting to cultivate land according to this huſbandry, without attending to this circumſtance, that it is practicable in no land excepting ſuch as have already been brought into good tilth by the old method, has gone far to make it contemptible in many places.

173 The different hoeings.

When a field is in good tilth, it ſhould be ſown ſo thin as to leave ſufficient room for the plants to extend their roots. After being well ploughed and harrowed, it muſt be divided into rows, at the diſtance of thirty inches from one another. On the ſides of each of theſe rows, two rows of wheat muſt be ſowed ſix inches diſtant from each other. By this means there will be an interval of two feet wide betwixt the rows, and every plant will have room enough to extend its roots, and to ſupply it with food. The intervals will likewiſe be ſufficient for allowing the earth to be hoed or tilled without injuring the plants in the rows.

The firſt hoeing, which ſhould be given before the winter, is intended to drain away the wet, and to diſpoſe the earth to be mellowed by the froſts. Theſe two ends will be anſwered by drawing two ſmall furrows at a little diſtance from the rows, and throwing the earth taken from the furrows into the middle of the intervals. This firſt hoeing ſhould be given when the wheat is in leaf.

The ſecond hoeing, which is intended to make the plants branch, ſhould be given after the hard froſts are over. To do this with advantage, after ſtirring the earth a little, near the rows, the earth which was thrown in the middle of the intervals ſhould be turned back into the furrows. This earth, having been mellowed by the winter, ſupplies the plants with excellent food, and makes the roots extend.

The third hoeing, which is intended to invigorate the ſtalk, ſhould be given when the ears of the corn begin to ſhew themſelves. This hoeing may, however, be very ſlight.

But the laſt hoeing is of the greateſt importance, as it enlarges the grain, and makes the ears fill at their extremities. This hoeing ſhould be given when the wheat is in bloom; a furrow muſt be drawn in the middle of the interval, and the earth thrown to the right and left on the foot of the plants. This ſupports the plants, prevents them from being laid, and prepares the ground for the next ſowing, as the ſeed is then to be put in the middle of the ground that formed the intervals.

By this ſucceſſive tillage, or hoeing, good crops will be obtained, provided the weather is not very unfavourable.

But as ſtrong, vigorous plants are longer before they arrive at maturity, corn raiſed in the new way is later in ripening than any other, and muſt therefore be ſown earlier.

In order to prepare the intervals for ſowing again, ſome well-rotted dung may be laid in the deep furrows made in the middle of the intervals; and this dung muſt be covered with the earth that was before thrown towards the rows of wheat. But, if the land does not require mending, the deep furrow is filled without any dung. This operation ſhould be performed immediately after harveſt, that there may be time to give the land a ſlight ſtirring before the rows are ſowed; which ſhould occupy the middle of the ſpace which formed the intervals during the laſt crop. The intervals of the ſecond year take up the ſpace occupied by the ſtubble of the firſt.

Suppoſing dung to be neceſſary, which is denied by many, a very ſmall quantity is ſufficient; a ſingle layer, put in the bottom of each furrow, will be enough.

DESCRIPTION of the INSTRUMENTS commonly uſed in the NEW HUSBANDRY.

174
Inſtruments deſcribed.
Plate VI.

Fig. 1. is a marking plough. The principal uſe of this plough is to ſtraight and regulate the ridges. The firſt line is traced by the eye, by means of three poles, placed in a ſtraight line. The plough draws the firſt furrow in the direction of this line; and, at the ſame time, with the tooth A, fixed in the block of wood near the end of the croſs-poll or ſlider B B, marks the breadth of the ridge at the diſtance intended. The ploughman next traces the ſecond line or rutt made by the tooth, and draws a ſmall furrow along it; and continues in this manner till the whole field is laid out in ſtraight and equidiſtant ridges.

Fig. 2. is a plough for breaking up lee, or turning up the bottom of land when greatly exhauſted. By its conſtruction, the width and depth of the furrows can be regulated to a greater certainty than by any other hitherto known in this country. Its appearance is heavy; but two horſes are ſufficient to plough with it in ordinary free land; and only four are neceſſary in the ſtiffeſt clay-ſoils. This plough is likewiſe eaſily held and tempered. A, is the ſword fixed in the ſizers B, which runs thro' a mortoiſe E, at the end of the beam C, and regulates the depth of the furrow by raiſing or depreſſing the beam; it is fixed by putting the pin D thro' the beam and ſword, and is moveable at E.

Fig. 3. is a jointed brake-harrow with 24 teeth, ſhaped like coulters, and ſtanding at about an angle of 80 degrees. By this inſtrument the land is finely pulveriſed, and prepared for receiving the ſeed from the drill. It requires four horſes in ſtiff, and two in open, land. This harrow is likewiſe uſed for levelling the ridges; which is done by preſſing it down by the handles where the ridge is high, and raiſing it up when low.

Fig. 4. is an angular weeding-harrow, which may follow the brake when neceſſary. The ſeven hindmoſt teeth ſhould ſtand at a more acute angle than the reſt, in order to collect the weeds, which the holder can drop at pleaſure, by raiſing the hinder part, which is fixed to the body of the harrow by two joints.

Fig. 5. is a pair of harrows with ſhafts. This harrow is uſed for covering the ſeed in the drills, the horſe going in the furrow.

Fig. 6. is a drill-plough, conſtructed in ſuch a manner as to ſow at once two rows of beans, peaſe, or wheat. This machine is eaſily wrought by two horſes. A, is the happer for containing the ſeed; B, circular boxes for receiving the ſeed from the happer; C C, two ſquare boxes which receive the ſeed from ſmall holes in the circular boxes, as they turn round; and laſt of all, the ſeed is dropped into the drills through holes in the ſquare boxes, behind the coulters D. The cylinder E follows, which, together with the wheel F, regulates the depth of the coulters, and covers the ſeed; the harrow G comes behind all, and covers the ſeed more completely. H H, two ſliders, which, when drawn out, prevent the ſeed from falling into the boxes; and, I, is a ketch which holds the rungs, and prevents the boxes from turning, and loſing ſeed at the ends of the ridges.

Fig. 7. is a ſingle hoe-plough of a very ſimple conſtruction, by which the earth in the intervals is ſtirred and laid up on both ſides to the roots of the plants, and at the ſame time the weeds are deſtroyed. A A the mould-boards, which may be raiſed or depreſſed at pleaſure, according as the farmer wants to throw the earth higher or lower upon the roots.

SUMMARY of the OPERATIONS neceſſary in executing the NEW HUSBANDRY with the PLOUGH.

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Summary
the ope
tions.

1. It is indiſpenſably neceſſary that the farmer be provided with a drill and hoe-plough.

2. The new huſbandry may be begun either with the winter or ſpring corn.

3. The land muſt be prepared by four good ploughings, given at different times, from the beginning of April to the middle of September.

4. Theſe ploughings muſt be done in dry weather, to prevent the earth from kneading.

5. The land muſt be harrowed in the ſame manner as if it were ſowed in the common way.

6. The rows of wheat ſhould be ſowed very ſtraight.

7. When

Plate VI.

Fig. 2.

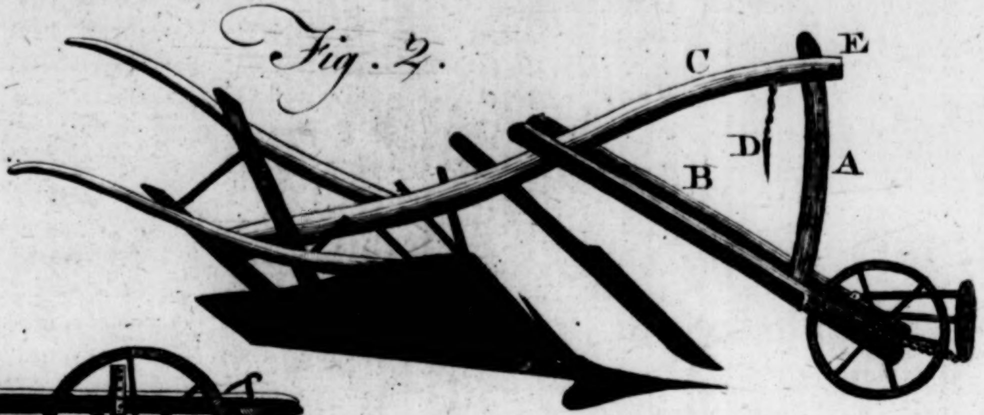


Fig. 1.

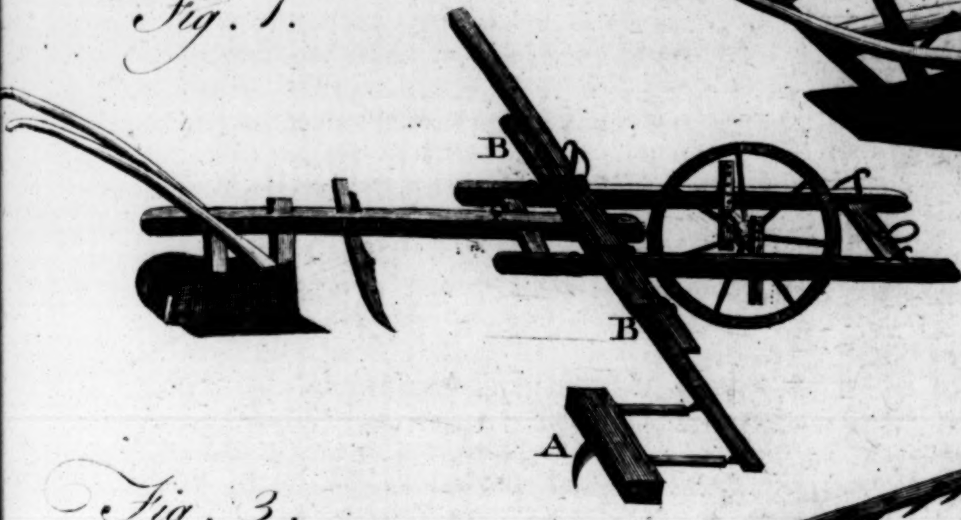


Fig. 4.

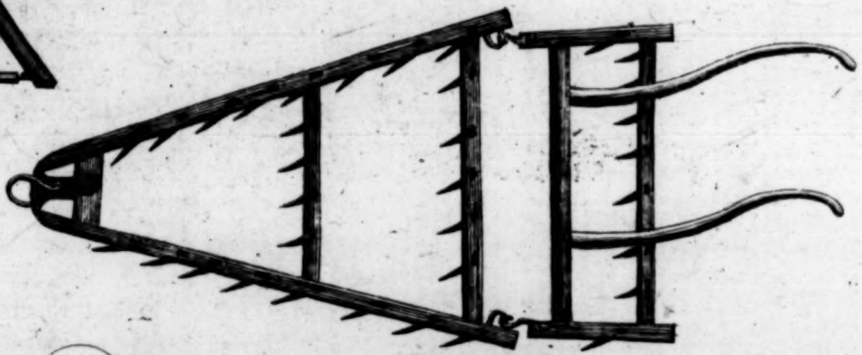


Fig. 3.

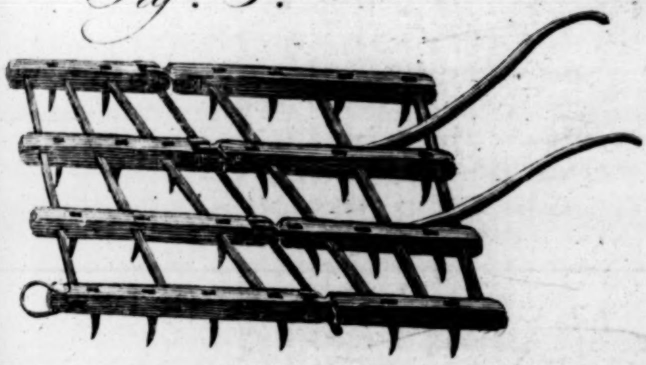


Fig. 5.

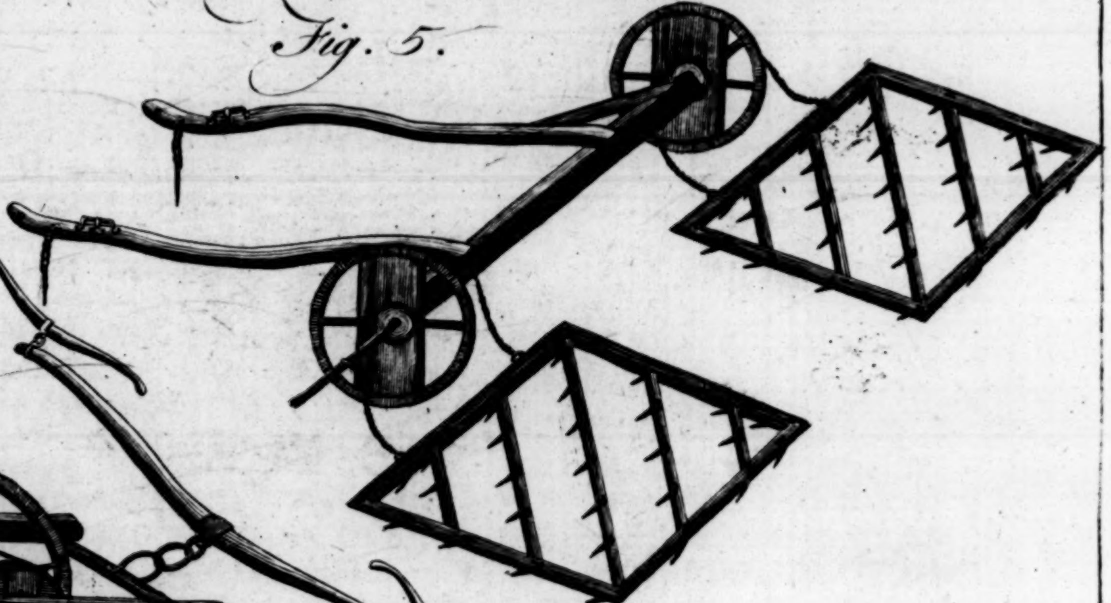


Fig. 6.

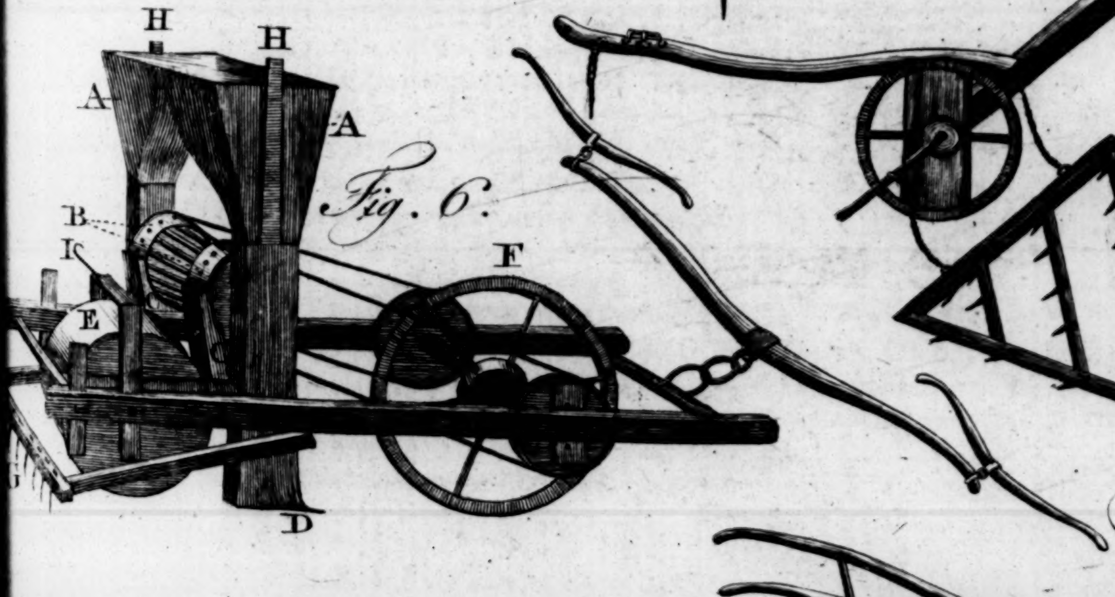
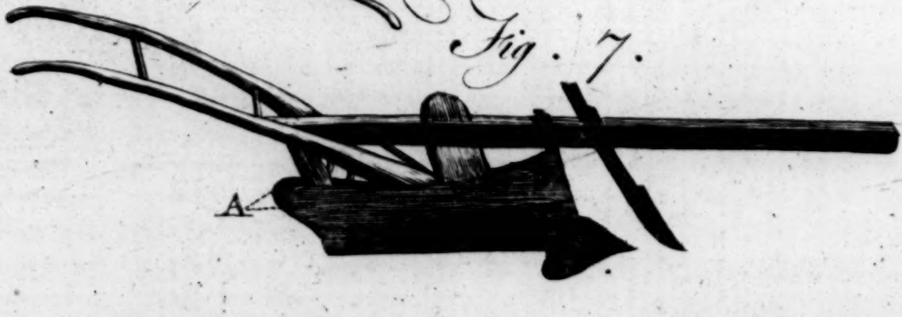


Fig. 7.



A.Bell Sculp.

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7. When the field is not very large, a line muſt be ſtrained acroſs it, by which a rill may be traced with a hoe for the horſe that draws the drill to go in; and when the rows are ſown, 50 inches muſt be left betwixt each rill. But, when the field is large, ſtakes at five feet diſtance from each other muſt be placed at the two ends. The workman muſt then trace a ſmall furrow with a plough that has no mold-board, for the horſe to go in that draws the drill, directing himſelf with his eye by the ſtakes.

8. The ſowing ſhould be finiſhed at the end of September, or beginning of October.

9. The furrows muſt be traced the long way of the land, that as little ground as poſſible may be loſt in headlands.

10. The rows, if it can be done, ſhould run down the ſlope of the land, that the water may get the eaſier off.

11. The ſeed-wheat muſt be plunged into a tub of lime-water, and ſtirred, that the light corn may come to the ſurface and be ſkimmed off.

12. The ſeed muſt be next ſpread on a floor, and frequently ſtirred, till it is dry enough to run through the valves of the happer of the drill.

13. To prevent ſmut, the ſeed may be put into a ley of aſhes and lime.

14. After the happers of the drill are filled, the horſe muſt go ſlowly along the furrow that was traced. That a proper quantity of ſeed may be ſown, the aperture of the happer muſt be ſuited to the ſize of the grain.

15. As the drill is ſeldom well managed at firſt, the field ſhould be examined after the corn has come up, and the deficiencies be ſupplied.

16. Stiff lands, that retain the wet, muſt be ſtirred or hoed in October. This ſhould be done by opening a furrow in the middle of the intervals, and afterwards filling it up by a furrow drawn on each ſide, which will raiſe the earth in the middle of the intervals, and leave two ſmall furrows next the rows, for draining off the water, which is very hurtful to wheat in winter.

17. The next ſtirring muſt be given about the end of March, with a light plough. In this ſtirring the furrows made to drain the rows muſt be filled up by earth from the middle of the intervals.

18. Some time in May, the rows muſt be evened; which, though troubleſome at firſt, ſoon becomes eaſy, as the weeds are ſoon kept under by tillage.

19. In June, juſt before the wheat is in bloom, another ſtirring muſt be given with the plough. A deep furrow muſt be made in the middle of the intervals, and the earth thrown upon the ſides of the rows.

20. When the wheat is ripe, particular care muſt be taken, in reaping it, to trample as little as poſſible on the ploughed land.

21. Soon after the wheat is carried off the field, the intervals muſt be turned up with the plough, to prepare them for the ſeed. The great furrow in the middle muſt not only be filled, but the earth raiſed as much as poſſible in the middle of the intervals.

22. In September, the land muſt be again ſowed with a drill, as above directed.

23. In October, the ſtubble muſt be turned in for forming the new intervals; and the ſame management muſt be obſerved as directed in the firſt year.

We pretend not to determine whether the old or new huſbandry be preferable in every country.

With regard to this point, the climate, the ſituation of particular land, ſkill and dexterity in managing the machinery, the comparative expence in raiſing crops, and many other circumſtances, muſt be accurately attended to before a determination can be given. One obſervation, however, may be made in favour of the new huſbandry:—Though the particular modes of cultivating land by it are perhaps too limited to be univerſally adopted; yet it has been of great uſe in raiſing ſuſpicions concerning the old method, and in turning the views of philoſophers and farmers towards improving in general. Many real improvements in agriculture have been the conſequences of theſe ſuſpicions; and as this ſpirit of inquiry remains in full vigour, particularly in our own country, a ſolid foundation is laid for expecting ſtill further improvements in this uſeful art.

AGRIFOLIUM, or Aquifolium. See Ilex.

AGRIMONIA, Agrimony; a genus of the digynia order, belonging to the dodecandria claſs of plants. Of this genus there are five ſpecies enumerated by botanical writers; but none of them have any remarkable properties except the two following.—(1.) The eupatoria, or common agrimony. It grows naturally in ſeveral parts of Britain by the ſides of hedges and of woods.—This ſpecies is eat by ſheep and goats, but refuſed by horſes and ſwine. The Canadians are ſaid to uſe an infuſion of the root in burning fevers, with great ſucceſs. An infuſion of ſix ounces of the crown of the root in a quart of boiling water, ſweetened with honey, and half a pint of it drank three times a-day, is an effectual cure for the jaundice, according to Doctor Hill. He adviſes to begin with a vomit, afterwards to keep the belly ſoluble, and to continue the medicine as long as any ſymptoms of the diſeaſe remain.—It is ſaid to be an aperient, detergent, and ſtrengthener of the viſcera. Hence it is recommended in ſcorbutic diſorders, in debility and laxity of the inteſtines, &c. Digeſted in whey, it affords an uſeful diet-drink for the ſpring-ſeaſon, not ungrateful to the palate or ſtomach. Doctor Alſton ſays, that the beſt mode of adminiſtering this herb is in powder, when the intention is to corroborate; and that if thus taken in a large quantity, we may expect many of the effects of the bark from it in agues.—(2.) The odorata, or ſweet-ſcented agrimony. This grows near four feet high; the leaves have more pinnæ than the former; the ſerratures of the leaves are alſo ſharper, and, when handled, they emit an agreeable odour. The leaves of this ſpecies make an agreeable cooling tea, which is ſometimes preſcribed by phyſicians as a drink for people in fevers.

Culture. Both theſe ſpecies may be propagated either by ſeed, or by parting the roots in autumn when the leaves begin to decay. The ſeeds ought alſo to be ſown in this ſeaſon; for if kept out of the ground till ſpring, they ſeldom come up that year.—Agrimony is a hardy perennial plant, and will thrive in almoſt any ſoil or ſituation; but the plants ſhould not be placed nearer one another than two feet, that the roots may have room to ſpread.

AGRIMONOIDES, the trivial name of a ſpecies of the agrimonia.

AGRIMONY. See Agrimonia.

Hemp Agrimony. See Eupatorium.

Water-hemp Agrimony. See Bidens.

AGRIONIA, in Grecian antiquity, feſtivals annually celebrated, by the Bœotians, in honour of Bacchus. At theſe feſtivals, the women pretended to ſearch after Bacchus as a fugitive; and, after ſome time, gave over their inquiry, ſaying, that he was fled to the Muſes, and was concealed among them.

AGRIOPHAGI, in antiquity, a name given to thoſe who fed on wild beaſts. The word is Greek, compounded of αγριος, wild, ſavage, and φαγω, I eat. The name is given, by ancient writers, to certain people, real or fabulous, ſaid to have fed altogether on lions and panthers. Pliny and Solinus ſpeak of *Agriophagi* in Ethiopia, and Ptolemy of others in India on this ſide the Ganges.

AGRIPPA, in midwifery, a term applied to children, brought forth with their feet foremoſt.

Agrippa (Herod) ſon of Ariſtobulus by Berenice, and the grandſon of Herod the Great. He was caſt into priſon by Tiberius for wiſhing Caius emperor, who gave him a chain of gold, equal in weight to thoſe which he had wore in priſon, and afterward made him king of Judea. He put St James to death, impriſoned St Peter, and, for allowing the deifying ſhouts of the people, was eaten up with worms.

Agrippa II. ſon of the preceding Herod, was made king of Chalcide; but three or four years after, he was deprived of that kingdom by Claudius, who gave him in the place of it other provinces. In the war Veſpaſian carried on againſt the Jews, Herod ſent him a ſuccour of 2000 men; by which it appears, that, tho' a Jew by religion, he was yet entirely devoted to the Romans, whoſe aſſiſtance indeed he wanted, to ſecure the peace of his own kingdom. He lived to the third year of Trajan, and died at Rome A. C. 100. He was the ſeventh and laſt king of the family of Herod the Great. It was before him and Berenice his ſiſter, that St Paul pleaded his cauſe at Cæſarea.

Agrippa (Marcus Viſpanius), ſon-in-law to Auguſtus, of mean birth, but one of the moſt conſiderable generals among the Romans. Auguſtus's victory over Pompey and Mark Anthony was owing to his counſel: he adorned the city with the pantheon, baths, aqueducts, &c.

Agrippa (Cornelius), born at Cologne in 1486, a man of conſiderable learning, and by common report a great magician; for the monks at that time ſuſpected every thing of hereſy or ſorcery which they did not underſtand. He compoſed his *Treatiſe of the Excellence of Women*, to inſinuate himſelf into the favour of Margaret of Auſtria, governeſs of the Low-Countries. He accepted of the charge of hiſtoriographer to the emperor, which that princeſs gave him. The treatiſe of the *Vanity of the Sciences*, which he publiſhed in 1530, enraged his enemies extremely; as did that of *Occult Philoſophy*, which he printed ſoon after at Antwerp. He was impriſoned in France for ſomething he had written againſt Francis I.'s mother; but was enlarged, and went to Grenoble, where he died in 1534. His works are printed in two volumes octavo.

AGRIPPINA, daughter of Germanicus, ſiſter of Caligula, and mother of Nero; a woman of wit, but exceſſively lewd: ſhe was thrice married, the laſt time to Claudius her own uncle, whom ſhe poiſoned to make way for Nero her ſon. Nero afterward cauſed her to be murdered in her chamber, when ſhe bid the executioner ſtab her firſt in the belly, that had brought forth ſuch a monſter.

Agrippina colonia ubiorum, (Pliny, Suetonius); now *Cologne*: ſo called from Agrippina, the daughter of Germanicus, and mother of Nero, who had a colony ſent thither at her requeſt by the emperor Claudius, to honour the place of her birth. See Cologne.

AGRIPPINIANS, in church-hiſtory, the followers of Agrippinus biſhop of Carthage, in the third century, who firſt introduced and defended the practice of rebaptization.

AGROM, a diſeaſe frequent in Bengal, and other parts of the Indies, wherein the tongue chaps and cleaves in ſeveral places, being extremely rough withal, and ſometimes covered with white ſpots. The Indians are very fearful of this diſeaſe, which they attribute to extreme heat of the ſtomach. Their remedy is, to chew the black-ſeeded baſilica, drink ſome chalybeated liquor, or the juice of large mint.

AGROSTEMMA, Wild Lychnis, or Campion; a genus of the pentagynia order, belonging to the decandria claſs of plants.

Species. The moſt remarkable are, 1. The githago, hairy wild lychnis, or common campion, which grows naturally in corn-fields in moſt parts of Britain. The flowers appear in June, are generally purple, ſometimes white, and by cultivation yellow. 2. The coronaria, or ſingle roſe-campion. Of this ſpecies there are four varieties; one with deep red, another with fleſh-coloured, a third with white, flowers; and a ſort with double flowers, which has turned moſt of the others out of the gardens. 3. The flos jovis, or umbelliferous mountain-campion, grows naturally upon the Helvetian mountains: it is a low plant with woolly leaves: the flower-ſtem riſes near a foot high; the flowers grow in umbels on the top of the ſtalk, and are of a bright red colour. They appear in July, and the ſeeds ripen in September.

Culture. The firſt and third ſpecies are annual plants, ſo muſt be propagated by ſeeds; but as the firſt is found naturally in corn-fields, it is very ſeldom cultivated in gardens; the third ſort ſhould have a ſhady ſituation, and thrives beſt in a ſtrong ſoil. The ſecond ſpecies is perennial, but only thoſe varieties which have ſingle flowers produce any ſeeds; the double kind, therefore, as it produces no ſeeds, muſt be propagated by parting the roots in autumn, after the flowers are paſt. In doing this, every head which can be ſlipped off with roots ſhould be parted: theſe ſhould be planted in a border of freſh undunged earth, at the diſtance of ſix inches one from the other, obſerving to water them gently until they have taken root; after which they will require no more; for much wet is very injurious to them, as is alſo dung. In this border they may remain till ſpring, when they ſhould be planted in the borders of the flower-garden, where they will be very ornamental during the time of their flowering, which is in July and Auguſt.—This plant is eat by horſes, goats, and ſheep.

AGROSTIS, Bent-grass, in botany, a genus of the triandria order, belonging to the digynia claſs of plants. The calix has two valves, terminated by a beard or aun. There are fifteen ſpecies; eight of them natives of Britain. See Grass.

AGROSTOGRAPHIA, ſignifies the hiſtory or deſcription of graſſes.

AGROUND, the ſituation of a ſhip whoſe bottom, or any part of it, hangs or reſts upon the ground, ſo as to render her immoveable, till a greater quantity of water floats her off, or till ſhe is drawn out into the ſtream by the application of mechanical powers.

AGRYPNIA, among phyſicians, implies an inaptitude to ſleep; a troubleſome ſymptom of feveriſh and other diſorders.

Agrypnia, in the Greek church, implies the vigil of any of the greater feſtivals.

AGUE, a general name for all periodical fevers, which, according to the different times of the returns of the feveriſh paroxyſm, are denominated tertian, quartian, and quotidian. See Medicine, nº 424—426.

Ague-tree, a name given to the ſaſſafras, on account of its febrifuge qualities.

AGUEPERSE, a town of France, ſituated on the Lyonnois, about fifteeen miles north of Clermont.

AGUILLANEUF, or Auguillaneuf, a form of rejoicing uſed among the ancient Franks on the firſt day of the year. The word is compounded of the French *A* to, *gui* miſleto, and *l'an neuf* the new year. Its origin is traced from a druid-ceremony: the prieſts uſed to go yearly in December, which with them was reputed a ſacred month, to gather miſleto of the oak in great ſolemnity. The prophets marched in the front, ſinging hymns in honour of their deities; after them came a herald with a caduceus in his hand; theſe were followed by three druids a-breaſt, bearing the things neceſſary for ſacrifice; laſt of all came the chief, or arch-druid, accompanied with the train of people. The chief druid climbing the oak, cut off the miſleto with a golden ſickle, and the other druids received it in a white cloth; on the firſt day of the year, it was diſtributed among the people, after having bleſſed and conſecrated it by crying *Au gui l'an neuf*, to proclaim the new-year. This cry is ſtill continued in Picardy, with the addition of *Plantez, Plantez*, to wiſh a plentiful year. In Burguudy and ſome other parts, the children uſe the ſame word to beg a new-year's gift. Of later times the name *Auguillaneuf* was alſo given to a ſort of begging, practiſed in ſome dioceſes, for church-tapers, on new-year's day, by a troop of young people of both ſexes, having a chief, &c. It was attended with various ridiculous ceremonies, as dancing in the church, &c. which occaſioned the ſynods to ſuppreſs it.

AGUILLAR, a town of Spain, in the province of Navarre, about twenty-four miles weſt of Eſtella.

Aguillar *Del Campo*, a town of Old Caſtile, with the title of marquiſate, about 15 leagues north of the city of Burgos.

AGUILLONIUS (Francis), a Jeſuit, born at Bruſſels: he was rector of the Jeſuits college at Antwerp, and eminent for his ſkill in mathematics. He was the firſt who introduced that ſcience among the Jeſuits in the low countries: he wrote a book of Optics, and was employed in finiſhing his Catoptrics and Dioptrics, when death prevented him in 1617.

AGUIRRA (Joſeph Sænz de), a Benedictine, and one of the moſt learned men of the 17th century, was born March 24, 1630. He was cenſor and ſecretary of the ſupreme council of the inquiſition in Spain, and interpreter of the ſcriptures in the univerſity of Salamanca. He printed three volumes in folio upon Philoſophy, a Comentary upon Ariſtotle's ten books of Ethics, and other pieces. He died at Rome, Auguſt 19, 1699.

AGUL, in botany, a ſynonime of the hedyſarum, See Hedysarum.

AGURAH, in Jewiſh antiquity, the name of a ſilver coin, otherwiſe called *gerah* and *keſhita*.

AGURIUM, or Agyrium, (anc. geogr.) a town of Sicily in the Val di Demona, near the river Semetus. The people were called *Populus Agyrinenſis*, by Cicero; *Agyrinus*, by Pliny. It was the birth-place of Diodorus Siculus, as he himſelf teſtifies; but he calls it *Argyrium*, as it is now called *S. Philippo d'Argirone*, which modern name ſeems to confirm that *Argyrium* is the true reading.

AGUSADURA, in ancient cuſtoms, a fee due from vaſſals to their lord for the ſharpening their ploughing tackle. Anciently the tenants in ſome manors were not allowed to have their rural implements ſharpened by any but whom the lord appointed; for which an acknowledgment was to be paid, called *Aguſadura*, in ſome places *Aguſage*: which ſome take to be the ſame with what was otherwiſe called *Reillage*, from the ancient French *Reille*, a plough-ſhare.

AGUTI, in zoology, the trivial name of a ſpecies of the mouſe, belonging to the mammalia glires of Linnæus. See Mus.

Aguti-guepa, in botany. See Sagittarium.

AGYEI, in antiquity, a kind of obeliſks, ſacred to Apollo, erected in the veſtibles of houſes, by way of ſecurity.

AGYNIANI, in church-hiſtory, a ſect who condemned all uſe of fleſh, and marriage, as not inſtituted by God, but introduced at the inſtigation of the devil. The word is compounded of the privative α and γυνη woman. They are ſometimes alſo called *Agynnenſes*, and *Agynii*; and are ſaid to have appeared about the year 694, It is no wonder they were of no long continuance. Their tenets coincide in a great meaſure with thoſe of the Abelians, Gnoſtics, Cerdonians, and other preachers of chaſtity and abſtinence.

AGYRTÆ, in antiquity, a kind of ſtrolling impoſtors running about the country, to pick up money by telling fortunes at rich mens doors, pretending to cure diſeaſes by charms, ſacrifices, and other religious myſteries; alſo to expiate the crimes of their deceaſed anceſtors, by virtue of certain odours and fumigations; to torment their enemies, by the uſe of magical verſes and the like. The word is Greek Αγυρται, formed of the verb αγυρω, I congregate; alluding to the practiſe of Charletans, who gather a crowd about them.

Agyrtæ, among the Greeks, amount to the ſame with *Æruſcatores* among the Latins, and differ not much from gypſies among us.

AHAB, ſon of Omri king of Iſrael, ſucceeded his father A. M. 3086, and ſurpaſſed all his predeceſſors in impiety and wickedneſs.

AHÆTULA, the trivial name of a ſpecies of the coluber. See Coluber.

AHALOTH. See Xylo-aloes.

AHEAD, a ſea-term, ſignifying further onward than the ſhip, or at any diſtance before her, lying immediately on that point of the compaſs to which her ſtem is directed. It is uſed in oppoſition to *aſtern*, which expreſſes the ſituation of any object behind the ſhip. See Astern.

AHICCYATLI, in zoology, the Indian name of a ſerpent reſembling the rattle-ſnake, only it wants the rattles. It is as fatal in the effect of its poiſon as any known ſpecies of ſerpent.

AHMELLA, in botany. See Bidens.

AHOUAI, in botany, a ſynonime, and alſo the trivial name of a ſpecies of the cerbera. See Cerbera.

A-HULL, in the ſea-language, the ſituation of a ſhip when all her ſails are furled on account of the violence of the ſtorm, and when having laſhed her helm on the lee-ſide, ſhe lies nearly with her ſide to the wind and ſea, her head being ſomewhat inclined to the direction of the wind.

AHUN, a town in France, in the Upper Marche and generality of Moulins, and is a royal juriſdiction. It is ſeated on the river Creuſe, near a Benedictine abbey of the ſame name, eight miles ſouth-eaſt of Gueret, 30 north-eaſt of Lomages, and 55 ſouth-eaſt of Moulins. E. Long. 2. 8. N. Lat. 49. 5.

AHUYS, a town of Sweden. It is ſmall, but very ſtrong by its ſituation, and has a good port. It is in the principality of Gothland, in the territory of Bleckingy, near the Baltic ſea, about 18 miles from Chriſtianſtadt. E. Long. 14. 10. N. Lat. 56. 20.

AI, (anc. geog.) a town in Judea, to the north of Jericho, called Αινα by Joſephus, and the inhabitants *Ainatæ*.

AICUROUS, a ſpecies of parrot. See Psittacus.

AJALON, (anc. geogr.) a town of the tribe of Dan, one of the Levitical. Another in the tribe of Benjamin, in whoſe valley Joſhua commanded the moon to ſtand ſtill, being then in her decreaſe, and conſequently to be ſeen at the ſame time with the ſun.

AJAN, a coaſt and country of Africa, has the river Quilmanci on the ſouth; the mountains from which that river ſprings, on the weſt; Abyſſinia, or Ethiopia, and the ſtraight of Babelmandel, on the north; and the eaſtern, or Indian ocean, on the eaſt. The coaſt abounds with all neceſſaries of life, and has plenty of very good horſes. The kings of Ajan are often at war with the emperor of the Abyſſins; and all the priſoners they take they ſell to the merchants of Cambaya, thoſe of Aden, and other Arabs, who come to trade in their harbours, and give them in exchange, coloured cloths, glaſs-beads, raiſins, and dates; for which they alſo take back, beſides ſlaves, gold and ivory. The whole ſea-coaſt, from Zanguebar to the ſtraight of Babelmandel, is called the coaſt of Ajan; and a conſiderable part of it is ſtyled the Deſert-coaſt.

AJAX, the ſon of Oileus, was one of the principal generals that went to the ſiege of Troy: he raviſhed Caſſandra the daughter of Priam, even in the temple of Minerva, where ſhe thought to have found ſanctuary. It is ſaid, he made a ſerpent of fifteen feet long ſo familiar with him, that it eat at his table, and followed him like a dog. The Locrians had a ſingular veneration for his memory.

Ajax, the ſon of Telamon, was, next to Achilles, the moſt valiant general among the Greeks at the ſiege of Troy: he commanded the troops of Salamis, and performed many great actions, of which we have an account in the Iliad, in *Dictys Cretenſis*, and in the 23d book of Ovid's Metamorphoſes. He was ſo enraged that the arms of Achilles were adjudged to Ulyſſes, that he immediately became mad. The Greeks paid great honours to him after his death, and erected a magnificent monument to his memory upon the promontory of Rheteum.

Ajax, in antiquity, a furious kind of dance, in uſe among the Grecians; intended to repreſent the madneſs of that hero, after his defeat by Ulyſſes, to whom the Greeks had given the preference in his conteſt for Achilles's arms. Lucian, in his treatiſe of Dancing, ſpeaks of dancing the *Ajax*.—There was alſo an annual feaſt called *Ajantia*, Αιαντεια, conſecrated to that prince, and obſerved with great ſolemnity in the iſland of Salamis, as well as in Attica; where, in memory of the valour of Ajax, a bier was expoſed, ſet out with a complete ſet of armour.

AJAZZO, a ſea-port town of the iſland of Corſica, in the Mediterranean, with a biſhop's ſee. Long. 26. 35. Lat. 41. 40.

Ajazzo, a ſea-port town of Natolia, in the province of Caramania, anciently Sileſia, ſeated on the coaſt of the Mediterranean, 30 miles north of Antioch, and 50 weſt of Aleppo, where the city of Iſſus anciently ſtood, and near which Alexander fought his ſecond battle with Darius. Long. 33. 10. Lat. 37. 0.

AICHSTAT, a town of Germany, in Franconia, and capital of a biſhoprick of the ſame name. It is remarkable for a curious piece of workmanſhip, called the Sun of the Holy Sacrament, which is in the church: it is of maſſy gold, of great weight, and is enriched with 350 diamonds, 1400 pearls, 250 rubies, and other precious ſtones. This place is moderately large, and ſeated in a valley on the river Altmul, 10 miles N. of Newburgh, and 37 S. of Neuremberg. E. Lon. 11. 10. N. Lat. 49. 0. The biſhoprick is 45 miles in length, and 17 in breadth; and the biſhop is chancellor of the church of Mayence or Mentz.

AID, in a general ſenſe, denotes any kind of aſſiſtance given by one perſon to another.

Aid, in law, denotes a petition made in court to call in help from another perſon who has intereſt in land, or any other thing conteſted.

Aid-*de-camp*, in military affairs, an officer employed to receive and carry the orders of a general.

Aid, *Auxilium*, in ancient cuſtoms, a ſubſidy paid by vaſſals to their lord on certain occaſions. Such were the aid of relief, paid upon the death of the Lord Meſne to his heir; the *aid cheval*, or capital aid, due to the chief lord on ſeveral occaſions, as, to make his eldeſt ſon a knight, to make up a portion for marrying his daughter, &c.

AIDS, in the French cuſtoms, certain duties paid on all goods exported or imported into that kingdom.

Court of **Aids**, in France, a ſovereign court eſtabliſhed in ſeveral cities, which has cognizance of all cauſes relating to the taxes, gabelles, and aids, impoſed on ſeveral ſorts of commodities, eſpecially wine.

Aids, in the menage, are the ſame with what ſome writers call *cheriſhings*, and uſed to avoid the neceſſity of corrections.—The inner heel, inner leg, inner rein, *&c.* are called *inner aids*; as the outer heel, outer leg, outer rein, *&c.* are called *outer aids*.

AIDAN, a famous Scottiſh biſhop of Lindiſfarne, or Holy Iſland, in the 7th century, was employed by Oſwald king of Northumberland in the converſion of the Engliſh, in which he was very ſucceſsful. He died in 651.

AIGHENDALE, the name of a liquid meaſure uſed in Lancaſhire, containing ſeven quarts.

AIGLE, a bailiwick, in the territory of Romand, in Swiſſerland, conſiſts of mountains and valleys, the principal of which are the Aigle and Bex. Through theſe is the great road from Vallais into Italy. When you paſs by Villeneuve, which is at the head of the lake of Geneva, you enter into a deep valley three miles wide, bordered on one ſide with the Alps of Swiſſerland, and on the other with thoſe of Savoy, and croſſed by the river Rhone. Six miles from thence you meet with Aigle, a large town, ſeated in a wide part of the valley, where there are vineyards, fields, and meadows. The governor's caſtle is on an eminence that overlooks the town, and has a lofty marble tower. This government has nine large pariſhes; and is divided into four parts, Aigle, Bex, Olon, and Ormont. This laſt is among the mountains, and joins to Rougement. It is a double valley, abounding in paſture-lands. Ivorna, in the diſtrict of Aigle, was in part buried by the fall of a mountain, occaſioned by an earthquake in 1584.

AIGLE a ſmall town, in France, in Upper Normandy, twenty-three miles from D'Evereux, and thirty-eight from Rouen. It is ſurrounded with walls and ditches, has ſix gates, three ſuburbs, and three pariſhes. It trades in corn, toys, and more particularly in needles and pins. E. Long. 1. 5. N. Lat. 48. 35.

AIGUILLON, a ſmall town of France in the province of Guienne, ſituated at the conflux of the rivers Garonne and Lot.

AIGUISCE, in heraldry, denotes a croſs with its four ends ſharpened, but ſo as to terminate in obtuſe angles.—In differs from the croſs fitchee, in as much as the latter tapers by degrees to a point, and the former only at the ends.

AILANA, AILATH, or AHELOTH, anciently a town of Arabia Petræa, ſituated near the Sinus Elanites of the Red Sea. It was alſo called *Elath*, and *Eloth*, (Stephanus, Strabo, Moſes.) The ſame with *Elana*.

AILE, in law, a writ which lies where a perſon's grandfather, or great-grand-father, being ſeiſed of lands, *&c.* in fee-ſimple, the day that he died, and a ſtranger abates or enters the ſame day, and diſpoſſeſſes the heir of his inheritance.

AILESBURY, AYLESBURY, or ALESBURY, a borough town in Buckinghamſhire, conſiſting of about 400 houſes. It conſiſts of ſeveral ſtreets, though the houſes are not very contiguous: theſe lie round about the market place, in the middle of which is a convenient hall, where the ſeſſions are held, and ſometimes the aſſizes for the county. It ſends two members to parliament; has a market on Saturdays; and three fairs for cattle, viz. on the Saturday before Palm-ſunday, June 14th, and September 25th. It is ſixty miles ſouth-eaſt of Bucingham and forty-four north-weſt of London. W. Long. 0. 40. N. Eat. 51. 40.

AILRED, or EALRED, abbot of Reveſby in Lincolnſhire, in the reigns of Stephen and Henry II. He was born in 1109, of a noble family, and educated in Scotland with Henry the ſon of king David. On his return to England, he became a monk of the Ciſtertian order, in the monaſtery of Reveſby, of which he afterwards was made abbot. He died on the 12th of January, 1166, aged 57, and was buried in his monaſtery. "He was (ſays Leland) in great eſteem during his life; celebrated for the miracles wrought after his death; and admitted into the catalogue of ſaints." He was author of ſeveral works; moſt of which were publiſhed by Gilbo the Jeſuit at Douay, 1631; part of them may be alſo found in the *Bibliotheca Ciſtertienſis*, and *Bibliotheca Patrum*. His principal work is the *Speculum charitatis*. Leland, Bale, and Pits, mention ſeveral manuſcripts which never were publiſhed.

AINSWORTH (Dr Henry), an eminent nonconformiſt divine, who, about the year 1590, diſtinguiſhed himſelf among the Browniſts; which drew upon him ſuch troubles, that he was obliged to retire to Holland, and became miniſter of a church at Amſterdam. His ſkill in the Hebrew language, and his excellent Annotations on the Holy Scriptures, which are ſtill highly eſteemed, gained him great reputation. He alſo wrote ſeveral pieces in defence of the Browniſts, and ſeveral other works.

AINSWORTH (Robert), born at Woodyale in Lancaſhire in 1660, was maſter of a boarding-ſchool at Bethnal-green, from whence he removed to Hackney, and to other places in the neighbourhood of London. After acquiring a moderate fortune, he retired, and lived privately till the time of his death, which happened in 1743. We are indebted to him for the beſt Latin and Engliſh Dictionary extant: he publiſhed it in quarto 1736; and in 1752, the fourth edition, under the care of Doctor Ward of Greſham College, and the Rev. William Younge, was enlarged to two vols folio.

1 Definition.

AIR is that inviſible fluid which every where ſurrounds the globe; and on which depends the life not only of every kind of animals, but of vegetables alſo; and which ſeems, in ſhort, to be one of the great agents employed by nature in carrying on her operations throughout the whole world.

2 Ancient notions concerning it.

For many ages the air was conſidered as an abſolutely ſimple fluid, the component parts of which were beyond the reach of man's wiſdom to diſcover. Its common operations were thought to be performed, either by its heat or cold, its moiſture or dryneſs; and if any effects were diſcovered which could not be explained by theſe, (ſuch as the appearance of peſtilential diſeaſes), they were reckoned to be entirely ſupernatural, and the immediate effect of Divine power.

3 Diſcovery of its mechanical powers.

In the beginning of the laſt century, Lord Bacon and Galileo diſcovered ſome of what may be called the *mechanical* powers of the air. The former, from experiments, aſcertained its elaſticity; and the latter, its weight. The preſſure of the atmoſphere, however, was more fully diſcovered by Toricelli, the diſciple of Galileo, and inventor of the barometer, as Lord Bacon had been of the thermometer. Paſcal obſerved, that this preſſure was not always the ſame; but diminiſhed according to the height to which the barometer was carried. Otto de Guerick ſoon after invented the air-pump; which was much improved by Mr Boyle and Doctor Hoock, two members of the Royal Society. The complete knowledge of the mechanical properties of the air, however, muſt be aſcribed to the labours of Doctor Halley and Sir Iſaac Newton; who have, by mathematical demonſtration, eſtabliſhed its rarefaction, and the proportion in which it is rarefied, according to its diſtance from the earth, &c.

4 Van Helmont the firſt diſcoverer of different kinds of air.

While theſe diſcoveries were making concerning the mechanical properties of the air, little notice ſeems to have been taken of the different kinds of fluid which go under that name. It was known, indeed, that air was ſeparable from terreſtrial bodies by means of fire, fermentation, &c.; but this was commonly reckoned to be the ſame with the air we breathe. Van Helmont, a diſciple of Paracelſus, was the firſt who undertook to make inquiries concerning this ſpecies of air. He gave it the name of *gas ſylveſtre*, from the Dutch word *ghoaſt*, ſignifying ſpirit; and obſerves, that ſome bodies reſolve themſelves almoſt entirely into it. "Not, (ſays he), that it had been actually contained in that form in the bodies from which it was ſeparated; but it was contained under a concrete form, as if fixed, or coagulated." According to this author, the gas ſylveſtre is the ſame with what is ſeparated from all ſubſtances by fermentation; from vegetables by the action of fire; from gun-powder when it explodes; and from charcoal when burning. On this occaſion he aſſerts, that ſixty-two pounds of charcoal contain ſixty-one pounds of gas, and only one pound of earth. To the effluvium of gas, he alſo attributes the fatal effects of the grotto del Cani in Italy, and the ſuffocation of workmen in mines. He aſſerts, that it is to the corruption of the aliment, and the gas diſcharged from it, that we are to attribute wind, and the diſcharges of it from the bowels. Upon the ſame principles he accounts for the ſwelling of dead bodies, which have remained ſome time under water; and for the tumours which ariſe on ſome parts of the body in certain diſeaſes. He alſo determines, that this gas is different from the air we breathe; that it has a greater affinity with water: and he imagined it might conſiſt of water reduced to vapours, or a very ſubtile acid combined with volatile alcali.

5 Diſcoveries by Mr Boyle.

Mr Boyle repeated all Van Helmont's experiments to more advantage than he himſelf had performed them; but ſeems not to have proceeded further in his diſcoveries than Van Helmont did: only he found, that there are ſome bodies, ſuch as ſulphur, amber, camphor, &c. which diminiſh the volume of air in which they burn.

6 By Dr Hales.

Doctor Hales was the firſt perſon who attempted to determine the quantity of air produced from different bodies: and, for this purpoſe, he made experiments on almoſt every known ſubſtance in nature, examining them by diſtillation, fermentation, combuſtion, combinations, &c. Of the vegetable ſubſtances which he examined, crude tartar ſeems to have yielded the greateſt quantity of air, and eſſential oils the leaſt. From a cubic-inch of the former he obtained 504 cubic-inches of air; and from a like quantity of oil of aniſeeds, only 22. Of the animal-ſubſtances, the greateſt quantity of air was obtained from the human calculus, or ſtone extracted from the bladder: three quarters of a cubic-inch of this ſubſtance yielding, on diſtillation, no leſs than 516 cubic-inches of air; while a cubic-inch of tallow yielded only 18 inches. In the mineral kingdom, pit-coal gave out the greateſt quantity of this fluid, 360 inches of air being obtained from one inch of it, or nearly one-third of its whole weight. From the ſame quantity of antimony, only 28 inches were obtained. By fermentation, 639 cubic inches of air were obtained from 42 inches of ſmall-beer in ſeven days; and from 26 inches of bruiſed apples, 968 inches of air were obtained in thirteen days.

7 Produc and abſor tion of a

In examining the quantities of air produced from combinations of different bodies, very ſtrange phenomena appeared; the very combinations which produced air one day, would abſorb all they had produced, and ſometimes much more, the next. Half a cubic inch of ſal-ammoniac, with one cubic-inch of oil of vitriol, produced five or ſix cubic-inches of air the firſt day; and the next, abſorbed 15. In a few hours, ſix inches of oyſter-ſhells, and as much vinegar, produced 29 inches of air; but, in nine days, 21 inches were abſorbed, and the remainder diſappeared upon pouring water into the veſſel. A quarter of an inch of iron-filings, and one cubic inch of ſulphur, inſtead of producing, abſorbed 19 inches of air. A cubic inch of aquafortis, with an equal quantity of marcaſite, abſorbed 85 inches; but the ſame quantity of aquafortis and ſea-coal, abſorbed 18 inches in three days; after which, inſtead of abſorbing, they generated 12 inches. Two cubic inches of lime, with four of vinegar, abſorbed 22 inches of air: but two inches of lime, with an equal quantity of ſal-ammoniac, abſorbed 115 inches.

By examining flaming ſubſtances, it appeared that all of them, nitre alone excepted, abſorbed or conſumed air. A lighted candle, three-fifths of an Engliſh inch in diameter, conſumed 78 inches of air: linen-rags, dipped in melted brimſtone, and burnt in a large veſſel, conſumed 198 inches; in a ſmaller one, 150. Two grains of Kunkel's phoſphorus abſorbed 28 inches of air; after which it had only loſt half a grain in weight, and in a ſhort time gained a whole grain. A rat, confined in a large receiver, conſumed 78 inches before it died; and 73 inches of air breathed by a man till he was almoſt ſuffocated, were reduced to 20.

8 Suſpici air in m ral wat

Doctor Hales alſo firſt ſuſpected, that the briſkneſs and ſparkling of the waters, improperly called *acidulous*, were owing to the air they contained. But notwithſtanding all his diſcoveries concerning the quantity of elaſtic fluid obtained from different bodies, he did not imagine there was any eſſential difference between this fluid and the air we breathe, only that it was loaded with noxious vapours, foreign to its nature. He therefore endeavoured to reſtore air which had been depraved by the reſpiration of animals, or by burning bodies, to its original purity. This he attempted, by filtering it through flannel which had been ſteeped in a ſolution of ſalt of tartar; and by this means the air was perfectly reſtored. A candle, likewiſe placed under a receiver, lined with flannel dipped in a ſolutiou of this ſalt, burned conſiderably longer than it would otherwiſe have done. The flannels, however, through which the air was filtered, were ſenſibly increaſed in weight.

9 Confir by M.V

What doctor Hales only ſuſpected, concerning the impregnation of ſome kinds of waters with air, was confirmed by M. Venel, profeſſor of chemiſtry at Montpelier, Air.

pelier, in a memoir read before the Royal Academy of Sciences in 1750. This gentleman proceeded ſo far as to diſengage the air from the Seltzer waters, and to meaſure its quantity; which he conſtantly found to amount to about one-fifth of its bulk. When the water was deprived of this air, it became flat, and ceaſed to ſparkle; the only difference then between the Seltzer water, deprived of its air, and common water, was, that the former contained a ſmall quantity of ſea-ſalt. Upon theſe principles he attempted to recompoſe Seltzer water, by diſſolving in a pint of common water two drachms of foſſile alkali, and then adding an equal quantity of marine acid. The quantity of ſea-ſalt produced by the union of theſe two, he knew would prove equal to that contained in a pint of Seltzer-water; and the effervеſcence produced by the action of the acid and alcali upon each other, he imagined, would produce air ſufficient for the impregnation of the water. In this he was not deceived; the water thus produced was not only analogous to Seltzer, but much more ſtrongly impregnated with air.

10 overies r Black.

Dr Black profeſſor of chemiſtry at Glaſgow, now at Edinburgh, firſt diſcovered, that magneſia alba, chalk, and all the earths in general which are reduced to quicklime by calcination, conſiſt of an alcaline earth, by itſelf ſoluble in water, but which, combined with a large quantity of fixed air, becomes inſoluble; loſing the properties of quicklime, and aſſuming the natural appearance we obſerve thoſe earths to have when not reduced into lime. The ſame thing he diſcovered in alkalies, both fixed and volatile. On the fixed air contained in theſe bodies, he found their property of effervеſcing with acids to depend, as likewiſe their mildneſs; both the alcalies and calcareous earth being highly cauſtic when deprived of their fixed air. He alſo found, that this fluid which he called *fixed-air*, had different degrees of affinity with different ſubſtances; that it was ſtronger with calcareous earth, than with fixed alcali; with fixed alcali, than magneſia; and with magneſia, than volatile alcali. He alſo ſuſpected, that the fixed air of alcaline ſalts unites itſelf with the precipitates of metals, when thrown down from acids; and that the increaſe of weight obſervable in theſe precipitates, was owing to this cauſe. But he was of opinion, that the fluid which he called *fixed air* was very different from the common air we breathe; and therefore adopted the name of air, merely as one already eſtabliſhed, whatever impropriety there might be in the term.

11 he de s.

In the mean time, the count de Saluces, at Turin, was employing himſelf in making experiments on the elaſtic fluid diſcharged from gun-powder.—He found, that, when at liberty, this ſpecies of air occupied two hundred times the ſpace of that taken up by the gun-powder itſelf. He was able to reduce it to the ſame ſtate with common air, by filtering through alcaline ſolutions, or by expoſing it for twelve hours to the degree of cold in which water freezes. The air detached from pulvis fulminans he found to be much leſs in quantity than that from gun-powder, notwithſtanding the exploſion of the former is much greater. He alſo obſerved, that air diſengaged from effervеſcing bodies extinguiſhes flame; but that what was ſeparated from volatile alcali and vinegar, was an exception to this rule. He was, however, of opinion, that all theſe different fluids were only common air loaded with heterogeneous particles.

12 By Mr Haller.

Mr Haller firſt inferred, from Doctor Hales's experiments, that air is the real cement of bodies; which, fixing itſelf in the ſolids and fluids, unites them to each other, and ſerves as a bond by which they are kept from diſſolution. In 1764, Dr Macbride of Dublin publiſhed a number of experiments in ſupport of this doctrine. From his work it appears, that fixed air is ſeparated, not only from all ſubſtances in fermentation, but alſo from all animal ſubſtances as they begin to putrefy; and that this air is capable of uniting itſelf to all calcareous earths, as well as alcalies both fixed and volatile, and reſtoring to them the property of effervеſcing with acids when they have by any means been deprived of it.—The concluſions drawn by him from his numerous experiments were, that fixed air is an elaſtic fluid, very different from the common air we breathe: that it is poſſeſſed of a ſtrong antiſeptic quality, and may be introduced with ſafety into the inteſtinal canal, and other parts of the animal œconomy, where common air would have fatal effects; but is mortal if breathed into the lungs, &c.

13 By Dr Macbride.

14 His opinion concerning fixed air.

15 Quantity of fixed air contained in alcaline ſalts determined by Mr Cavendiſh.

In 1766 and 1767, Mr Cavendiſh communicated ſome new experiments to the Royal Society at London, wherein he determines the quantity of air contained in fixed alcali, when fully ſaturated with it, to be five-twelfths of its weight, and ſeven-twelfths in volatile alcali: that water is capable of abſorbing more than its own bulk of this air; that it has then an agreeable, ſpirituous, and acidulous taſte; and that it has the property of diſſolving calcareous earths and magneſia, as well as almoſt all the metals, eſpecially iron and zinc: that the vapour of burning charcoal occaſions a remarkable diminution of common air, at the ſame time that a conſiderable quantity of fixed air is produced in the operation. He alſo found, that ſolution of copper in ſpirit of ſalt, inſtead of producing inflammable air, like that of iron or zinc, afforded a ſpecies of air which loſt its elaſticity as ſoon as it came into contact with water.

16 Dr Black's theory oppoſed by Mr Meyer.

About the ſame time that Dr Macbride publiſhed his experiments, a treatiſe appeared, written in German by Mr Meyer, apothecary at Oſnabruck, wherein he oppoſes Doctor Black's theory concerning fixed air being the cauſe of effervеſcence in calcareous earths and alcaline ſalts. The loſs of weight theſe ſubſtances ſuffer by calcination, he attributes to the quantity of water expelled by the vehement heat; and their not effervеſcing afterwards, he attributes to their having been neutralized, while in the fire, by a peculiar kind of acid, which he calls *acidum pingue*. The exiſtence of ſuch an acid in lime he proves from the precipitation of lime-water by alcaline ſolutions. From this he concludes, that the acidum pingue forſakes the earth, which it before kept in a diſſolved ſtate, to unite with the alcali. This acid he alſo affirms to be what eſcapes from charcoal in burning; what unites with metals in their calcination; and what gives the cauſticity to volatile and fixed alcalies, as being the very *acid*, *cauſtic*, or *power* of fire itſelf.

17 His manner of evading Dr Black's objections.

A ſtrong objection lies againſt this theory, from a fact diſcovered by Doctor Black; namely, that pure calcareous earth diſſolved in the nitrous acid, may be precipitated either in the form of lime, or of chalk, according as we make uſe of the cauſtic or the mild alcalies.

lies. The reaſon given by Dr Black for this phenomenon is, that, in the diſſolution of the earth by the acid, all its fixed air is expelled. In the precipitation, if a mild fixed alcali is made uſe of, the fixed air is expelled from it by its union with the acid, and the calcareous earth has liberty again to combine with the fixed air expelled from the alcali; in which caſe, the earth appears in its natural mild ſtate: but if an alcali is made uſe of, which contains no fixed air, the calcareous earth has none to combine with, and therefore appears in the ſtate of lime.

This formidable objection Mr Meyer eaſily ſolves by his new hypotheſis of the acidum pingue. "When we mix (ſays he) a ſolution of calcareous earth in the nitrous acid with a cauſtic fixed alcali in a fluid ſtate, we mix ſolutions of two neutral ſalts together; the one of calcareous nitre, the other of alcali ſaturated with acidum pingue. In this caſe, according to the known laws of affinities, a double decompoſition ought to take place; and we ſee it actually does ſo. The weaker acidum pingue is expelled from its baſis by the nitrous acid, which forſakes the earth to unite with the alcali. The acidum pingue, having now nothing elſe to combine with, unites with the earth which the nitrous acid hath left, neutralizes, and forms it into lime. The caſe is different when the mild alcali is employed: for this having no acidum pingue joined with it, can communicate none; and therefore the precipitate falls as a calcareous earth."

18
Anſwered by Mr Jacquin.

To this new ſyſtem of Mr Meyer's, Mr Jacquin, botanical profeſſor at Vienna, publiſhed an anſwer in 1769.—He firſt attempts to prove, that calcareous earth is not converted into quicklime merely by the loſs of its humidity. To aſcertain this, he diſtilled 38 ounces of limeſtone in a ſtone-retort, fitted with a large tubulated receiver, with a fire gradually increaſed to the higheſt degree; and obtained only two ounces of water, which had ſome ſlight traces of volatile alcali. This came over with a moderate fire; and after the aqueous vapours ceaſed, an elaſtic vapour began to ſeparate very plentifully, and continued for an hour and an half to fly off through the tube of the receiver with an hiſſing noiſe. The lime which was left in the retort weighed only 17 ounces.—Here was therefore a deficiency of 19 ounces, which Mr Jacquin attributed to the air; and, according to him, limeſtone contains ſix or ſeven hundred times its bulk of air.

Mr Jacquin afterwards examines the action of water upon lime; and finds, that it is by no means the abſence or preſence of moiſture in any degree, which conſtitutes lime; ſeeing it can be preſerved under water for any length of time as lime, provided we keep the ſurface of the water from contact with the air.

19
Mr Crans's reply.

About the time that Mr Jacquin's performance made its appearance, Mr Meyer died; but Mr Crans, phyſician to his Pruſſian majeſty, publiſhed a reply to Mr Jacquin at Leipſic. He eludes the force of Mr Jacquin's experiment with limeſtone diſtilled in a retort, by attributing to water, reduced to a ſtate of vapour, or in a great degree of expanſion, the elaſtic ſeparation during the continuance of the diſtillation. But of this aſſertion he hath not brought any deciſive proof.

Mr Crans denies that lime is deprived of the power of efferveſcing with acids; and corroborates his aſſertion, both from experiments made by himſelf, and by the united teſtimonies of Meſſrs Duhamel, Geoffroy, Homberg, and Pott.--On this occaſion he objects, that if lime differs from calcareous earth only in being deprived of its air, it ought, by a ſhort expoſure to the open air, to imbibe all that it has loſt; but ſo far from this, he affirms, that, after being expoſed a conſiderable time, it even acquires greater cauſticity. In favour of Mr Meyer's hypotheſis, he likewiſe obſerves, that the ſudden ſwelling and heat, obſerved in the ſlaking of lime, is a natural conſequence of his ſyſtem, whereas it is abſolutely inexplicable on Dr Black's hypotheſis; which alſo can give no reaſon why calcareous earth diſſolves with very little heat in the nitrous acid, while the diſſolution of lime in the ſame acid produces a degree of heat ſuperior to that of boiling water; and aſſerts the partiſans of fixed air to be utterly unable to explain many phenomena, which upon Mr Meyer's plan are perfectly intelligible.

This author further obſerves, that lime-water diſſolves ſulphur, camphor, and reſins, nearly in the ſame manner that ſpirit of wine does. If Dr Black's diſciples then reaſon conſiſtently, they ought to ſay that it renders thoſe ſubſtances ſoluble by attracting their air from them; but thus they will be obliged to affirm the ſame of ſpirit of wine, which, he ſays, would lead them into a labyrinth of difficulties, if not of abſurdities.

With regard to efferveſcence, Mr Crans obſerves, that, in the diſſolution of a calcareous earth, we may have an efferveſcence or not, juſt as we pleaſe, by employing a ſtrong or a weak acid; whereas, on Dr Black's plan, there ought to be an efferveſcence whether the acid employed is ſtrong or weak.—He afterwards ſhews, that a briſk efferveſcence may be obtained by a mixture of cauſtic lixivium with an acid, though, according to Dr Black and Mr Jacquin, neither of theſe ſubſtances contain any air. Mr Crans's method is to pour ſome cauſtic lixivium into a ſolution of calcareous earth. The alcali trickles down the ſides of the bottle, and reaches the bottom. If the two liquors are afterwards ſuddenly agitated, a briſk efferveſcence enſues, and the precipitation is formed in an inſtant.

The experiments adduced by Dr Black and Mr Jacquin for the ſupport of their ſyſtem, from the precipitation of calcareous earths in the form of lime by cauſtic alcalies, are abſolutely denied by Mr Crans; who affirms, that, with whatever alcali he precipitated the earth, the precipitate always efferveſced with acids. The only difference he could perceive, was, that it had ſome degree of ſolubility in water, and turned ſyrup of violets green.

A ſtrong argument in Dr Black's favour is, that calcareous earths, when diſſolved in acids, ſuffer a loſs of weight equal to what they would have done, had they been reduced by calcination into quicklime.—Here Mr Crans oppoſes experiments made by ſolutions of calcareous ſtones in the nitrous acid, compared with ſolutions of lime. In theſe proceſſes, he always obſerved a conſiderable diminution of weight, but without any rule; ſometimes the lime appeared more diminiſhed than the calcareous earth, at other times the calcareous earth appeared to receive an augmentation in weight during its diſſolution. Theſe experiments, however, do not appear to have been made with ſufficient accuracy, both as Mr Crans employed too ſhallow veſſels, and likewiſe operated upon ſuch ſmall quantities, that an error in the ſcales might occaſion moſt of the inequalities he has remarked.

21 anſwer Dr Mac- e.

Laſtly, Mr Crans proceeds to Dr M'Bride's experiments concerning the reſtoration of the effervesſcing power to alcalies by means of fixed air. To this trial he ſubmitted the cauſtic lixivium made after Mr Meyer's method. The air detached from an effervesſcing mixture precipitated from the lixivium a white ſediment, which collected at the bottom of the bottle. The liquor alſo acquired, after ſome time, the property of effervesſcing with acids; but he obſerved, that it did ſo, nearly, in as ſhort a time when expoſed to the open air. He alſo remarked, that this property was much ſooner recovered if the lixivium was placed over a moderate fire; and that it was recovered at the inſtant when the fumes began to ariſe. Hence Mr Crans concludes, that it acquires the effervesſcing power only in proportion to the evaporation of the cauſtic principle, or acidum pingue, to which the alcali was united.

The ſame thing was obſerved with reſpect to the cauſtic volatile alcali obtained from ſal ammoniac. Mr Crans placed one portion of it in a ſtove; another on hot cinders; and expoſed the third to the vapours of an effervesſcing mixture. At the end of eight hours all the three effervesſced. The reaſon he gives, is, the evaporation of the acidum pingue; ſo that, according to him, the fixed air had no other effect than what might have naturally taken place in the open air.

Upon the whole, Mr Crans agrees that fixed air combines with alcaline liquors; but he affirms that theſe liquors are impregnated in the ſame manner with common water, and denies that there is any real combination, or that to ſuch a combination is owing the mild ſtate of alcaline ſalts. This he conſtantly aſcribes to the evaporation of the acidum pingue.

22 Black's ry at- ed by de th.

While Mr de Crans thus attacked Dr Black's doctrine at Leipſic, Mr de Smeth did the ſame at Utrecht. This gentleman begins with aſſerting that we have no knowledge of common air, except by ſome of its phyſical effects; of its internal nature and compoſition we know nothing; and therefore we ought not to call any ſubſtance *air*, merely becauſe it has elaſticity, and gravity, while it wants the other eſſential properties of air. He affirms, that elaſticity is a very equivocal characteriſtic of air; and that we may at this rate affirm water reduced into vapours to be atmoſpherical fluid. He is of opinion, that the elaſtic vapours which ariſe either from fermenting or effervesſcing liquors, are very different from atmoſpherical air; and he particularly obſerves, that the vapour of fermentation is much more ſubtile than common air, as paſſing through bodies which would be an unſurmountable obſtacle to the latter. This vapour he found incapable of being retained by lutes; a moiſtened bladder, tied over the mouth of the veſſel, was not at all inflated, though he was certain, from other experiments, that a great quantity of this vapour had eſcaped. Nay, ſo far is he from thinking it a particular element, or *ſimple*, in the ſenſe which chemiſts give to that word, that he is very poſitive it did not originally exiſt in the bodies from which it is extracted by art, but is only a *miaſma* formed by the colliſion of ſolid and fluid parts; that it is therefore never produced, but in caſes where the bodies ſuffer violent inteſtine motion, in conſequence of which their parts are altered, broken, and attenuated, ſo as to exhibit the phenomena of fixed air.

23 Mr Henry's experiments concerning the antiſeptic power of fixed air.

The antiſeptic virtue of aſtringents, according to Dr M'bride, conſiſts in the power they have of contracting the pores of animal ſubſtances, and thus preventing the eſcape of their fixed air. This argument Mr de Smeth pays no regard to; and affirms that we know too little of the manner in which aſtringents act, to be able to form the leaſt induction from thence. Indeed, from the following experiments mentioned by Mr Henry, F. R. S. it would ſeem that the ſweetening properties of fixed air may poſſibly depend on an affinity between this fluid and the ſeptic particles ariſing from putrid bodies.—"A piece of putrid beef, faſtened by a ſtring to a cork, was confined in three pints of fixed air for 13 hours, during which time it was conſiderably, though not entirely, ſweetened; but the air in the bottle ſeemed to have acquired all the putrid ſmell of which the fleſh had been deprived; ſo that the ſeptic effluvium did not ſeem to be deſtroyed, but only to change its place. Slips of linen cloth alſo, dipped in very rancid oil, were much ſweetened by being expoſed to a ſtream of fixed air from an effervesſcent mixture; but a pint-bottle of the ſame oil, though it abſorbed much of this air, ſo as to become entirely ſaturated with it, was not ſweetened in the leaſt."

24 A remarkable experiment by Mr de Smeth.

Mr de Smeth endeavours to overthrow Dr Black's theory by a number of experiments, moſt of which are evidently inconcluſive. The principal, indeed the only one, which deſerves attention, is the following:—Having obſerved that Homberg's pyrophorus gained weight conſiderably by being expoſed to the air, he was induced to make the ſame experiment with regard to quicklime. Twelve ounces of this ſubſtance, being expoſed to the air in a balance, augmented almoſt viſibly in weight during the firſt month. After this period, its attractive power diminiſhed conſiderably; and at the end of a year, or thirteen months, was abſolutely loſt. In this time it had acquired an augmentation in weight of four ounces, three drachms, and forty grains; was reduced to a fine powder, and no longer ſeparated the volatile alcali but in a concrete form. After a ſpace of thirteen months, then, the whole weight of this lime was ſixteen ounces, three drachms, and forty grains. Mr de Smeth weighed, ſeparately, twelve ounces, three drachms, and forty grains; which, by calculation, he found ought to contain three ounces, two drachms, fifty-four grains and an half, of matter attracted from the atmoſphere. This matter he thought would be eaſily diſſipable by fire; and to aſcertain himſelf of this, he put the abovementioned quantity into an earthen retort, and expoſed it to a very ſtrong fire for two hours. During the operation, there paſſed into the receiver, one ounce, four drachms, and forty grains of pure phlegm, in which no ſaline matter could be diſcovered. The reſiduum, weighing ten ounces five drachms, proved a quicklime, notwithſtanding there was only two drachms of weight loſt upon the whole. If there had been a ſeparation of air then, during the operation, it could by no means have been ſo conſiderable, as according to Dr Black's theory it ought to have been.—From this experiment it alſo appears, that quicklime, by being expoſed to the air, gains ſomething from it which cannot afterwards be ſeparated by fire. He afterwards repeated the ſame operation in open veſſels, with the ſame ſucceſs. Having put the remaining four ounces of lime in a wind furnace, and urged it with a very ſtrong fire, it retained one drachm eleven grains of matter, attracted from the atmoſphere. Being again expoſed to the air, it regained in weight, 4 drachms, 28 grains. The ſame thing has been obſerved by Mr du Hamel; who relates, that lime, ſlaked in the air, retained an increaſe of weight, amounting to about four and a half drachms *per* pound, and which could not be driven off by the ſtrongeſt fire he could employ.

During this controverſy among the learned, concerning the exiſtence or non-exiſtence of fixed air, as ſuch, in terreſtrial bodies, none of the contending parties ſeem to have apprehended, that this fluid might poſſibly be one of the component parts of our atmoſphere; and, tho' pernicious when ſeparated from the others, might nevertheleſs be abſolutely neceſſary, in a certain degree, to preſerve that life which its ſuffocating properties, when collected by itſelf, would ſeem calculated rather than to deſtroy.—To decompoſe the ſubtile inviſible fluid we daily breathe; to be able to recompoſe it again, and produce air either ſalutary or noxious as we pleaſe; ſeems to be one of the higheſt diſcoveries ever made by man.—This, however, hath been accompliſhed by Dr Prieſtley, whoſe diſcoveries we now begin to relate.

25
Dr Prieſtley firſt diſcovered the true compoſition of the atmoſphere.

The Doctor began his experiments much about the ſame time with Mr de Smeth. He begins with obſerving, that the term *fixed air* may be equally applied to every ſpecies of air hitherto diſcovered; ſeeing inflammable, and other kinds of air, are fixed in terreſtrial bodies as well as this. As the term, however, has come into ſuch general uſe, he chuſes to retain it, and diſtinguiſhes by that name the fluid which iſſues from fermenting liquors, and from the efferveſcence of acids with calcareous earths. It may be obtained in its greateſt purity from a mixture of oil of vitriol and chalk. From fermenting liquors alſo, if the quantity is conſiderable, it may be obtained tolerably pure; and in this way Dr Prieſtley himſelf uſed frequently to procure it, when living in the neighbourhood of a large brewery.

26
His account of fixed air.

One general property of this air is to be imbibed by water with great avidity. By agitation, the water may be impregnated very quickly with a great quantity of it; but as agitation will alſo make water part with its fixed air, ſo great a quantity cannot be imbibed by this means as when the water is left to take up the air leiſurely by being at reſt.—The air thus taken up is diſcharged by boiling, or by freezing, the water which contains it.

Dr Prieſtley agrees with Dr Black, that the concrete form of volatile alcaline ſalts, as well as the efferveſcing power of both kinds of alcalies, and calcareous earths, depends upon the preſence of fixed air. He alſo owns it to be of an acid nature, though weak, and of a peculiar kind. This was demonſtrated by Mr Bewly, in ſome letters to Dr Prieſtley, wherein he gives an account of his having both changed the blue juices of vegetables red with this acid, and likewiſe formed perfectly neutral ſalts, both from fixed and volatile alcali, by means of it; and in the laſt volume of his obſervations, Doctor Prieſtley hath given very ſtrong reaſons for thinking that fixed air is a modification of the nitrous acid. He found alſo, that it poſſeſſed an inebriating quality; and, when combined with fixed alcali in ſuch quantity as to neutralize it, could not be expelled by a boiling heat, unleſs the liquor was expoſed to the open air; in which caſe it was impoſſible to retain it. The Doctor hath alſo obſerved, that water held long in fixed air diſcharged from fermenting liquor, acquires a very diſagreeable taſte: once he obſerved it like tar-water; but could not ſatisfy himſelf whence this aroſe, for fear of hurting the liquor; having once injured a large quantity of beer, by holding over it a quantity of ether in a glaſs.

27
Fixed air a modification of the nitrous acid.

By agitating pure fixed air in a glaſs, with water, a part of it always remained, which the water could not imbibe; and in this reſiduum the Doctor found that animals could live, though flame was extinguiſhed. By a mixture of iron-filings and brimſtone, about one fifth of the air was imbibed, and the remainder was not ſo noxious as before.

In making experiments on common air made noxious by the burning of candles, brimſtone, &c. he found, that lime-water became turbid by being placed in the veſſel where the candle was burning. This made him ſuſpect, that the manner in which this change happens to the air, is by its depoſiting its heavieſt part, or that which commonly goes by the name of *fixed air*. This he was afterwards aſſured of, by finding air conſiderably diminiſhed by the electric ſpark; and that, in conſequence of this, blue juices of vegetables were turned red, and lime-water was precipitated exactly as by fixed air.—The Count de Saluces, at Turin, had imagined, that air which had been rendered incapable of ſupporting flame, could be reſtored merely by being expoſed to a conſiderable degree of cold, and alſo by being compreſſed in bladders. Dr Prieſtley repeated his experiments; but found them not to ſucceed, unleſs the air was compreſſed in bladders only, which he attributes to the poroſity of the bladders; and with great reaſon, having conſtantly found, that however he compreſſed it, or to whatever degree of cold he expoſed it, in glaſs-veſſels, the air underwent no change. Vegetation alone he found effectual for this purpoſe; which was generally accompliſhed in five or ſix days: after which time candles would burn in it perfectly well; while another portion of the ſame air, after being kept for many months, without any vegetation, would extinguiſh candles equally as at firſt.

28
Miſtake of the Count de Saluces detected.

29
Noxious rendered wholeſome by vegetation.

The reſtoration of the air depended entirely upon the vegetation of the plant made uſe of; for a great number of freſh leaves of mint were unſucceſsfully uſed for a long time, in endeavouring to reſtore a ſmall quantity of air in which candles had burnt out. Though mint was the firſt plant made uſe of by the doctor in this experiment, he found all others to anſwer equally well, as well aromatics, as thoſe which had no ſmell; and even poiſonous plants, as well as others. The plant he found moſt efficacious for this purpoſe was ſpinach.

One caution the doctor gives in making experiments of this kind, *viz.* that it is abſolutely neceſſary to remove all the dead or rotten leaves of the plant; for they will deprave air in ſuch a manner as to render it incapable of ſupporting flame. A freſh cabbage-leaf, put under a glaſs veſſel for one night, ſo affected the air in it, that it extinguiſhed a candle next morning; and this without any appearance of putrefaction in the leaf.

After candles ceaſe to burn, animals feel little or no inconvenience from breathing the ſame air. It is impoſſible, however, for them to breathe air of this or any other kind for any length of time without ſuffocation. The reaſon of their death, according to Dr Prieſtley, is not the want of the *pabulum vitæ*, ſuppoſed to be contained in the air; but to the air being impregnated with ſomething ſtimulating to the lungs. The noxious effluvium with which the air, in this caſe, is loaded, cannot be abſorbed by ſtanding, without agitation, in freſh or ſalt water. Growing vegetables, however, reſtored air depraved by animal reſpiration, as perfectly as that in which candles had burned out. The ſame effect was produced by agitating this air with water; and in ſome degree, alſo, by a mixture of fixed air.

30
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Notwithſtanding that this kind of air, (which the Doctor diſtinguiſhes by the name of *putrid air*), proves ſo very noxious to moſt animals; yet vegetables thrive in it to a ſurpriſing degree. It is alſo impoſſible for them to be kept clean from ſwarms of inſects; which Dr Prieſtley was frequently obliged to bruſh off the ſprigs of mint on which he made his experiments.

31
nflam-
le air.

Inflammable air was firſt obſerved by Mr Cavendiſh. He obtained it from a ſolution of iron, zinc, or tin, in the marine acid. Doctor Prieſtley hath found, that this air may be procured from every inflammable ſubſtance, either animal, mineral, or vegetable, by combuſtion alone. From theſe ſubſtances he extracted it, by heating them in a gun-barrel, to the orifice of which a glaſs-tube or tobacco-pipe was luted, and to this was tied a flaccid bladder, in order to catch the generated air: but, in order to get a great quantity of air, it was neceſſary to apply the heat as ſuddenly, and as vehemently, as poſſible. By this treatment, a bit of dry oak, weighing twelve grains, will yield a ſheep's bladder full of air, while only two or three ounce meaſures of it can be obtained if the heat is ſlowly applied.

Inflammable air, when made by a quick proceſs, has a ſtrong offenſive ſmell, from whatever ſubſtance it is extracted. It differs, however, according to the ſubſtance from which it is obtained; and is moſt fetid when procured from animal bodies. If a quantity of this kind of air is contained in a glaſs veſſel ſtanding inverted in water, it will even ſmell through the water; which will ſoon become covered with a thin film, aſſuming all the different colours. If the air has been generated from iron, the film will be a red okre; if from zinc, it is a whitiſh ſubſtance, probably the calx of that metal; it likewiſe ſettles to the bottom; and, when the water is ſtirred, has very much the appearance of wool. When water is once impregnated in this manner, it continues to yield this ſcum for a conſiderable time after the air is removed.

This kind of air is no leſs noxious to animals than the fixed or putrid kinds. It was generally thought to be immiſcible with water: but Dr Prieſtley hath obſerved four inſtances of its entirely loſing the inflammable property, and being reduced to half its bulk, by long ſtanding in a bottle inverted in water. In this ſtate it extinguiſhed candles much more ſpeedily than that air in which they had formerly burnt out, and inſtantly killed animals that were put into it.

2
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If inflammable air, contained in a vial, be mixed with an equal quantity of common air, it will inſtantly explode on the approach of flame. If leſs than an equal quantity of common air is introduced, a number of exploſions may be produced from the ſame quantity of inflammable air; only taking care to ſtop the mouth of the vial immediately after every exploſion, otherwiſe the inflammable air will continue burning, though inviſibly in the day-time, till the whole is conſumed. A ſmall mixture of the fumes of ſmoking ſpirit of nitre, makes it go off at once, as if mixed with an equal quantity of common air. This kind of air Dr Prieſtley could not kindle without bringing it into contact with a ſubſtance actually flaming; but Mr Volta, inventor of the *electrophorus* or perpetual electrifying machine, hath ſucceeded in firing it by the ſimple electric ſpark, even when the electricity is very moderate, by a well lighted coal without any flame, by a red hot iron, and even by a flint and ſteel.

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Inflammable air cannot be mixed with fixed air.

Upon trial, with fixed air, the inflammable kind ſeemed incapable of mixing with it. Even after equal quantities of the two had been confined together in a vial for three years, they did not ſeem to have at all united, or affected one another; the fixed air being abſorbed by water, and the inflammable air exploding as uſual.

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Rendered ſalutary by agitation in water.

Vegetables continued to grow in this kind of air, but without making it loſe its inflammability, or become fit for reſpiration. This could be accompliſhed only by agitation in water. By agitating a large quantity of inflammable air in water, one fourth of it diſappeared in ten minutes, and a mouſe lived 20 minutes in 2½ ounce meaſures of the remainder; which is as long as that creature can live in the ſame quantity of common air. The air was yet, however, inflammable, though very weakly ſo. By a continuance of the agitation, this air admitted a candle to burn in it; and at laſt came to extinguiſh it like that in which a candle had burned out. The degree of diminution ſuffered by this kind of air when it loſt its inflammability, was about one half. Diſtilled water imbibed about one fourteenth of its bulk of inflammable air; but the taſte was not ſenſibly altered.

A mixture of iron-filings and brimſtone, made into a paſte with water, diminiſhed the air in which it ſtood, between one fourth and one fifth of its whole quantity; which then became rather lighter than common air. In this ſtate it is highly noxious; has a very pungent and offenſive ſmell; nor is it meliorated by ſtanding in water.——The diminution in this, as well as in other caſes, Dr Prieſtley concludes to ariſe from a depoſition of the fixed air, owing to a ſuperabundant quantity of phlogiſton being introduced.

36
Nitrous air.

All the acids have been reduced by Dr Prieſtley into the form of air. He begins with the nitrous, which is obtained from a ſolution of any kind of metallic ſubſtance in that acid. From gold, and the regulus of antimony, it is obtained by means of aqua regia. He hath even found that it may be obtained in great plenty from common water. See Water.

36
Diminiſhes common air.

One of the moſt conſpicuous properties of this air is the great diminution of any quantity of common air with which it is mixed, attended with a turbid red or deep orange colour, exactly like that which appears on unſtopping a bottle containing ſmoking ſpirit of nitre, which the air itſelf very much reſembles in ſmell. This diminution is attended with a conſiderable degree of heat.

If one ounce meaſure of nitrous, be put to double the quantity of common air, in a few minutes the mixture will want one ninth of the original quantity; and if both kinds of air be very pure, the diminution will ſtill go on very ſlowly, till the whole, in a day or two, is reduced to one fifth leſs than the original quantity of common air. After this ſaturation of common with nitrous air, a freſh quantity of the latter makes an addition equal to its own bulk, without producing the leaſt redneſs, or other viſible effect.—The diminution in this mixture, was found to ariſe from a precipitation of the fixed part of the common air, and the condenſation of the nitrous air into the acid, called ſpirit of nitre. The precipitation of fixed air appeared, when the proceſs was conducted in lime-water, by its becoming turbid, though a ſmall quantity of this water put into the veſſel was not affected by it. The condenſation was evident by the acid taſte communicated to water in which this proceſs had been conducted; and Mr Bewley has obſerved, that, without a mixture of common air, the condenſation of nitrous air will not take place.

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As for the Doctor's experiments on the other kinds of acid and alkaline air, as they come more properly under CHEMISTRY, we ſhall here only mention, that from the fume of the marine acid he always obtained inflammable air, by putting to it ſpirit of wine, oil of olives, oil of turpentine, charcoal, phoſphorus, bees wax, and even ſulphur. This made him ſuſpect, that the common air we breathe, was no other than ſome kind of acid united with phlogiſton; and that it really was ſo, he diſcovered by the following experiments.

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Having expoſed *mercurius calcinatus per ſe* to the focus of a burning glaſs twelve inches diameter, he obtained air from it very plentifully. This air, he found, was not abſorbed by water; a candle burned with a very vigorous and greatly enlarged flame; a piece of red-hot wood ſparkled in it like paper dipped in a ſolution of nitre, and conſumed very faſt.—The ſame properties he obſerved in air drawn from red precipitate. From minium, he extracted air of the very ſame kind. One third of this air, indeed, was readily abſorbed by water; but in the remainder, a candle burned very ſtrongly, and with a crackling noiſe.

After ſome time, it occurred to him to apply the teſt of nitrous air to that which he had newly procured; and, upon ſo doing, he found that it was fully as much diminiſhed as common air. From hence he concluded, that this air was reſpirable. Accordingly, he put a mouſe into two ounce meaſures of air, obtained from *mercurius calcinatus per ſe*. Had it been common air, he knew that this creature would have lived a quarter of an hour in ſuch a quantity. In the *dephlogiſticated* air, however, as Dr Prieſtley calls it, the mouſe lived a full half hour; nor did it, when taken out, ſhew ſigns of being injured any otherwiſe than by cold, as it preſently revived upon being held to the fire. The remainder of the air which had been ſo long breathed by the mouſe, and which, had it been common air, would have been in the higheſt degree noxious, was ſtill found to be much better than common air, being reduced by nitrous air to almoſt one half of its original quantity.

From this quality of taking more phlogiſton from nitrous air, than common air was capable of doing, he concluded, that it muſt originally contain leſs of that principle than common air. In his experiments to know why this kind of air comes to be ſo much dephlogiſticated, he at laſt hit upon a method of producing very pure air readily, and in conſiderable quantity. Having moiſtened half an ounce of red lead with ſpirit of nitre, and then dried the maſs, he obtained from it not quite a pint of dephlogiſticated air, exceedingly pure, in which a candle burned very briſkly; and which ſeemed to be about five times as pure as common air. From this experiment, the Doctor concluded, that the nitrous acid was that which gave the minium power to emit this dephlogiſticated air. The vitriolic and marine acids were tried without effect. No air of any kind was produced by treating them in the ſame manner. The minium efferveſced violently with all the acids.

For the ſame purpoſe, the Doctor tried, with ſucceſs, flowers of zinc, chalk, quicklime, ſlaked lime, tobacco-pipe-clay, flint, Muſcovy talcs, and even glaſs itſelf; from all which he draws the general concluſion, "That the air we breathe conſiſts of the nitrous acid and earth, with as much phlogiſton as is neceſſary to its elaſticity; and likewiſe as much more as is neceſſary to bring it from its ſtate of perfect purity, to the mean condition in which we find it." The reſiduum of his diſtillation, he found equally fit with freſh earth for the production of more air, upon being again moiſtened with the ſpirit of nitre. In his third volume, publiſhed in 1777, the Doctor acquaints us, that very pure dephlogiſticated air is produced by ſimply diſtilling a ſolution of any metal in the nitrous acid: and Mr Bewly found even that trouble unneceſſary; nothing more being requiſite, than to moiſten red lead with the ſpirit of nitre, and then pour upon it oil of vitriol; when the dephlogiſticated air would immediately be expelled without any more heat being required than what was generated by the mixture. The Doctor hath alſo endeavoured to determine the proportions

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As for the Doctor's experiments on the other kinds of acid and alkaline air, as they come more properly under Chemistry, we ſhall here only mention, that from the fume of the marine acid he always obtained inflammable air, by putting to it ſpirit of wine, oil of olives, oil of turpentine, charcoal, phoſphorus, bees wax, and even ſulphur. This made him ſuſpect, that the common air we breathe, was no other than ſome kind of acid united with phlogiſton; and that it really was ſo, he diſcovered by the following experiments.

44
overed.

Having expoſed *mercurius calcinatus per ſe* to the focus of a burning glaſs twelve inches diameter, he obtained air from it very plentifully. This air, he found, was not abſorbed by water; a candle burned with a very vigorous and greatly enlarged flame; a piece of red-hot wood ſparkled in it like paper dipped in a ſolution of nitre, and conſumed very faſt.—The ſame properties he obſerved in air drawn from red precipitate. From minium, he extracted air of the very ſame kind. One third of this air, indeed, was readily abſorbed by water; but in the remainder, a candle burned very ſtrongly, and with a crackling noiſe.

After ſome time, it occurred to him to apply the teſt of nitrous air to that which he had newly procured; and, upon ſo doing, he found that it was fully as much diminiſhed as common air. From hence he concluded, that this air was reſpirable. Accordingly, he put a mouſe into two ounce meaſures of air, obtained from *mercurius calcinatus per ſe*. Had it been common air, he knew that this creature would have lived a quarter of an hour in ſuch a quantity. In the *dephlogiſticated* air, however, as Dr Prieſtley calls it, the mouſe lived a full half hour; nor did it, when taken out, ſhew ſigns of being injured any otherwiſe than by cold, as it preſently revived upon being held to the fire. The remainder of the air which had been ſo long breathed by the mouſe, and which, had it been common air, would have been in the higheſt degree noxious, was ſtill found to be much better than common air, being reduced by nitrous air to almoſt one half of its original quantity.

From this quality of taking more phlogiſton from nitrous air, than common air was capable of doing, he concluded, that it muſt originally contain leſs of that principle than common air. In his experiments to know why this kind of air comes to be ſo much dephlogiſticated, he at laſt hit upon a method of producing very pure air readily, and in conſiderable quantity. Having moiſtened half an ounce of red lead with ſpirit of nitre, and then dried the maſs, he obtained from it not quite a pint of dephlogiſticated air, exceedingly pure, in which a candle burned very briſkly; and which ſeemed to be about five times as pure as common air. From this experiment, the Doctor concluded, that the nitrous acid was that which gave the minium power to emit this dephlogiſticated air. The vitriolic and marine acids were tried without effect. No air of any kind was produced by treating them in the ſame manner. The minium effervеſced violently with all the acids.

For the ſame purpoſe, the Doctor tried, with ſucceſs, flowers of zinc, chalk, quicklime, ſlaked lime, tobacco-pipe-clay, flint, Muſcovy talcs, and even glaſs itſelf; from all which he draws the general concluſion, "That the air we breathe conſiſts of the nitrous acid and earth, with as much phlogiſton as is neceſſary to its elaſticity; and likewiſe as much more as is neceſſary to bring it from its ſtate of perfect purity, to the mean condition in which we find it." The reſiduum of his diſtillation, he found equally fit with freſh earth for the production of more air, upon being again moiſtened with the ſpirit of nitre. In his third volume, publiſhed in 1777, the Doctor acquaints us, that very pure dephlogiſticated air is produced by ſimply diſtilling a ſolution of any metal in the nitrous acid: and Mr Bewly found even that trouble unneceſſary; nothing more being requiſite, than to moiſten red lead with the ſpirit of nitre, and then pour upon it oil of vitriol; when the dephlogiſticated air would immediately be expelled without any more heat being required than what was generated by the mixture. The Doctor hath alſo endeavoured to determine the proportions

tions of earth and nitrous acid, required to produce this kind of air; but hitherto without ſucceſs. Air, he finds, will take up a great deal of earth when hot, which it depoſits when cold. See EARTH.

45
The uſe of blood in animals.

We ſhall conclude this ſubject with ſome obſervations which the Doctor has made on the uſe of the blood in animals, and on reſpiration. They are to be found at length in the Philoſophical Tranſactions for the year 1776, and in his third volume on air publiſhed in 1777.

46
Reſpiration a phlogiſtic proceſs.

In his treatiſe on putrid air, or that infected by animal reſpiration, he had ſhewn, that reſpiration was a phlogiſtic proceſs; and that by means of it a putrid effluvium was carried off from the body, without which he imagined that a living body might perhaps putrefy as ſoon as a dead one. In this paper he proves, that the blood is the principal agent in carrying off the ſuperabundant phlogiſton; that when the whole maſs of blood is ſucceſſively brought almoſt into contact with the air in the lungs, it diſcharges phlogiſton into it; and that the blood receives its red florid colour from the air, he proves by the following experiments.

47
Black coloured blood becomes florid by being expoſed to the air.

Pieces of the nearly black-coloured craſſamentum of a ſheep's blood, incloſed in nets of open gauze, or wire, having been introduced thro' water or quickſilver into inverted receivers containing common air, received from it a florid red colour, at the ſame time that the air was conſiderably depraved.—The brighteſt red blood became black in phlogiſticated or any otherwiſe depraved air; and reſumed its colour again upon being expoſed to the freſh air, parting, in this laſt ſituation, with the phlogiſton it had acquired in the preceding.

That pure air is depraved by the preſence of blood, while the colour of it is changed from black to red, the Doctor proved by his very pure dephlogiſticated air being conſiderably vitiated by ſucceſſively introducing freſh pieces of craſſamentum to the ſame portion of it; and this without any tendency to putrefaction in the blood employed.

48
Remarkable diſcovery concerning the nature of ſerum.

In the courſe of his experiments on blood, he made the following remarkable diſcovery concerning the nature of ſerum, viz. that a covering of ſerum ſeveral inches deep was no impediment to the action of the air upon the craſſamentum of the blood, as it acquired the red colour as eaſily on being expoſed to pure air with this thick coat of ſerum, as without it; whereas the ſlighteſt covering of water, or ſaliva, effectually prevented any change of colour. On reverſing the experiment, he found that phlogiſticated air would act upon craſſamentum, ſo as to turn it black, through a covering of ſerum two inches deep.—From theſe experiments he concluded, that the ſerous part of the blood was particularly organized for the purpoſe of tranſmitting air through it.

49
Apparatus for making experiments on air.

It now remains that we give ſome account of the apparatus requiſite for making experiments on air: and for this purpoſe it will be ſufficient to give an idea of that made uſe of by Dr Prieſtley; both as being moſt eaſily underſtood, and likewiſe, if we may judge from the diſcoveries he hath made by the uſe of it, as being the moſt efficacious of any that hath hitherto been invented.

Plate VII.

For experiments in which air will bear to be confined in water, he made uſe of an oblong wooden trough *a*, fig. 1. two feet long, 11 inches deep, and 18 inches wide; with a ſhelf, *bb*, about an inch lower than the top, for the convenience of placing the jars upon it. The ſeveral kinds of air are kept in cylindric jars *cccc*, about about 10 inches long, and 2½ wide; though it is neceſſary, for particular experiments, to have veſſels of different forms and ſizes. When he has occaſion to transfer air from one jar to another in quickſilver, a ſmall oblong trough is abſolutely neceſſary; but, on other occaſions, a baſon is more convenient for holding the quickſilver.

When veſſels of air are to be removed from the large trough, they are placed in pots or diſhes *ggg*, of different ſizes, to hold more or leſs water as there is occaſion. For the purpoſe of merely removing a jar of air from one place to another, where it is to ſtand only a few days, common tea-diſhes may be uſed; unleſs the air be in a ſtate of diminution, when veſſels of a larger ſize muſt be made uſe of.

When an experiment is to be tried how long a ſmall animal, a mouſe for inſtance, will live in a certain ſpecies of air, a tall beer-glaſs, ſuch as is repreſented by *d*, which contains between two and three ounce meaſures of air, will anſwer the purpoſe. In this quantity of common air a mouſe will live 20 minutes, or half an hour.—On this occaſion the Doctor obſerves, that mice muſt be kept in a pretty exact temperature, as they are unable to bear either much heat or much cold. He was alſo ſurprized to find that they lived entirely without water; and he had an inſtance of one mouſe tearing another almoſt in pieces, though there was plenty of proviſions at the time for both. The method of putting theſe creatures into the quantity of air deſigned for the experiment, is to paſs them through the water into the cavity of the glaſs, into which ſomething muſt be put for them to ſit conveniently out of the reach of the water.—The ſame method may be uſed when a plant is to be conveyed into any given quantity of air. If the plant is of ſuch a nature that it will grow in water only, there will be no occaſion to ſet it in a pot of earth, which otherwiſe will be neceſſary.

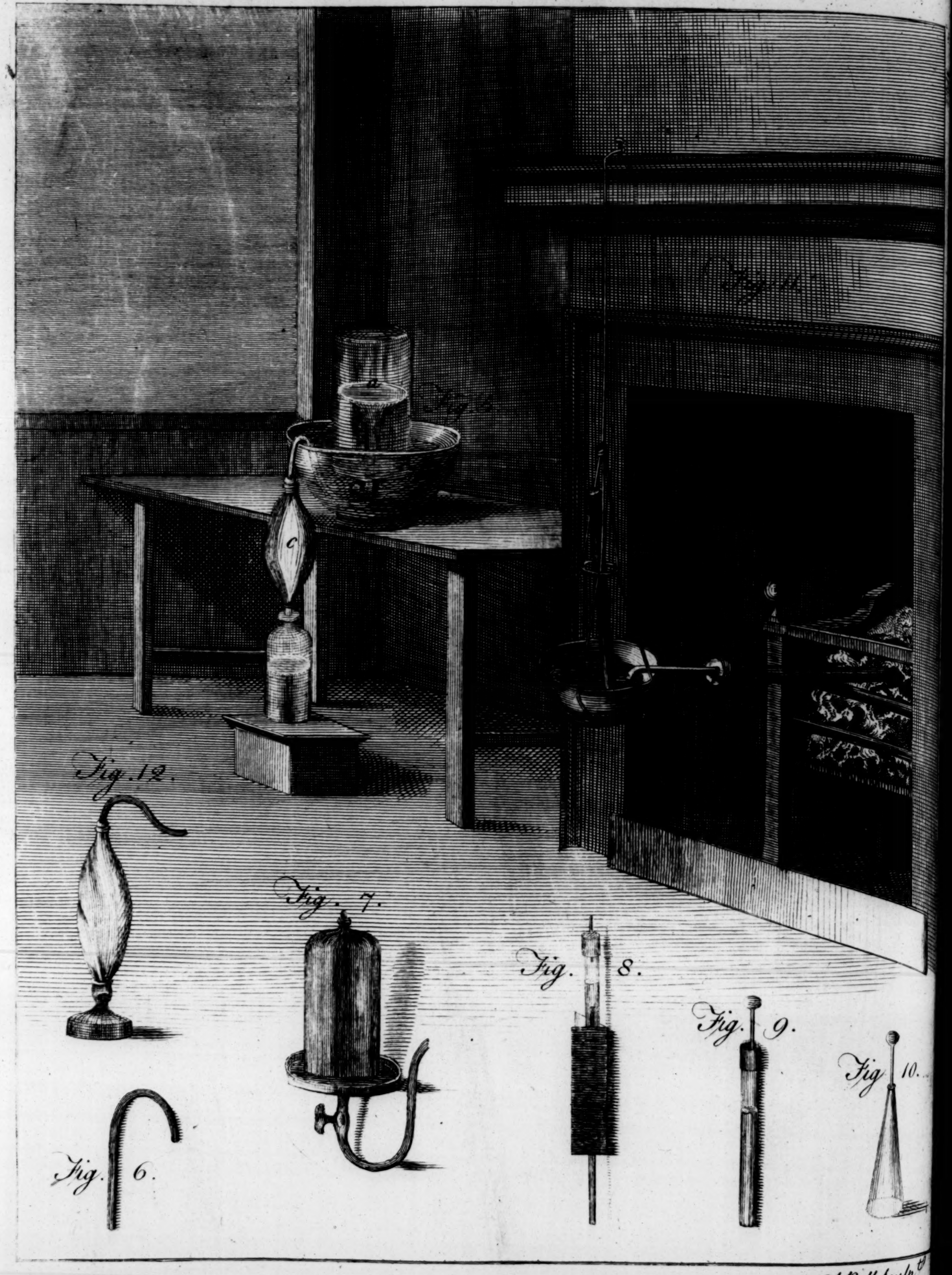
For opening the mouth of a vial, in any quantity of air, without admitting the water into the vial, it is neceſſary to have a cork cut tapering, with a ſtrong wire thruſt through it, (*h*, fig. 1.) by which means it may be introduced into the mouth of an inverted jar, and the cork withdrawn by means of the wire, which afterwards can be replaced by the ſame means, if there is occaſion.—For ſupporting a gallipot at a conſiderable height within a jar, it is convenient to have ſuch wire-ſtands as are repreſented fig. 2. They anſwer better than any other, as they take up but little room, and eaſily bend to any form.

When air is to be poured from a wide-necked, into a very narrow-necked veſſel, a glaſs funnel *e* muſt be uſed, by which means the operation is rendered exceedingly eaſy; firſt filling the veſſel into which the air is to be conveyed with water, and unſtopping the other containing the air under the funnel, which is inſerted into the mouth of the narrow veſſel, and immerſed in water. The air immediately aſcends through the neck of the funnel, makes the water deſcend, and take its place.

Plate VIII. fig. 11.

To expel air from ſolid ſubſtances by means of heat, a gun-barrel may be ſometimes uſed, which is filled up with dry ſand that has been well burned, ſo

3 MA 53


a
Fig. 5
Fig. 11
c
Fig. 12.
Fig. 7.
Fig. 8.
Fig. 9.
Fig 10.
Fig. 6.

A. Bell Sculp.

3 MA 53

Plate . VII .

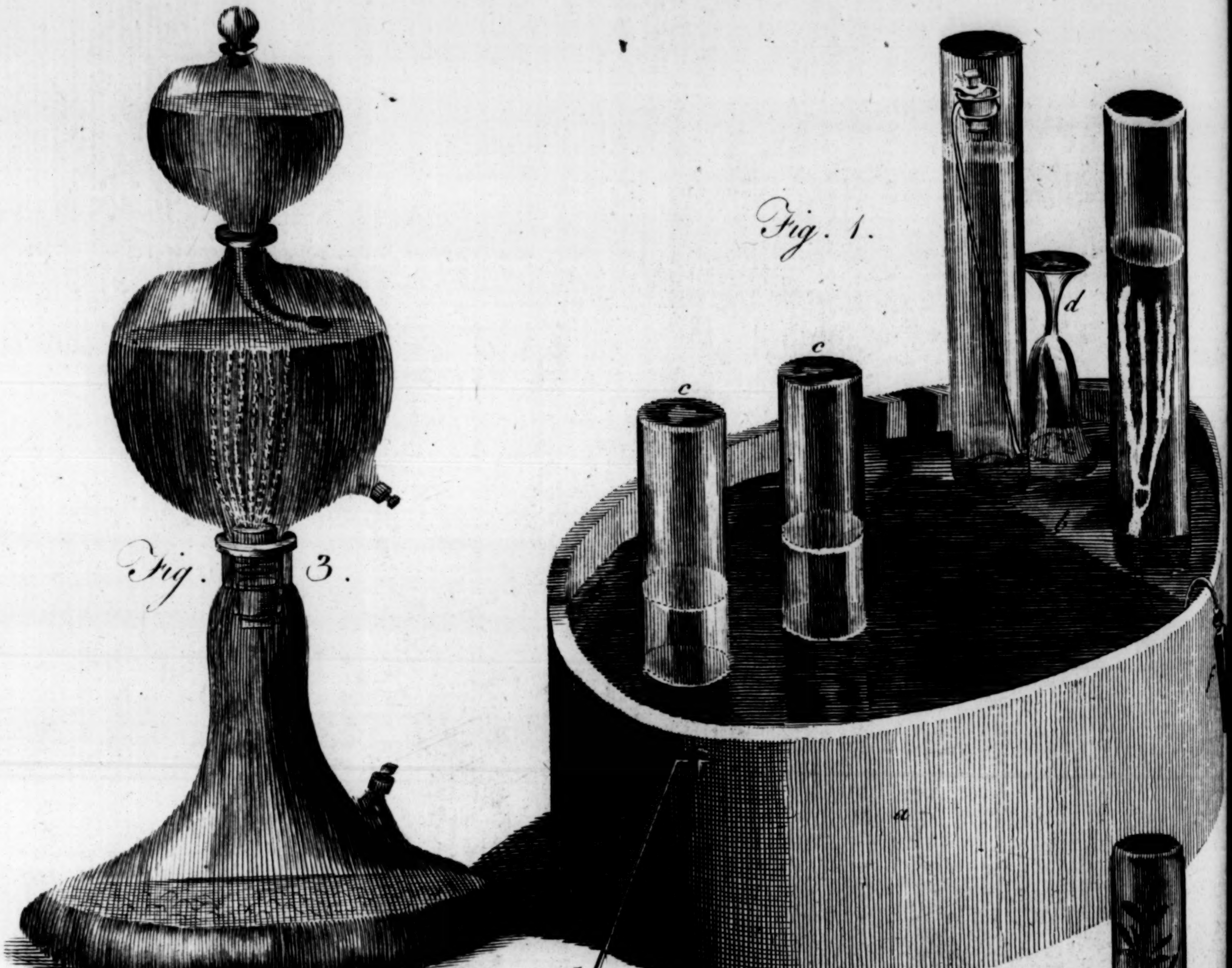


Fig. 1.
c
c
d
b
f
a
h
Fig. 3.
e
Fig. 2.
c
c
g
g
g
Fig. 4.
A Bell sculp

Air.

ſo that no air can come from it. To the open end is luted the ſtem of a tobacco-pipe, or a ſmall glaſs-tube. Having put the cloſed end of the barrel containing the materials, into the fire, the generated air, iſſuing through the tube, may be received in a veſſel of quickſilver having its mouth inverted into a baſon of the ſame, ſuſpended all together by wires, in the manner repreſented in the figure.

But the moſt accurate method of extracting air from ſeveral ſubſtances, by means of heat, is to put them, if they will bear it, into vials full of quickſilver, with the mouths immerſed in the ſame; and then throwing the focus of a burning mirror, or convex lens, upon them. The vials uſed for this purpoſe ſhould have their bottoms round and very thin, that they may not break with a ſudden application of heat; for which Florence flaſks ſeem very proper.

VII.

If air is to be expelled from any liquid, a vial is nearly filled with it. To the vial is fitted a perforated cork, having a glaſs tube inſerted in it, bent as in *f*, fig. 1. and ſecured with cement. The vial is then to be put in a kettle of boiling water, in order to expell the air; or it may be heated by means of a candle, or red-hot poker. But where the air is readily imbibed by water, quickſilver ought always to be uſed; or if a ſufficient quantity of it cannot be procured, oil will in ſome meaſure anſwer the purpoſe.

VIII.

When air is to be transferred from a jar ſtanding in the trough of water to any other veſſel, the contrivance fig. 12. is made uſe of. It conſiſts of a bladder furniſhed at one end with a ſmall tube of glaſs bent, having at the other a cork perforated, ſo as juſt to admit the ſmall end of a funnel. When the common air is preſſed out of this bladder, and the funnel thruſt tightly into the cork, it may be filled with any kind of air as eaſily as a glaſs jar. A ſtring being then tied above the cork in which the funnel is inſerted, and the orifice in the other cork cloſed by preſſing the bladder againſt it, it may be carried to any place; and if the tube be carefully wiped, the air may be conveyed quite free from moiſture through a body of quickſilver, or any thing elſe.

To impregnate fluids with air of any kind, as water with fixed air, a vial is filled with the fluid, as *a*, fig. 5. It is then inverted in a bowl *b*, containing a quantity of the ſame fluid; and the bladder *c* being filled with the air, as much of it as is thought proper may be thrown into the vial; and, to accelerate the impregnation, the vial may be ſhaken as much as poſſible. The ſame apparatus ſerves very conveniently for conveying air immediately as it is generated from an efferveſcing mixture, into any other ſpecies of fluid; and that the vial may be more conveniently ſhaken, in order to make the efferveſcence occaſionally more briſk, a flexible leather pipe may be ſometimes uſed, inſtead of the inflexible glaſs one.

VII.

When any kind of air is to be tried with regard to its capacity for ſuſtaining flame, a cylindrical glaſs veſſel (fig. 4.) is made uſe of, with a bit of wax candle, faſtened to the end of a wire, and turned up in ſuch a manner as to be let down into the veſſel with the flame upwards. The veſſel ſhould be kept carefully covered, till the moment the candle is admitted; and by this means the Doctor has extinguiſhed a candle more than 20 times ſucceſſively; although it is impoſſible to dip the candle in it without giving the external air an opportunity of mixing more or leſs with that in the veſſel. The candle at the other end of the wire is very convenient for being held under a jar ſtanding in water, in order to burn as long as the incloſed air can ſupply it; for, the moment it is extinguiſhed, it may be drawn through the water, before any ſmoke can have mixed with the air.

Plate VIII.

In order to draw air out of a veſſel which has its mouth immerſed in water, and thereby to raiſe the water to any height, it is convenient to uſe a glaſs ſyphon, fig. 6. putting one of the legs up into the veſſel, and drawing the air out of the other by the mouth. If the air is of a noxious quality, it may be neceſſary to have a ſyringe faſtened to the ſyphon; or if a very ſmall hole is made in the upper part of a glaſs-veſſel, it may be filled to any height, by holding it under water, while the air is diſcharged at the hole, which may be afterwards cloſed with cement.

When a particular kind of air is to be admitted to any thing that will not bear wetting, eſpecially if it is a powder, and muſt be placed on a ſtand, as in thoſe experiments in which the focus of a burning mirror is to be thrown upon it, a receiver is firſt exhauſted, in which it is previouſly placed; and having a glaſs tube bended for the purpoſe, as in fig. 7. it is to be ſcrewed to the ſtem of a transfer of the air-pump on which the receiver had been exhauſted; and introducing it into a jar of that kind of air with which the receiver is deſired to be filled, the purpoſe is gained, by only turning the cock.

To take the electric ſpark in any kind of air, the quantity of which muſt be very ſmall, to produce a ſenſible effect upon it in a ſhort time, a piece of wire is put into the end of a ſmall tube, and faſtened with hot cement, as in fig. 8. and having got the air deſired into the tube, by means of the apparatus already deſcribed, it is placed inverted in a baſon containing quickſilver or any other fluid ſubſtance. By the help of the air-pump, then, as much of the air is driven out as is thought proper; and putting a braſs ball on the end of the wire, the ſparks, or ſhocks, are communicated by its means, thro' the air contained in the tube, to the fluid.—If air is generated very faſt by this proceſs, a glaſs is uſed, fig. 10. which is narrow above, and grows wider below, that the quickſilver may not too ſoon recede beyond the ſtriking diſtance.

50
Apparatus for impregnating water with fixed air.

Beſides this general apparatus, which hitherto may be conſidered as merely experimental, and a matter of curioſity only, it will be proper to mention that for impregnating water with fixed air; as water impregnated with this kind of air hath been found exceedingly ſalutary in putrid diſeaſes, particularly in the ſea-ſcurvy. For this reaſon, a method of impregnating large quantities of water with fixed air has become an object worthy of public attention. A propoſal for doing ſo was laid before the board of Admiralty, and was accepted of; and the captains of two ſhips that were juſt ſailing for the ſouth ſeas, had orders to make trial of the impregnated water; for which purpoſe Dr Prieſtley drew out his directions in writing, and ſent a drawing of his apparatus.

51
By Dr Prieſtley.

The apparatus recommended by Dr Prieſtley for impregnating water, is not in the leaſt different from that repreſented fig. 5. where *a* repreſents a glaſs-veſſel, with a pretty narrow neck, but ſo formed that it will ſtand upright with its mouth downwards. Having filled it with water, lay a ſlip of clean paper, or thin paſteboard, upon the mouth: then, if they be preſſed cloſe together, the veſſel may be turned upſide down, without danger of admitting common air into it; and when thus inverted, it muſt be placed into another veſſel, in the form of a bowl or baſon, *b*, with a little water in it, ſo much as to permit the ſlip of paper or paſteboard to be withdrawn, and the end of the crooked pipe to be introduced. One end of this pipe is inſerted into a bladder, which is tied round it; and the other communicates, by means of a perforated cork, with a vial which contains the effervеſcing mixture, from whence the fixed air is to be detached. On ſome occaſions it may be convenient to have this pipe flexible; when it will be beſt made of leather ſewed with a waxed thread, in the manner uſed by ſhoe-makers. When this pipe is flexible, a piece of quill muſt be thruſt into each end of it, to keep them open, while one of them is introduced into the veſſel of water, and the other into the bladder *c*, the oppoſite end of which muſt be tied round a cork perforated, and the hole kept open by a quill. The cork muſt fit the vial containing the effervеſcing mixture, two-thirds of which muſt be filled with chalk, juſt covered with oil of vitriol. The Doctor, however, finds it moſt convenient to uſe a glaſs tul · and, for the advantage of agitating the vial, to have o bladders, communicating by a perforated cork, to which they are both tied.

Things being thus prepared, and the vial containing the chalk and water being detached from the bladder, and the pipe from the veſſel of water, pour a little oil of vitriol upon the chalk and water; and having carefully preſſed all the common air out of the bladder, put the cork into the bottle preſently after the effervеſcence has begun. Alſo, preſs the bladder once more, after a little of the newly generated air has got into it, in order the more effectually to clear it of all remains of common air; and then introduce the end of the pipe into the mouth of the veſſel of water, as in the drawing, and begin to agitate the chalk and water briſkly. This will preſently produce a conſiderable quantity of fixed air, which will diſtend the bladder; and this being preſſed, the air will force its way through the pipe, and aſcend into the veſſel of water, the water at the ſame time deſcending and coming into the baſon.

When about one half of the water is forced out, let the operator lay his hand upon the uppermoſt part of the veſſel *a*, and ſhake it as briſkly as he can, not to throw the water out of the baſon; and, in a few minutes, the water will abſorb the air; and, taking its place, will nearly fill the veſſel as at firſt. Then ſhake the vial containing the chalk and water again, and force more air into the veſſel, till upon the whole an equal bulk of air has been thrown into it. Alſo ſhake the water as before, till no more of the air can be imbibed. As ſoon as this is perceived to be the caſe, the water is ready for uſe; and if it is not to be uſed immediately, ſhould be put, as ſoon as poſſible, into a bottle well corked and cemented. It will, however, keep very well, if the bottle be only well corked, and kept with the mouth downwards. A little more than a tea-ſpoonful of oil of vitriol will be ſufficient to impregnate three pints of water with fixed air.

By this proceſs may fixed air be given to wine, beer, and almoſt any liquor whatever: and when beer is become flat or dead, it will be revived by this means; but the delicate agreeable flavour, or acidulous taſte, communicated by the fixed air, and which is manifeſt in water, will hardly be perceived in wine, or other liquors, which have much taſte of their own.

52 Artifici Pyrmo water.

By the ſame means alſo may be prepared water having all the medicinal virtues of Pyrmont water, or any other mineral water ſimilar to it; eſpecially if a few iron-filings be added, to render it a chalybeate like genuine Pyrmont water; which it may be made to reſemble exactly, by putting eight or ten drops of *tinctura martis cum ſpiritu ſalis* to every pint.

The firſt hint of the uſes to which fixed air may be applied, was given by Sir John Pringle; who diſcovered that putrefaction was checked by fermentation. Doctor Macbride found this to be an effect of the fixed air produced in the proceſs; upon which principle he recommended the uſe of wort to ſailors, as a ſubſtitute to freſh vegetables, by ſupplying a quantity of fixed air from its fermentation in the ſtomach; which conjecture is now confirmed by experience. Dr Black diſcovered the exiſtence of fixed air in calcareous ſubſtances; Dr Brownrigg claims the diſcovery of it in Pyrmont, and other mineral waters; and Dr Prieſtley, that of an eaſy method of impregnating water with it in large quantities. He alſo conjectured, that, if applied by way of clyſter, it might be of ſervice in putrid fevers; which is likewiſe verified by experience. The fixed air may be injected into the inteſtinal canal, by the ſame apparatus employed for injecting the ſmoke of tobacco.

53 Dr No apparat

The uſe of bladders in this apparatus was objected to by Dr Nooth; who aſſerted, that they were apt to communicate an urinous flavour to the water. This he attributed to the action of the ſolvent power of the air upon the bladder; and he gave a particular kind of apparatus of his own invention, in which, the veſſels being entirely made of glaſs, no inconvenience of this ſort could be apprehended.—To Dr Nooth's objections Dr Prieſtley replied, that he had been converſant with bladders, and fixed air contained in bladders, as much as any man, and never found any ſuch flavour ariſing from the uſe of them as Dr Nooth had experienced. He ſuſpected, therefore, that the taſte complained of had ariſen from the careleſsneſs of the ſervant, and that urine had really been mixed with the water made uſe of. He owned, however, that the apparatus recommended by Dr Nooth, and improved by Mr Parker, had in ſome reſpects the advantage of his own, particularly in being more cleanly to the operator, and requiring leſs attendance; though it was more inconvenient, where large quantities of water were to be impregnated, on account of its being much ſlower.

Plate V

This apparatus is repreſented, fig. 3. In the loweſt veſſel, the chalk, or pounded marble, (which laſt is preferred by Dr Prieſtley), and the water acidulated with oil of vitriol, is to be put; in the middle veſſel is the water to be impregnated, the deſcent of which is prevented by the aſcent of the fixed air. During the effervеſcence, the fixed air riſes into the middle veſſel, diſplaces part of the water in it, thro' the bent tube into the upper veſſel, the common air going out through a channel in the ſtopple. When this bent

Air, Muſic.

tube is of a proper length, the proceſs requires no attention; and if the production of air be copious, the water will generally be ſufficiently impregnated in five or ſix hours. At leaſt, all the attention that needs be given to it is to raiſe the uppermoſt veſſel once or twice, to let out that part of the fixed air which is not readily abſorbed by water. If the operator chuſes to accelerate the proceſs by agitating the mixture, he muſt ſeparate the two uppermoſt veſſels from the loweſt, or the air will be too copiouſly produced, and he will alſo be in danger of throwing the liquor contained in the loweſt veſſel, in contact with the ſtopple which ſeparates it from the middle veſſel, by which means ſome of the oil of vitriol might get into the water.

Fluor-acid Air	See Chemistry	n° 264.
Marine-acid Air		n° 226, 262.
Vegetable-acid Air		n° 289.
Vitriolic-acid Air		n° 163.

Air, in mythology, was adored by the heathens under the names of Jupiter and Juno; the former repreſenting the ſuperior and finer part of the atmoſphere, and the latter the inferior and groſſer part. The augurs alſo drew preſages from the clouds, thunder, lightning, &c.

Air, in painting, &c. denotes the manner and very life of action; or it is that which expreſſes the diſpoſition of the agent.—It is ſometimes alſo uſed in a ſynonymous ſenſe with geſture or attitude.

Air, in muſic, is taken in different ſenſes. In a vulgar acceptation, it ſignifies any particular manner of execution: thus, we ſay of a practical muſician, that he performs with a good or bad, proper or improper, *air*. But this is certainly a ſoleciſm of ſpeech. The animating graces, and moving touches, with which melody is adorned and heightened in execution, are reſolvable either into manner or expreſſion.—*Air* is likewiſe ſometimes contraſted with harmony; and, in this ſenſe, it is ſynonymous with melody in general.—Its proper meaning is, A tune, which is ſet to words, or to ſhort pieces of poetry that are called *ſongs*.

In operas, we give the name of *air* to ſuch pieces of muſic as are formed with meaſures and cadences, to diſtinguiſh it from the recitative; and, in general, every piece of muſic is called an *air*, which is formed for the voice, or even for inſtruments, and adapted to ſtanzas, whether it forms a whole in itſelf, or whether it can be detached from any whole of which it forms a part, and be executed alone.

If the ſubject admits of harmony, and is ſet in parts, the *air* is, according to their number, denominated a *duett*, a *trio*, a *quartetto*, &c. We need not follow Rouſſeau, and the other philologiſts, in their endeavours to inveſtigate the etymon of the word *air*. Its derivation, though found and aſcertained, would contribute little to illuſtrate its meaning in that remote ſenſe, to which, through a long continuance of time, and the various viciſſitudes of language, it has now paſſed. The curious may conſult the ſame article in the *Dictionaire de Muſique* by M. Rouſſeau.

In modern muſic, there are ſeveral different kinds of *airs*, each of which agrees to a certain kind of dancing, and from theſe dances the airs themſelves take their ſpecific names. See Music, Art. 252.

Air, in Muſic.

The *airs* of our operas, are, if we may be permitted the expreſſion, the canvaſs or ſubſtratum upon which are painted all the pictures of imitative muſic; melody is the deſign, and harmony the colouring: every pictureſque object ſelected from the moſt beautiful parts of nature, every reflected ſentiment of the human heart, are the models which the artiſt imitates; whatever gains attention, whatever intereſts the ſoul, whatever charms the ear, or cauſes emotion in the heart, theſe are the objects of his imitation*. An air which delights the ear, and diſcovers the learning of the compoſer; an air invented by genius, and compoſed with taſte; is the nobleſt effort of muſic: it is this which explores the compaſs, and diſplays the delicacy, of a beautiful voice; it is in this where the charms of a well-conducted ſymphony ſhine; it is by this, that the paſſions, excited and inflamed by nice gradations, reach and agitate the ſoul through the avenues of external ſenſe. After hearing a beautiful *air*, the mind is acquieſcent and ſerene: the ear is ſatisfied, not diſguſted: it remains impreſſed on the fancy, it becomes a part of our eſſence, we carry it with us, we are able to repeat it at pleaſure: without the ability acquired by habit to breathe a ſingle note of it, we execute it in our imagination in the ſame manner as we heard it upon the theatre: one ſees the ſcene, the actor, the theatre; one hears the accompaniments and the applauſes. The real enthuſiaſt in muſic never forgets the beautiful airs which he has heard; when he chuſes, he cauſes the opera to recommence.

The words to which *airs* are adapted, are not always rehearſed in regular ſucceſſion, nor ſpoken in the ſame manner with thoſe of the recitative; and though, for ordinary, they are very ſhort, yet they are interrupted, repeated, tranſpoſed, at the pleaſure of the artiſt. They do not conſtitute a narrative, which once told is over: they either delineate a picture, which it is neceſſary to contemplate in different points of view; or inſpire a ſentiment in which the heart acquieſces with pleaſure, and from which it is neither able nor willing to be diſengaged; and the different phraſes of the *air*, are nothing elſe but different manners of beholding the ſame image. This is the reaſon why the ſubject of an *air* ſhould be one. It is by theſe repetitions properly placed, it is by theſe redoubled efforts, that an impreſſion, which at firſt was not able to move you, at length ſhakes your ſoul, agitates you, tranſports you out of yourſelf: and it is likewiſe upon the ſame principle, that the runnings as they are called, or thoſe long, mazy, and inarticulated inflections of the voice, which, in pathetic *airs*, frequently ſeem, though they are not always ſo, improperly placed; whilſt the heart is affected with a ſentiment exquiſitely moving, it often expreſſes its emotions by inarticulate ſounds, more ſtrongly and ſenſibly than it could do by words themſelves.

The form of *airs* is of two kinds. The ſmall airs are often compoſed of two ſtrains, which ought each of them to be ſung twice; but the important airs in operas, are frequently in the form of rondeaus.

AIRS, in the menage, are the artificial motions of taught horſes; as the demivolt, curvet, capriole, &c*.

Air-*Bladder*, in fiſhes. See Comparative Anatomy, n° 147.

Air-*Gun*, a pneumatic machine for exploding bullets, &c. with great violence.

Plate IX.

The common air-gun is made of braſs, and has two barrels; the inſide barrel A, fig. 1. which is of a ſmall bore, from whence the bullets are exploded; and a large

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* See *Imitation*.

* See *Demivolt, &c.*

Air gun.

barrel ECDR on the outſide of it. There is a ſyringe SMNP fixed in the ſtock of the gun, by which the air is injected into the cavity between the two barrels through the valve EP. The ball K is put down into its place in the ſmall barrel, with the rammer, as in any other gun. At SL is another valve, which, being opened by the trigger O, permits the air to come behind the bullet, ſo as to drive it out with great force. If this valve be opened and ſhut ſuddenly, one charge of condenſed air may be ſufficient for ſeveral diſcharges of bullets; but if the whole air be diſcharged on one ſingle bullet, it will drive it out with a great force. This diſcharge is effected by means of a lock, fig. 2. placed here as uſual in other guns; for the trigger being pulled, the cock will go down and drive the lever O, fig. 1. which will open the valve, and let in the air upon the bullet K.

The *Magazine Air-gun* was invented by that ingenious artiſt L. Colbe. By this contrivance ten bullets are ſo lodged in a cavity, near the place of diſcharge, that they may be drawn into the ſhooting-barrel, and ſucceſſively diſcharged ſo faſt as to be nearly of the ſame uſe as ſo many different guns.

Fig. 3. repreſents the preſent form of this machine, where part of the ſtock is cut off, to the end of the injecting ſyringe. It has its valve opening into the cavity between the barrels, as before. KK is the ſmall ſhooting-barrel, which receives the bullets from the magazine ED, which is of a ſerpentine form, and cloſed at the end D when the bullets are lodged in it. The circular part *abc*, is the key of a cock, having a cylindric hole through it, *ik*, which is equal to the bore of the ſame barrel, and makes a part of it in the preſent ſituation. When the lock is taken off, the ſeveral parts Q, R, T, W, &c. come into view, by which means the diſcharge is made by puſhing up the pin P*p*, which raiſes and opens a valve V, to let in the air againſt the bullet I, from the cavity FF; which valve is immediately ſhut down again by means of a long ſpring of braſs, NN. This valve V being a conical piece of braſs, ground very true in the part which receives it, will of itſelf be ſufficient to confine the air.

To make a diſcharge, you will pull the trigger ZZ, which throws up the ſeer *ya*, and diſengages it from the notch *a*, upon which the ſtrong ſpring WW moves the tumbler T, to which the cock is fixed. This, by its end *u*, bears down the end *v* of the tumbling lever R, which, by the other end *m*, raiſes at the ſame time the flat end of the horizontal lever Q; and by this means, of courſe, the pin P*p*, which ſtands upon it, is puſhed up, and thus opens the valve V, and diſcharges the bullet. This is all evident from a bare view of the figure.

To bring another bullet to ſucceed that marked I, inſtantaneouſly, turn the cylindric cavity of the key of the cock, which before made part of the barrel KK, into the ſituation *ik*, ſo that the part *i* may be at K; and hold the gun upon your ſhoulder, with the barrel downwards, and the magazine upwards, by which means that bullet next the cock will fall into it out of the magazine, but go no farther into this cylindric cavity than the two little ſprings *ss*, which detain it. The two circles repreſent the cock-barrel, wherein the key abovementioned turns upon an axis not repreſentted here, but viſible in fig. 4. This axis is a ſquare piece of ſteel, on which comes the ſquare hole of the hammer H, fig. 5.; by which the cylindric cavity mentioned is opened to the magazine. Then opening the hammer, as in that figure, the bullet is brought into its proper place near the diſcharge-valve, and the cylindric cavity of the key of the cock again makes part of the inward barrel KK.

Air-pi

It evidently appears how expeditious a method this is of charging and diſcharging a gun; and were the force of condenſed air equal to that of gunpowder, ſuch an air-gun would anſwer the end of ſeveral guns.

In the air-gun, and all other caſes where the air is required to be condenſed to a very great degree, it will be requiſite to have the ſyringe of a ſmall bore, viz. not exceeding half an inch in diameter; becauſe the preſſure againſt every ſquare inch is about 15 pounds, and therefore againſt every circular inch about 12 pounds. If therefore the ſyringe be one inch in diameter, when one atmoſphere is injected, there will be a reſiſtance of 12 pounds againſt the piſton; and when 10 are injected, there will be a force of 120 pounds to be overcome; whereas ten atmoſpheres act againſt the circular half-inch piſton (whoſe area is only one-fourth part ſo big) with only a force equal to 30 pounds; or 40 atmoſpheres may be injected with ſuch a ſyringe, as well as 10 with the other. In ſhort, the facility of working will be inverſely as the ſquares of the diameter of the ſyringe.

Air-*Jacket*, a ſort of jacket made of leather, in which are ſeveral bags, or bladders, compoſed of the ſame materials, communicating with each other. Theſe are filled with air through a leather tube, having a braſs ſtop-cock accurately ground at the extremity, by which means the air blown in through the tube is confined in the bladders. The jacket muſt be wet, before the air be blown into the bags, as otherwiſe it will immediately eſcape through the pores of the leather. By the help of theſe bladders, which are placed near the breaſt, the perſon is ſupported in the water, without making the efforts uſed in ſwimming *.

Air-*Pipes*, an invention for drawing foul air out of ſhips, or any other cloſe places, by means of fire. Theſe pipes were firſt found out by one Mr Sutton, a brewer in London; and from him have got the name of *Sutton's Air-pipes*. The principle on which their operation depends is known to every body, being indeed no other than that air is neceſſary for the ſupport of fire; and, if it has not acceſs from the places moſt adjacent, will not fail to come from thoſe that are more remote. Thus, in a common furnace, the air enters through the aſh-hole; but if this is cloſed up, and a hole made in the ſide of the furnace, the air will ruſh in with great violence through that hole. If a tube of any length whatever is inſerted in this hole, the air will ruſh through the tube into the fire, and of conſequence there will be a continued circulation of air in that place where the extremity of the tube is laid. Mr Sutton's contrivance then, as communicated to the Royal Society by Doctor Mead, amounts to no more than this.—"As, in every ſhip of any bulk, there is already provided a copper or boiling-place proportionable to the ſize of the veſſel; it is propoſed to clear the bad air, by means of the fire already uſed under the ſaid coppers or boiling-places for the neceſſary uſes of the ſhip.

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* See a
the arti
Cork-J
ket, and
Bambo
Habit.

r-pipes.

“ It is well known, that, under every ſuch copper or boiler, there are placed two holes, ſeparated by a grate; the firſt of which is for the fire, and the other for the aſhes falling from the ſame; and that there is alſo a flue from the fire-place upward, by which the ſmoke of the fire is diſcharged at ſome convenient place of the ſhip.

“ It is alſo well known, that the fire once lighted in theſe fire-places, is only preſerved by the conſtant draught of air through the forementioned two holes and flue; and that if the ſaid two holes are cloſely ſtopped up, the fire, though burning ever ſo briſkly before, is immediately put out.

“ But if, after ſhutting up the abovementioned holes, another hole be opened, communicating with any other room or airy place, and with the fire; it is clear, the ſaid fire muſt again be raiſed and burn as before, there being a like draught of air through the ſame as there was before the ſtopping up of the firſt holes; this caſe differing only from the former in this, that the air feeding the fire will now be ſupplied from another place.

“ It is therefore propoſed, that, in order to clear the holds of ſhips of the bad air therein contained, the two holes abovementioned, the fire-place and aſh-place, be both cloſed up with ſubſtantial and tight iron-doors; and that a copper or leaden pipe, of ſufficient ſize, be laid from the hold into the aſh-place, for the draught of air to come in that way to feed the fire. And thus it ſeems plain, from what has been already ſaid, that there will be, from the hold, a conſtant diſcharge of the air therein contained; and conſequently, that that air, ſo diſcharged, muſt be as conſtantly ſupplied by freſh air down the hatches or ſuch other communications as are opened into the hold; whereby the ſame muſt be continually freſhened, and its air rendered more wholeſome and fit for reſpiration.

“ And if into this principal pipe ſo laid into the hold, other pipes are let in, communicating reſpectively either with the well or lower decks; it muſt follow, that part of the air, conſumed in feeding the fire, muſt be reſpectively drawn out of all ſuch places to which the communication ſhall be ſo made.”

This account is ſo plain, that no doubt can remain concerning the efficacy of the contrivance; it is evident, that, by means of pipes of this kind, a conſtant circulation of freſh air would be occaſioned thro' thoſe places where it would otherwiſe be moſt apt to ſtagnate and putrefy. Several other contrivances have been uſed for the ſame purpoſe; and Doctor Hales's ventilators, by ſome unaccountable prejudice, have been reckoned ſuperior in efficacy and even ſimplicity to Mr Sutton's machine, which at its firſt invention met with great oppoſition *, and even when introduced by Dr Mead, who uſed all his intereſt for that purpoſe, was ſhamefully neglected.

A machine capable of anſwering the ſame purpoſe was invented by Mr Deſaguliers, which he called the *ſhip's lungs*. It conſiſted of a cylindrical box ſet up on its edge, and fixed to a wooden pedeſtal. From the upper edge of the box iſſued a ſquare trunk open at the end, and communicating with the cavity of the box. Within this box was placed a cylindrical wheel turning on an axis. It was divided into 12 parts, by means of partitions placed like the radii of a circle. Theſe partitions did not extend quite to the centre, but left an open ſpace of about 18 inches diameter in the middle; towards the circumference, they extended as far as poſſible without interferring with the caſe, ſo that the wheel might always be allowed to turn freely.—Things being thus circumſtanced, it is plain, that if the wheel was turned towards that ſide of the box on which the trunk was, every diviſion would puſh the air before it, and drive it out through the trunk, at the ſame time that freſh air would come in through the open ſpace at the centre, to ſupply that which was thrown out thro' the trunk. By turning the wheel ſwiftly, a ſtrong blaſt of air would be continually forced out thro' the ſquare trunk, on the ſame principles on which a common fanner winnows corn. If the wheel is turned the oppoſite way, a draught of air may be produced from the trunk to the centre.——If this machine, then, is placed in a room where a circulation of air is wanted, and the trunk made to paſs through one of the walls; by turning the wheel ſwiftly round, the air will be forced with great velocity out of that room, at the ſame time that freſh air will enter through any chinks by which it can have acceſs to ſupply that which has been forced out.

It is evident, that the circulation which is promoted by this machine, is entirely of the ſame kind with that produced by Mr Sutton's; the turning of the wheel in Mr Deſaguliers's machine being equivalent to the rarefaction of the air by fire in Mr Sutton's: but that the latter is vaſtly ſuperior, as acting of itſelf, and without intermiſſion, requires no arguments to prove. Mr Sutton's machine has yet another conveniency, of which no other contrivance for the ſame purpoſe can boaſt; namely, that it not only draws out putrid air, but deſtroys it by cauſing it paſs through fire; and experience has abundantly ſhewn, that though putrid air is thrown into a great quantity of freſh air, it is ſo far from loſing its pernicious properties, that it often produces noxious diſeaſes. We do not ſay, indeed, that putrid air becomes ſalutary by this means; but it is undoubtedly rendered leſs noxious than before; tho' whether it is equally innocent with the ſmoke of a fire fed in the common way, we cannot pretend to determine.

Beſides this machine by Mr Deſaguliers, the ventilators of Doctor Hales, already mentioned, and thoſe called *Wind-ſails*, are likewiſe uſed for the ſame purpoſe. The former of which is an improvement of the Heſſian-bellows *: the other is a contrivance for throwing freſh air into thoſe places where putrid air is apt to lodge; but this has the laſt-mentioned inconvenience in a much greater degree than any of the others, as the blaſt of freſh air throws out that which was rendered putrid by ſtagnation, in ſuch a manner as to contaminate all around it. See **Wind-sails**.

Air-trunks.

Air-*Trunk*, is alſo a contrivance by Doctor Hales to prevent the ſtagnation of putrid effluvia in jails, and other places where a great number of people are crowded together in a ſmall ſpace. It conſiſts only of a long ſquare trunk open at both ends; one of which is inſerted into the cieling of the room, the air of which is required to be kept pure; and the other extends a good way beyond the roof. Through this trunk a continued circulation is carried on: and the reaſon is, that the putrid effluvia which do ſo much miſchief when collected, being much lighter than the pure atmoſphere, ariſe to the top of the room; and, if they there find a vent,

* See *Ventilator.*

vent, will continually go out through it. Theſe effluvia ariſe in very conſiderable quantity, being calculated by the late Dr Keil at no leſs than 39 ounces from one man in 24 hours.

Theſe trunks were firſt made trial of by Mr Yeoman, over the Houſe of Commons, where they were nine inches wide within; and over the Court of King's-bench in Weſtminiſter-hall, where they were ſix inches wide. They are ſometimes made wider, and ſometimes narrower: but the wider they are, the longer they ought to be, more effectually to promote the aſcent of the vapour. The reaſon why vapours of this kind aſcend more ſwiftly through a long trunk than a ſhort one, is, that the preſſure of fluids is always according to their different depth, without regard to the diameter of their baſis, or of the veſſel which contains them; and, upon this principle, a gallon of water may be made to ſplit a ſtrong caſk *. When the column of putrid effluvia is long and narrow, the difference between the column of atmoſphere preſſing on the upper end of the trunk, and that which preſſes on the lower end, is much greater than if the column of putrid effluvia was ſhort and wide; and conſequently the aſcent is much ſwifter.—One pan of a ſingle pair of ſcales, which was two inches in diameter, being held within one of theſe trunks, over the houſe of commons, the force of the aſcending air made it riſe ſo as to require four grains to reſtore the equilibrium, and this when there was no perſon in the houſe; but when it was full, no leſs than 12 grains were requiſite to reſtore the equilibrium; which clearly ſhews that theſe trunks muſt be of real, and very great efficacy.

Air-*Pump*, a machine by which the air contained in a proper veſſel may be exhauſted, or drawn out *.

Air-*Shafts*, among miners, are holes made to meet the adits, and ſupply them with freſh air.

Air-*Threads*, in natural hiſtory, a name given to the long filaments, ſo frequently ſeen in autumn floating about in the air.

Theſe threads are the work of ſpiders, eſpecially of that ſpecies called the long-legged field-ſpider; which, having mounted to the ſummit of a buſh or tree, darts from its tail ſeveral of theſe threads, till one is produced capable of ſupporting the creature in the air: on this it mounts in queſt of prey, and frequently riſes to a very conſiderable height. See Aranea.

Air-*Veſſels*, are ſpiral ducts in the leaves, &c. of plants, ſuppoſed to be analogous to the lungs of animals, in ſupplying the different parts of a plant with air. See Plants, n° 35. and the figure there referred to.

AIRA, in botany, a genus of the triandria digynia claſs. There are 14 ſpecies of the aira, nine of which are natives of Britain. The Engliſh name is *Hair-graſs*. See the general article Grass.

AIRANI, in church-hiſtory, an obſcure ſect of Arians, in the fourth century, who denied the conſubſtantiality of the Holy Ghoſt with the Father and the Son. They are otherwiſe called *Airaniſtæ;* and are ſaid to have taken their name from one *Airas*, who diſtinguiſhed himſelf at the head of this party, in the reigns of Valentinian and Gratian.

AIRE, in geography, a ſea-port town in Scotland, ſituated in N. lat. 55. 30. and W. long. 4. 40. at the mouth of a river of the ſame name, which diſcharges itſelf into the frith of Clyde. Aire is the chief town of the county, and very ancient. About a mile north from the town, there is a lazar-houſe, commonly called *the King's chapel*, which King Robert de Bruce ſet apart for the maintenance of lepers.

Aire, a town of France, in Proper Gaſcony, of which it is the capital, with a biſhop's ſee. It is ſeated on the river Adour, on the declivity of a mountain. E. Long. 0. 3. N. Lat. 43. 47.

Aire, a ſtrong town in the Netherlands, in the county of Artois, with a caſtle. It was taken by the French in 1710, and was confirmed to them by the treaty of Utrecht. It is ſeated on the river Lis, 22 miles ſouth of Dunkirk, and communicates with St Omer's by a canal cut from the river Aa. E. Long. 2. 31. N. Lat. 50. 38.

AIRESHIRE, a county of Scotland, the capital of which is the town of Aire. It lies eaſtward of the frith of Clyde.

AIRING, a term peculiarly uſed for the exerciſing horſes in the open air. It purifies the blood; purges the body from groſs humours; and, as the jockies expreſs it, teaches the horſe how to make his wind rake equally, and keep time with the other motions of his body. It alſo ſharpens the ſtomach, and keeps the creature hungry; which is a thing of great conſequence, as hunters and racers are very apt to have their ſtomach fall off, either from want of exerciſe, or from the too violent exerciſe which they are often expoſed to. If the horſe be over fat, it is beſt to air him before ſun-riſe, and after ſun-ſetting; and in general, it is allowed by all, that nothing is more beneficial to thoſe creatures than early and late airings. Some of our modern managers, however, diſpute this: they ſay, that the cold of theſe times is too great for the creature; and that if, in particular, he is ſubject to cattarhs, rheums, or the like complaints, the dews and cold fogs, in theſe early and late airings, will be apt to increaſe all thoſe diſorders. Nature, we ſee, alſo points out the ſun-beams as of great uſe to theſe animals; thoſe which are kept hardy and lie out all night, always running to thoſe places where the ſunſhine comes, as ſoon as it appears in a morning. This ſhould ſeem to recommend thoſe airings that are to be made before ſun-ſet, and a little time after ſun-riſe. As to the caution, ſo earneſtly inculcated by Markham, of uſing theſe early and late airings for fat horſes, it is found unneceſſary by many: for they ſay, that the ſame effect may be produced by airings at warmer times, provided only that they are made longer; and that, in general, it is from long airings that we are to expect to bring a horſe to a perfect wind and ſound courage.

AIRY, or Aery, among ſportſmen, a term expreſſing the neſt of a hawk or eagle.

Airy *Triplicity*, among aſtrologers, denotes the three ſigns, gemini, libra, and aquarius.

AISNE, a river of France, which riſes in Champaign, and runs W. by Soiſons in the Iſle of France, falling into the river Oiſe, a little above Campeigne.

AITOCZU, a conſiderable river of Leſſer Aſia, which, ariſing in the mountain Taurus, falls into the ſouth part of the Euxine ſea.

AJUGA, Bugle, a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants. The *Species* enumerated by Linnæus are, 1. The orientalis, with inverted flowers, which is a native of the Eaſt. 2. The genevenſis, with woolly leaves and hairy cups,

* See *Hydroſtatics*, n° 6.

† See *Pneumatics*, n° 6.

is a native of Swiſſerland and of the ſouthern parts of Europe. 3. The pyramidalis, or mountain-bugle, with a ſquare pyramidal ſpike, and blue flowers, is a native of Sweden, Germany, Swiſſerland, and the hilly parts of Britain. Sheep and goats eat it; cows are not fond of it; horſes and ſwine refuſe it. 4. The reptans, common, or paſture bugle, with creeping ſuckers, and blue, red, or white bloſſoms, in long leafy ſpikes, is a native of the ſouthern parts of Europe, and is met with in woods and moiſt places in many parts of Britain. The roots are aſtringent, and ſtrike a black colour with vitriol of iron.

Culture. The firſt ſpecies is propagated by ſowing the ſeeds ſoon after they are ripe, in a pot filled with loamy earth, and placed in a ſhady ſituation till autumn; when it muſt be removed under a frame, and protected from the froſts. In the ſpring, after the plants are come up, let them be tranſlated each into a ſeparate pot, and in ſummer placed under a ſhady ſituation. The other ſorts are eaſily propagated by their ſide-ſhoots, and ſucceed beſt in a moiſt ſhady ſituation.

AIUS LOCUTIUS, the name of a deity to whom the Romans erected an altar.—The words are Latin, and ſignify "a ſpeaking voice."—The following accident gave occaſion to the Romans erecting an altar to the Aius Locutius. One M. Ceditius, a plebeian, acquainted the tribunes, that, in walking the ſtreets by night, he had heard a voice over the temple of Veſta, giving the Romans notice that the Gauls were coming againſt them. This intimation was however neglected; but after the truth was confirmed by the event, Camillus acknowledged this voice to be a new deity, and erected an altar to it under the name of the *Aius Locutius.*

AJUTAGE, or ADJUTAGE, a kind of tube fitted to the mouth of the veſſel through which the water of a fountain is to be played. To the different form and ſtructure of ajutages, is owing the great variety of fountains. See FOUNTAIN.

AIX, a ſmall, but ancient town, in the duchy of Savoy, with the title of a marquiſate. It is ſeated on the lake Bourget, at the foot of a mountain, between Chamberry, Annecy, and Rumilly. There is here a triumphal arch of the ancient Romans, but it is almoſt entirely ruined. The mineral waters bring a great number of ſtrangers to this place. E. Long. 7. 10. N. Lat. 45. 40.

AIX, an ancient city, the capital of Provence, in France. It is an archbiſhopric; and has a parliament, a court of aids, a chamber of accounts, a ſeneſchal's juriſdiction, a generality, and an univerſity. It is a well-built city; and moſt like Paris of any place in the kingdom, as well for the largeneſs of the buildings, as in reſpect of the politeneſs of the inhabitants. It is embelliſhed with abundance of fine fountains and ſeveral beautiful ſquares. The preachers ſquare is on the ſide of a hill; it is about 160 yards in length, and is ſurrounded with trees, and houſes, built with ſtone, three ſtories high. The town-hall is at one end of the city, and is diſtributed into ſeveral fine apartments: the two loweſt are taken up by the board of accounts, and by the ſeneſchal; that above is deſigned for the ſeſſions of parliament. The hall of audience is adorned with the pictures of the kings of France on horſeback. The hotel of the city is a handſome building, but hid by the houſes of the narrow ſtreet in which it is placed. The cathedral church is a Gothic ſtructure. The church of the fathers of the oratory is a handſome building; and not far from thence is the chapel of the blue penitents, which is full of paintings. The convent of preachers is very fine; in their church is a ſilver ſtatue of the Virgin Mary almoſt as big as the life. There are other churches and buildings which contain a great number of rarities. The baths without the city, which were diſcovered not long ſince, have good buildings, raiſed at a vaſt expence, for the accommodation of thoſe that drink the waters. E. Long. 5. 32. N. Lat. 43. 32.

AIX, a ſmall iſland on the coaſt of France, between the iſle of Oleron and the continent. It is twelve miles north-weſt of Rochfort, and twelve ſouth-ſouth-weſt of Rochelle. W. Long. 1. 4. N. Lat. 46. 5.

AIX LA CHAPELLE, a fine city of Germany, in the circle of Weſtphalia and duchy of Juliers. All authors are agreed about its antiquity, it being mentioned in Cæſar's Commentaries and the Annals of Tacitus. The Romans had colonies and fortreſſes there, when they were at war with the Germans; but the mineral waters and the hot bath ſo increaſed its fame, that, in proceſs of time, it was advanced to the privileges of a city, by the name of Aquægranii, that is, the waters of Granius; that which it has now, of *Aix la Chapelle*, was given it by the French, to diſtinguiſh it from the other Aix. It is ſo called, on account of a chapel built by Charlemagne in honour of the Holy Virgin. Having repaired, beautified, and enlarged the city, that was deſtroyed by the Huns, in the reign of Attila, in 451, he made it the uſual place of his reſidence. The town is ſeated in a valley ſurrounded with mountains and woods, and yet the air is very wholeſome. It may be divided into the inward and outward city. The inward is incompaſſed with a wall about three quarters of a league in circumference, having ten gates; and the outward wall, in which there are eleven gates, is about a league and a half in circumference. There are rivulets which run through the town and keep it very clean, turning ſeveral mills; beſides twenty public fountains, and many private ones. They have ſtone-quarries in the neighbourhood, which furniſh the inhabitants with proper materials for their magnificent buildings, of which the ſtadt-houſe and the cathedral are the chief. There are likewiſe thirty parochial or collegiate churches. The market-place is very ſpacious, and the houſes round it ſtately. In the middle, before the ſtadt-houſe, is a fountain of blue ſtones, which throws out water, from ſix pipes, into a marble baſon placed beneath, thirty feet in circumference. On the top of this fountain, is placed the ſtatue of Charlemagne, of braſs, gilt, holding a ſceptre in his right hand, and a globe in his left. The ſtadt-houſe is adorned with the ſtatues of all the emperors ſince Charlemagne. This fabric has three ſtories, the upper of which is one entire room, of 162 feet in length and 60 in breadth. In this the new-elected emperor formerly entertained all the electors of the empire.—Aix la Chapelle is a free imperial city, and changes its magiſtracy every year on the eve of St John Baptiſt. The mayor is in the nomination of the elector palatine, in the quality of the duke of Juliers, as protector of the city. This place is famous for ſeveral councils, and treaties of peace concluded here, particularly thoſe between France and Spain in 1668, and between Great

Britain and France in 1748. The baths have been frequented for ſeveral centuries, of which ſome are hot and ſome are warm. The principal are called the Emperor's Bath, the Bath of St Cornille, the Bath of Roſes, the Bath of St Quirin, the Little Bath, and the Bath of the Poor, beſides ſeveral others. The Emperor's Bath has the name of Charlemagne, who repaired it, and bathed very often in its waters; it is the fineſt and moſt commodious. The Little Bath receives its waters from the Emperor's Bath, and contains three bathing places. That of St Quirin has particular ſprings, but its virtues are the ſame as the former. The Bath of St Cornille is ſo called from the ſign of the houſe where it is ſeated; it is only warm, and is divided into five different baths. The Bath of Roſes, is ſo called from a citizen called John Roſen, who built it. The Poor's Bath is free for every one, and is frequented by crowds of poor people. The men bathe in diſtinct baths from the women, and even private baths are to be had for money. There are two ſprings in the lower part of the city, over one of which there is the ſtatue of the Virgin Mary, and over the other that of Charlemagne. Theſe are for drinking; and there are two pumps to raiſe up the waters. There are ſeveral galleries or piazzas, under which they walk during the time of drinking, to make them paſs the more freely.—About a quarter of a league from Aix, ſtands the abbey of Borzet, or Burſcheit, which is a very magnificent pile of building. It was formerly a monaſtery; but ſerves for a nunnery, whoſe abbeſs is a princeſs of the empire, and lady of Borzet. The baths here are much hotter than at Aix la Chapelle: ſome of them are ſo hot, that they will boil eggs, which is frequently done by poor people; and if you throw in a dog, he will be killed in an inſtant. Therefore, here, as at Aix, the water muſt ſtand till it is of a proper coolneſs. You may bathe here at fourteen different houſes; and there is likewiſe one open bath where the poor may bathe gratis. Near this place are ſeveral mines of lead, coal, and lapis calaminaris. The time of drinking the waters, in the firſt ſeaſon, is from the beginning of May to the middle of June; and, in the latter ſeaſon, from the middle of Auguſt to the latter end of September. They are ſaid to be efficacious in almoſt all tedious chronic diſeaſes, whether internal or of the ſkin, particularly in all diſorders of the nerves, or in all cold diſeaſes, and inward decays.—We need not to mention, that there are all kinds of amuſements common to other places of public reſort; but the ſharpers appear more ſplendid here than elſewhere, aſſuming titles, with an equipage ſuitable to them.—Aix la Chapelle is 36 miles from Liege, and 30 from Cologne. E. Long. 5. 48. N. Lat. 51. 55.

AIZOON, called by Mr Miller *ſempervive;* though the name Aizoon has been by ſome writers applied to the houſe-leek, and alſo to the aloes: A genus of the pentagynia order, belonging to the icoſandria claſs of plants. Linnæus mentions three ſpecies; the canarienſe, hiſpanicum, and paniculatum. The firſt is a native of the Canary iſlands, the ſecond of Spain, and the third of the Cape of Good Hope. They may all be raiſed in this country on hot-beds; but as they are not at all remarkable either for beauty or any other property, we reckon it unneceſſary to take further notice of them.

AKENSIDE (Dr Mark), a celebrated phyſician and poet, born at Newcaſtle upon Tyne in 1721; where, and at the univerſities of Edinburgh and Leyden, he was educated. He was afterward admitted by mandamus to the degree of doctor in phyſic at Cambridge; and was appointed one of the queen's phyſicians, upon the eſtabliſhment of her houſhold. He was poſſeſſed of a fine luxuriant fancy; which, tho' he wrote many pieces, particularly odes, is principally diſplayed in that admired poem, The Pleaſures of Imagination; which, however, he did not live to finiſh according to his plan. He died of a putrid fever in 1770.

AKIBA, a famous rabbin, flouriſhed a little after the deſtruction of Jeruſalem by Titus. He kept the flocks of a rich citizen of Jeruſalem till the 40th year of his age, and then applied himſelf to ſtudy in the academies for 24 years; and was afterwards one of the greateſt maſters in Iſrael, he having 24,000 ſcholars. He declared for the impoſtor Barcochebas, whom he owned for the Meſſiah; and not only anointed him king, but took upon himſelf the office of his maſter of the horſe. The troops which the emperor Hadrian ſent againſt the Jews, who under the conduct of this falſe Meſſiah had committed horrid maſſacres, exterminated this faction. Akiba was taken, and put to death with great cruelty. He lived 120 years; and was buried with with his wife in a cave upon a mountain not far from Tiberias, and his 24,000 ſcholars were buried round about him upon the ſame mountain. It is imagined he invented a ſuppoſititious work under the name of the patriarch Abraham.

AKISSAT, the ancient Thyatira, a city in Natolia, in Aſia, ſituated in a plain 18 miles broad, which produces plenty of cotton and grain. The inhabitants, who are reckoned to be about 5000, are ſaid to be all Mahometans, and not one Chriſtian among them, except a few ſlaves. The houſes are built of nothing but earth or turf dried in the ſun, and are very low and ill contrived: but there are ſix or ſeven moſques, which are all of marble. There are remarkable inſcriptions on marble in ſeveral parts of the town, which are part of the ruins of ancient Thyatira. It is ſeated on the river Hermus, 50 miles from Pergamos. E. Long. 28. 30. N. Lat. 38. 50.

AKOND, in the Perſian affairs, the chief judge in all caſes of contracts and other civil matters. He is at the head of the lawyers, and has his deputies in all courts of the kingdom.

AL, an Arabic particle prefixed to words, and ſignifying much the ſame with the Engliſh particle *the:* Thus they ſay, alkermes, alkoran, &c. *i. e.* the kermes, the koran, &c.

Al, or **Ald**, a Saxon term frequently prefixed to the names of places, denoting their antiquity; as Aldborough, Aldgate, &c.

ALA, a Latin term properly ſignifying a wing; from a reſemblance to which ſeveral other things are called by the ſame name: Thus,

Ala, is a term uſed by botaniſts for the hollow of a ſtalk, which either the leaf, or the pedicle of the leaf, makes with it; or it is that hollow turning, or ſinus, placed between the ſtalk or branch of a plant, and the leaf, whence a new offspring uſually iſſues. Sometimes it is uſed for thoſe parts of leaves otherwiſe called *lobes*, or *wings*.

ALÆ (the plural number) is uſed to ſignify thoſe petals or leaves of papilionaceous flowers, placed between thoſe others which are called the vexillum and carina, and which make the top and bottom of the flowers. Inſtances of flowers of this ſtructure are ſeen in thoſe of peaſe and beans, in which the top leaf or petal is the vexillum, the bottom the carina, and the ſide ones the alæ. See Papilionaceous.

Alæ is alſo uſed for thoſe extremely ſlender and membranaceous parts of ſome ſeeds, which appear as wings placed on them; it likewiſe ſignifies thoſe membranaceous expanſions running along the ſtems of ſome plants, which are therefore called alated ſtalks.

Alæ, in anatomy, a term applied to the lobes of the liver, the cartilages of the noſtril, &c.

Alæ, in the Roman art of war, were the two wings or extreme parts of the army drawn up in order of battle.

ALABA, one of the three ſmalleſt diſtricts of Biſcay in Spain, but pretty fertile in rye, barley, and fruits. There are in it very good mines of iron, and it had formerly the title of a kingdom.

ALABARCHA, in antiquity, a kind of magiſtrate among the Jews of Alexandria, whom the emperors allowed them to elect, for the ſuperintendency of their policy, and to decide differences and diſputes which aroſe among them.

ALABASTER, in natural hiſtory, a genus of foſſils reſembling marble, which are bright, brittle, and do not give fire with ſteel; they ferment with acids, and readily calcine with heat. There are three ſpecies of alabaſter. 1. The ſnow-white ſhining alabaſter, or lygdinum of the ancients, is found in Taurus, in pieces large enough to make diſhes, or the like. It cuts very freely, and is capable of a fine poliſh. 2. The yellowiſh alabaſter, or phengites of Pliny, is found in Greece; and is of a ſoft looſe open texture, pretty heavy, and nearly of the colour of honey. This ſpecies has likewiſe been found in Germany, France, and in Derbyſhire in England. 3. Variegated, yellow, and reddiſh alabaſter. This ſpecies is the common alabaſter of the ancients, and is ſo ſoft that it may be cut with a knife: It is remarkably bright, and almoſt tranſparent; admits of a fine poliſh and conſiſts of large angular ſparry concretions. It is not proof againſt water; it ferments violently with aqua-fortis, and burns to a pale yellow. The colour of this ſpecies is a clear pale yellow reſembling amber, and variegated with undulated veins; ſome of which are pale red, others whitiſh, and others of a pale brown. It was formerly brought from Egypt, but is now to be met with in ſeveral parts of England. The alabaſters are frequently uſed by ſtatuaries for ſmall ſtatues, vaſes, and columns. After being calcined and mixed with water, they may be caſt in any mould like plaſter of Paris. See Gypsum.

Alabaster, in antiquity, a term not only uſed for a box of precious ointment; but alſo for a liquid meaſure, containing ten ounces of wine, or nine of oil.

ALABASTRUM dendroide, a kind of laminated alabaſter, beautifully variegated with the figures of ſhrubs, trees, &c. found in great abundance in the province of Hohenſtein.

ALADINISTS, a ſect among the Mahometans, anſwering to free-thinkers among us.

ALADULIA, a conſiderable province of Turky in Aſia, in that part called Natolia, between the mountains of Antitaurus, which ſeparate it from Amaſia on the north, and from Carimania on the weſt. It has the Mediterranean ſea on the ſouth; and the Euphrates, or Frat, on the eaſt, which divides it from Diarbeker. It comprehends the Leſſer Armenia of the ancients, and the eaſt part of Cilicia. Formerly it had kings of its own; but the head of the laſt king was cut off by Selim I. emperor of the Turks, who had conquered the country. It is now divided into two parts: the north, comprehended between Taurus, Antitaurus, and the Euphrates, is a beglerbeglic, which bears the name of Maraſh, the capital town; and the ſouth, ſeated between mount Taurus and the Mediterranean, is united to the beglerbeglic of Aleppo. The country is rough, ragged, and mountainous; yet there are good paſtures, and plenty of horſes and camels. The people are hardy and thieviſh. The capital is Malatigah.

ALAIN (Chartier), ſecretary to Charles VII. king of France, born in the year 1386. He was the author of ſeveral works in proſe and verſe; but his moſt famous performance was his Chronicle of King Charles VII. Bernard de Girard, in his preface to the Hiſtory of France, ſtyles him "an excellent hiſtorian, who has given an account of all the affairs, particulars, ceremonies, ſpeeches, anſwers, and circumſtances, at which he was preſent himſelf, or had information of." Giles Coroxet tells us, that Margaret, daughter to the king of Scotland, and wife to the dauphin, paſſing once through a hall where Alain lay aſleep, ſhe ſtopped and kiſſed him before all the company who attended: ſome of them telling her, that it was ſtrange ſhe ſhould kiſs a man who had ſo few charms in his perſon, ſhe replied, "I did not kiſs the man, but the mouth from whence proceed ſo many excellent ſayings, ſo many wiſe diſcourſes, and ſo many elegant expreſſions." Mr Fontenelle, among his Dialogues of the Dead, has one upon this incident, between the princeſs Margaret and Plato. Mr Paſquier compares Alain to Seneca, on account of the great number of beautiful ſentences interſperſed throughout his writings.

ALAIS, a conſiderable town of France, in the province of Languedoc, ſituated on the river Gardon, at the foot of the Cevennes. The Jeſuits had a college in this place; and a fort was built here in 1689. It is 34 miles north of Montpellier, and 340 from Paris. E. Lon. 4. 20. N. Lat. 44. 8.

ALALCOMENIUS, in Grecian antiquity, the Bœotian name of the month called, by the Athenians, *Mæmacterion.*

ALAMANNI (Lewis) was born at Florence, of a noble family, on the 28th of October, 1495. He was obliged to fly his country for a conſpiracy againſt Julius de Medici, who was ſoon after choſen pope under the name of Clement VII. During this voluntary baniſhment, he went into France; where Francis I. from a love to his genius and merit, became his patron. This prince employed him in ſeveral important affairs, and honoured him with the collar of the order of St. Michael. About the year 1540, he was admitted a member of the Inflammati, an academy newly erected at Padua, chiefly by Daniel Barbaro and Ugolin Martelli. After the death of Francis, Henry duke of Orleans, who ſucceeded him in 1537, ſhewed no leſs favour to Alamanni; and in the year 1551, ſent him as his ambaſſador to Genoa: this was his laſt journey to Italy; and being returned to France, he died at Amboiſe on the 18th of April 1556, being in the 61st year of his age. He left many beautiful poems, and other valuable performances, in the Italian language. We have alſo ſome notes of his upon Homer's Iliad and Odyſſey; thoſe upon the Iliad were printed in the Cambridge edition of Homer in 1689, and Joſhua Barnes has alſo inſerted them in his fine edition of Homer in 1711.

ALAMODALITY, in a general ſenſe, is the accommodating a perſon's behaviour, dreſs, and actions, to the prevailing taſte of the country or times in which he lives.

Alamodality of writing, is defined the accommodation of mental productions, both as to the choice of ſubject and the manner of treating it, to the genius or taſte of the times, in order to render them more acceptable to the readers.

ALAMODE, a phraſe originally French, importing a thing to be in the faſhion or mode. The phraſe has been adopted not only into ſeveral of the living languages, as the Engliſh and High-Dutch, but ſome have even taken it into the Latin. Hence we meet with *Alamodicus* and *Alamodalitas*.

Alamode, in commerce, a thin gloſſy black ſilk, chiefly uſed for womens hoods and mens mourning ſcarfs.

ALAN (Cardinal William), was born at Roſſal in Lancaſhire, in the year 1532. He went to Oxford at the age of 15, and in 1550 was elected fellow of Oriel college. In 1556, being then only 24 years old, he was choſen principal of St Mary's hall, and one of the proctors of the univerſity. In 1558 he was made canon of York; but, upon queen Elizabeth's acceſſion to the throne, he left England, and ſettled at Louvain in an Engliſh college, of which he became the chief ſupport. In 1565 he viſited his native country; but, on account of his extreme activity in the propagation of the Roman-catholic religion, he was obliged to fly the kingdom in 1568. He went firſt to Mechlin; and then to Doway, where he was made doctor of divinity. Soon after, he was appointed canon of Cambray, and then canon of Rheims. He was created cardinal on the 28th of July, 1587, by the title of *St Martin in Montibus;* and obtained from the king of Spain a rich abbey in the kingdom of Naples, and afterwards the biſhoprick of Mechlin. It is ſuppoſed to have been by the advice and inſtigation of this prieſt, that Philip II. attempted to invade England. He died on the 20th of October 1594, aged 63; and was buried in the Engliſh college at Rome. He was a man of conſiderable learning, and an elegant writer. He wrote many books in defence of the Romiſh religion. The moſt remarkable are, 1. *A defence of the 12 martyrs in one year.* Tho. Alfield was hanged for bringing, and publiſhing, this and other of Alan's works, into England, in the year 1584. 2. *A declaration of the ſentence of Sextus V.* &c. A work intended to explain the pope's bull for the excommunication of queen Elizabeth, and to exhort the people of England to take up arms in favour of the Spaniards. Many thouſand copies of this book, printed at Antwerp, were put on board the Armada; but the enterpriſe failing, they were afterwards deſtroyed. 3. *Of the worſhip due to ſaints and their relicts,* 1583. This treatiſe was anſwered by lord Burleigh, and is eſteemed the moſt elegant of the cardinal's writings.

ALAND, an iſland of the Baltic ſea, between Sweden and Finland, ſubject to the former. It lies between 17 and 19 degrees of E. Long. and between 59 and 61 degrees of Lat. at the entrance of the gulph of Bothnia.

ALANORARIUS, in our old cuſtoms, was a keeper of ſpaniels, ſetting-dogs, &c. for the uſe of ſportſmen. The word is derived from *alan*, a gothic term for a *grey-hound*.

ALAQUECA, a ſtone brought from the Eaſt Indies in ſmall gloſſy fragments, ſaid to ſtop hæmorrhages by external application.

ALARAF, in the Mahometan theology, the partition wall that ſeparates heaven from hell. The word is plural, and properly written *al araf;* in the ſingular it is written *al arf.* It is derived from the Arabic verb *arafa*, to diſtinguiſh. Al araf gives the denomination to the ſeventh chapter of the alcoran, wherein mention is made of this wall. Mahomet ſeems to have copied his al araf, either from the great gulf of ſeparation mentioned in the New Teſtament, or from the Jewiſh writers, who alſo ſpeak of a thin wall dividing heaven from hell. Mahometan writers differ extremely as to the perſons who are to be found on al araf. Some take it for a ſort of limbus for the patriarchs, prophets, &c. others place here ſuch whoſe good and evil works ſo exactly balance each other, that they deſerve neither reward nor puniſhment. Others imagine this intermediate ſpace to be poſſeſſed by thoſe who, going to war without their parents leave, and ſuffering martyrdom there, are excluded paradiſe for their diſobedience, yet eſcape hell becauſe they are martyrs.

ALARBES, or Alarabes, a name given to thoſe Arabians who live in tents, and diſtinguiſh themſelves by their dreſs from the others who live in towns.

ALARES, in Roman antiquity, an epithet given to the cavalry, on account of their being placed in the two wings of the army.

ALARM, in the military art, denotes either the apprehenſion of being ſuddenly attacked; or the notice thereof, ſignified by firing a cannon, firelock, or the like.—Falſe alarms are frequently made uſe of to harraſs the enemy, by keeping them conſtantly under arms. Sometimes alſo this method is taken to try the vigilance of the piquet-guard, and what might be expected from them in caſe of real danger.

Alarm-*Bell*, that rung upon any ſudden emergency, as a fire, mutiny, or the like.

Alarm-*Poſt*, or alarm-*place*, the ground for drawing up each regiment in caſe of an alarm. This is otherwiſe called *the rendezvous*.

Alarm, in fencing, is the ſame with what is otherwiſe called an appeal, or challenge.

ALASCANI, in church-hiſtory, a ſect of Antilutherans, whoſe diſtinguiſhing tenet, beſides their denying baptiſm, is ſaid to have been this, that the words, *This is my body*, in the inſtitution of the euchariſt, are not to be underſtood of the bread, but of the whole action, or celebration of the ſupper. They are ſaid to have taken the name from one Joannes a Laſco, a Poliſh baron, ſuperintendant of the church of that country, laſco || lauda.

in England. See the next article.

ALASCO (John), a Poliſh nobleman of the 16th century, who, imbibing the reformed opinions, was expelled his country, and became preacher to a Proteſtant congregation at Embden; but foreſeeing perſecution there, came to England about the year 1551, while the reformation was carrying on under Edward the VI. The publication of the Interim driving the Proteſtants to ſuch places as afforded them toleration, 380 were naturalized here, and obtained a charter of incorporation, by which they were erected into an eccleſiaſtical eſtabliſhment, independent on the church of England. The Auguſtine friars church was granted them, with the revenues, for the maintainance of Alaſco as ſuperintendant, with four aſſiſtant miniſters, who were to be approved by the king: and this congregation lived undiſturbed until the acceſſion of Queen Mary, when they were all ſent away. They were kindly received and permitted to ſettle at Embden; and Alaſco at laſt, after an abſence of twenty years, by the favour of Sigiſmund returned to his own country, where he died in 1560. Alaſco was much eſteemed by Eraſmus, and the hiſtorians of his time ſpeak greatly in his praiſe: we have of his writing, *De Cœna Domini liber; Epiſtola continens ſummam Controverſiæ de Cœna Domini, &c.* He had ſome particular tenets; and his followers are called *Alaſcani* in church-hiſtory. See the preceding article.

ALATAMAHA, a large river of North America, which, riſing in the Apalachian mountains, runs ſouth-eaſt through the province of Georgia, and falls into the Atlantic ocean, below the town of Frederica.

ALATED ANIMALS, ſuch as are furniſhed with wings.

ALATED *Leaves*, in botany, ſuch as are compoſed of ſeveral pinnated ones. See PINNATED.

ALATERNOIDES, in botany, a ſynonime of a ſpecies of the myrica. See MYRICA.

ALATERNUS, in botany, the trivial name of a ſpecies of the rhamnus. See RHAMNUS.

ALAVA, a diſtrict of Spain, about 20 miles in length, and 17 in breadth, containing very good iron mines. Victoria is the capital town.

ALAUDA, or LARK, in ornithology, a genus of birds of the order of paſſeres; the characters of which are theſe: The beak is cylindrical, ſubulated, ſtraight; and the two mandibles or chaps are of equal ſize. The tongue is bifid, and the hinder claw is ſtraight, and longer than the toe. There are nine ſpecies of the alauda.

ark,
I, fig. 8.

1. The arvenſis, or common ſky-lark. This and the wood-lark are the only birds that ſing as they fly; this raiſing its note as it ſoars, and lowering it till it quite dies away as it deſcends. It will often ſoar to ſuch a height, that we are charmed with the muſic when we loſe ſight of the ſongſter; it alſo begins its ſong before the earlieſt dawn. Milton, in his Allegro, moſt beautifully expreſſes theſe circumſtances; and biſhop Newton obſerves, that the beautiful ſcene that Milton exhibits of rural cheerfulneſs, at the ſame time gives us a fine picture of the regularity of his life, and the innocency of his own mind: thus he deſcribes himſelf as in a ſituation

> To hear the lark begin his flight,
> And ſinging ſtartle the dull night,
> From his watch-tow'r in the ſkies,
> Till the dappled dawn doth riſe.

Alauda, or lark.

It continues its harmony ſeveral months, beginning early in the ſpring, on pairing. In the winter they aſſemble in vaſt flocks, grow very fat, and are taken in great numbers for our tables. They build their neſt on the ground, beneath ſome clod, forming it of hay, dry fibres, &c. and lay four or five eggs.—The place theſe birds are taken in the greateſt quantity, is the neighbourhood of Dunſtable: the ſeaſon begins about the 14th of September, and ends the 25th of February; and during that ſpace, about 4000 dozen are caught, which ſupply the markets of the metropolis. Thoſe caught in the day are taken in clap-nets of fifteen yards length, and two and a half in breadth; and are enticed within their reach by means of bits of looking-glaſs, fixed in a piece of wood, and placed in the middle of the nets, which are put in a quick whirling motion by a ſtring the larker commands; he alſo makes uſe of a decoy-lark. Theſe nets are uſed only till the 14th November: for the larks will not *dare*, or frolic in the air, except in fine ſunny weather; and of courſe cannot be inveigled into the ſnare. When the weather grows gloomy, the larker changes his engine, and makes uſe of a trammel net, twenty-ſeven or twenty-eight feet long, and five broad; which is put on two poles, eighteen feet long, and carried by men under each arm, who paſs over the fields and quarter the ground as a ſetting dog: when they hear or feel a lark hit the net, they drop it down, and ſo the birds are taken.

Tit-lark.

—2. The pratenſis, or tit-lark, has the two outward feathers of the wing edged with white, and frequents the meadows. It is found frequently in low marſhy grounds: like other larks, it builds its neſt among the graſs, and lays five or ſix eggs. Like the wood-lark, it ſits on trees; and has a moſt remarkable fine note, ſinging in all ſituations, on trees, on the ground, while it is ſporting in the air, and particularly in its deſcent. This bird, with many others, ſuch as the thruſh, blackbird, willow-wren, &c. become ſilent about midſummer, and reſume their notes in September: hence the interval is the moſt mute of the year's three vocal ſeaſons, ſpring, ſummer, and autumn. Perhaps the birds are induced to ſing again as the autumnal temperament reſembles the vernal.

Wood-lark, &c.

—3. The arborea, or wood-lark, is a native of Europe, and is diſtinguiſhed by an annular white fillet about the head. It is inferior in ſize to the ſky-lark, and is of a ſhorter thicker form; the colours are paler, and its note is leſs ſonorous and leſs varied, though not leſs ſweet. It perches on trees, and whiſtles like the black-bird. It will ſing in the night; and, like the common lark, will ſing as it flies. It builds on the ground, and makes its neſt on the outſide with moſs, within of dried bents, lined with a few hairs. It lays five eggs, duſky and blotched with deep brown marks, darkeſt at the thicker end. The males of this and the laſt are known from the females by their ſuperior ſize. But this ſpecies is not near ſo numerous as that of the common kind.—4. The campeſtris, has one half of its chief feathers of the wings brown, except two in the middle which are white, and the throat and breaſt are yellowiſh.—5. The trivialis, whoſe chief feathers on the tail are brown, only half of the outermoſt is white, and the ſecond is white at the end, in the ſhape of a wedge; there is likewiſe a double whitiſh line on the wings. It is a native of Sweden, and perches on the tops of trees.—6. The criſtata: the chief tail-

tail-feathers are black, but the two outermoſt are edged with white, and the head is creſted. It is a native of Europe.—7. The ſpinoletta: the chief tail-feathers are black, only the outermoſt two are obliquely half white. It is a native of Italy.—8. The alpeſtris: the chief wing-feathers are half white, the throat yellow, and it has a black ſtreak under the eyes and on the breaſt. It is a native of North America.—9. The magna, is yellow on the belly, with a crooked black ſtreak on the breaſt, and the three ſide-feathers of the tail white. It is a native of Africa and America.

ALAUTA, a conſiderable river of Turkey in Europe, which, after watering the north-eaſt part of Tranſylvania and part of Wallachia, falls into the Danube almoſt oppoſite to Nicopolis.

ALB, or ALBE, in the Romiſh church, a veſtment of white linen hanging down to the feet, and anſwering to the ſurplice of the Engliſh clergy. In the ancient church, it was uſual, with thoſe newly baptized, to wear an alb, or white veſtment; and hence the Sunday after Eaſter was called *dominica in albis*, on account of the albs worn by thoſe baptized on eaſter-day.

ALB is alſo a name of a Turkiſh coin, otherwiſe called *aſper*. See ASPER.

ALBA FIRMA, or ALBUM, in our old cuſtoms, denoted rent paid in ſilver, and not in corn, which was called *black-mail*.

ALBA *Terra*, one of the numerous names for the philoſopher's ſtone.

ALBA, (anc. geog.) a town of the Marſi in Italy, ſituated on the north-ſide of the Lacus Fucinus, ſtill retaining its name. The inhabitants were called *Albani*, and *Albenſes*.

ALBA HELVIORUM, or *Albauguſta*, in ancient geography, (Pliny, Ptolemy); afterwards called *Vivarium;* now *Viviers*, in the ſouth-eaſt of Languedoc, on the Rhone. In the lower age the inhabitants were called *Albenſes*, and their city, *Civitas Albenſium*, in the Notitia Galliæ. E. long. 4. 45. lat. 44. 50.

ALBA JULIA, (anc. geog.) now *Weiſſenburg*, a town of Tranſylvania, on the river Mariſius, or Meriſch, to the weſt of Hermanſtat, ſuppoſed to be called *Alba Julia*, after Julia Domna the mother of Caracalla. There are, however, ſeveral inſcriptions found at or near Weiſſenburg, which bear COL. APUL. that is *Colonia Apulenſis*, without the leaſt mention of *Alba Julia*, though inſcribed after Caracalla's time. Add, that Ulpian, reciting the colonies of Dacia, calls this colony *Apulenſis*, and neither *Alba* nor *Julia*. Whence there is a ſuſpicion, that *Alba Julia* is a corruption of *Apulum*. It was alſo called *Apulum Auguſtum*. E. Long. 25. 0. Lat. 46. 46.

ALBA LONGA, (anc. geog.) a colony from Lavinium, in Latium, eſtabliſhed by Aſcanius the ſon of Æneas, at the foot of the Mons Albanus: called *Alba*, from a white ſow found by Æneas, which farrowed 30 white pigs on that ſpot; which circumſtance was interpreted to portend the building of a city there in 30 years after, (Propertius). The epithet *Longa* was added on account of its length. It was the royal reſidence, till the building of Rome, as was foretold by Anchiſes, (Virgil); was deſtroyed by Tullus Hoſtilius, all but the fane or temple; and the inhabitants were tranſplanted to Rome, (Strabo.)

ALBA POMPEIA, (anc. geog.) on the river Ceba, now *Ceva*, in Liguria, the birth-place of the emperor Pertinax; a colony either eſtabliſhed at firſt by Pompey, or re-eſtabliſhed by him after having been before ſettled by Scipio. The inhabitants were called *Alpenſes Pompeiani*. At this day the town is ſimply called *Alba*, without any epithet.

ALBANA, (anc. geog.) a ſea-port town of Albania, on the Caſpian ſea, between the rivers Caſius and Albanus; now called *Bachu*, or *Bachy*, giving name to the Caſpian ſea, *viz. Mar de Bahu*. E. Long. 49. 0. Lat. 40. 0.

ALBAHURIM, *figura ſexdecim laterum*, a figure of great importance according to aſtrological phyſicians, who built their prognoſtics on it.

ALBANENSES, in church-hiſtory, the ſame with Albigenſes, according to ſome; according to others, different. Thoſe, however, who are for diſtinguiſhing them, attribute the ſame opinions to both; only making the Abanenſes to have been prior in reſpect of time, as having been found towards the cloſe of the eighth century; whereas the Albigenſes appeared not till the twelfth. See ALBIGENSES.

ALBANI, in Roman antiquity, a college of the *ſalii*, or prieſts of Mars; ſo called from mount Albanus, the place of their reſidence. See SALII.

ALBANIA, a province of Turkey in Europe, on the gulph of Venice, bounded by Livadia on the ſouth, by Theſſaly and Macedonia on the eaſt, and on the north by Boſnia and Dalmatia. The people are ſtrong, large, courageous, and good horſemen; but are ſaid to be of a thieviſh diſpoſition: the grand ſeignior procures excellent ſoldiers from hence, particularly cavalry, known by the name of *Arnauts*. There are ſeveral large towns in this province; and the inhabitants are almoſt all Chriſtians of the Greek church, and deſcended from the ancient Scythians. Formerly it was part of the kingdom of Macedonia. Their chief manufacture is carpets. The principal places are Durazzo, Velona, Antivari, Scutari, Croya, Aleſſo, Dibra, Dolcigno, and Albanapoli. Long. from 28° to 31° E. Lat. from 39° to 43° N.

ALBANIA, a country of Aſia, bounded on the weſt by Iberia; on the eaſt by the Caſpian ſea; on the north by mount Caucaſus; on the ſouth by Armenia, and the river *Cyrus*, now *Kur;* which, ſpringing from the *Moſchian* mountains that ſeparate Colchis from Armenia, and watering the country of *Mokan*, receives the Aragus and Araxes, and falls into the Caſpian ſea within a ſmall diſtance from the ſouthern borders of this country.—The whole country formerly called *Albania*, now goes under the names of *Shirwan* and *Eaſt-Georgia*, and is extremely fruitful and pleaſant. The ancient hiſtorians take notice of the Albanian men being tall, ſtrong-bodied, and, generally ſpeaking, of a very graceful appearance; far excelling all other nations in comelineſs, as well as ſtature. Modern travellers take no notice of the appearance of the men; but extol the beauty of the women, which ſeems to be unnoticed by the ancients. The Albanians were anciently an independent and pretty powerful people; but we find no mention made of their kings till the reign of Alexander the Great, to whom the king of Albania is ſaid to have preſented a dog of an extraordinary fierceneſs and ſize.—It does not appear that the Albanians were ever conquered by the Romans, even when their power was at its greateſt height; though, when they ventured to engage in war with that powerful empire, they were always defeated, as might naturally be expected.

ALBANO (Franceſco), a celebrated hiſtory and landſcape painter, born at Bologna in 1578, who ſtudied firſt in the ſchool of Dennis Calvert at the ſame time with Guido, but placed himſelf afterward under the direction of the Caracci, and completed his ſtudies at Rome. For the moſt part he painted in a ſmall ſize, and choſe his ſubjects from poetic or fabulous hiſtory: he was fond of introducing cupids, in a variety of actions and attitudes. It has been objected to him, that he was apt to preſerve too great a ſimilitude in his figures, and in the air of his heads; which aroſe from his painting after his wife and children as models. The ſtyle of his landſcape is very agreeable, as his ſcenes and objects were ſtudied from nature. In the king of Sardinia's palace at Turin, are the Four Elements painted by him, which are of extraordinary beauty and well preſerved. He died in 1660. He had a brother Giovanni Battiſta Albano, who was his diſciple, and became an admirable painter in his ſtyle: he died in 1668.

ALBANO, a town of Italy, on a lake of the ſame name, in the Campagnia of Rome, with a biſhop's ſee. The territory about it produces the beſt wine in all this country; and a great many noblemen have gardens here, where they paſs the ſummer. It is near the Caſtle Gandolfo, 15 miles S. E. of Rome. E. long. 13. 10. N. lat. 41. 43. There is likewiſe another town of the ſame name in the Baſilicate of the kingdom of Naples, remarkable for the fertility of the ſurrounding territory, and for the nobility of the inhabitants.

ALBAN (St) is ſaid to have been the firſt perſon who ſuffered martyrdom for Chriſtianity in Britain; he is therefore uſually ſtyled the protomartyr of this iſland. He was born at Verulam, and flouriſhed towards the end of the third century. In his youth he took a journey to Rome, in company with Amphibalus a monk of Caerleon, and ſerved ſeven years as a ſoldier under the emperor Diocleſian. At his return home, he ſettled in Verulam; and, through the example and inſtructions of Amphibalus, renounced the errors of paganiſm, in which he had been educated, and became a convert to the Chriſtian religion. It is generally agreed, that Alban ſuffered martyrdom during the great perſecution under the reign of Diocleſian; but authors differ as to the year when it happened: Bede and others fix it in 286; ſome refer it to the year 296; but Uſſerius reckons it amongſt the events of 303. The ſtory and circumſtances relating to his martyrdom, according to Bede, are as follows. Being yet a pagan, (or at leaſt it not being known that he was a Chriſtian), he entertained Amphibalus in his houſe. The Roman governor being informed thereof, ſent a party of ſoldiers to apprehend Amphibalus; but Alban, putting on the habit of his gueſt, preſented himſelf in his ſtead, and was carried before that magiſtrate. The governor having aſked him of what family he was? Alban replied, "To what purpoſe do you inquire of my family? if you would know my religion, I am a Chriſtian." Then being aſked his name, he anſwered, "My name is Alban; and I worſhip the only true and living God, who created all things." The magiſtrate replied, "If you would enjoy the happineſs of eternal life, delay not to ſacrifice to the great gods." Alban anſwered, "The ſacrifices you offer are made to devils; neither can they help the needy, or grant the petitions of their votaries." His behaviour ſo enraged the governor, that he ordered him immediately to be beheaded. In his way to execution, he was ſtopped by a river, over which was a bridge ſo thronged with ſpectators that it was impoſſible to croſs it; the ſaint, as we are told, lifted up his eyes to heaven, and the ſtream was miraculouſly divided, and afforded a paſſage for himſelf and a thouſand more perſons. Bede does not indeed give us the name of this river; but, notwithſtanding this omiſſion, the miracle, we ſuppoſe, will not be the leſs believed. This wonderful event converted the executioner upon the ſpot, who threw away his drawn ſword, and, falling at St Alban's feet, deſired he might have the honour to die with him. This ſudden converſion of the headſman occaſioning a delay in the execution, till another perſon could be got to perform the office, St Alban walked up to a neighbouring hill, where he prayed for water to quench his thirſt, and a fountain of water ſprung up under his feet: here he was beheaded, on the 23d of June. The executioner is ſaid to have been a ſignal example of divine vengeance; for as ſoon as he gave the fatal ſtroke, his eyes dropt out of his head. We may ſee the opinion of Mr Milton in regard to this narrative, in his hiſtory of England: his words are theſe, ſpeaking of St Alban, "The ſtory of whoſe martyrdom, ſoiled and worſe martyred with the fabling zeal of ſome idle fancies, more fond of miracles than apprehenſive of the truth, deſerves no longer digreſſion." Between 4 or 500 years after St Alban's death, Offa, king of the Mercians, built a very large and ſtately monaſtery to his memory; and the town of St Alban's in Hertfordſhire takes its name from our protomartyr.

ALBANS (St), a market-town of Hertfordſhire, is a very great thoroughfare, accommodated with good inns, on the north-weſt road from London, at the diſtance of twenty-one miles. This town ſends two members to parliament, gives the title of *duke* to the noble family of Beauclerc, and has one of the beſt markets for wheat in England. St Alban's is ſeated near the ruins of an ancient Roman city, by Tacitus called *Verolam*; and by the Saxons *Watlingceſter*, becauſe it is ſeated on the road called *Watlingſtreet*. Nothing now remains of Verolam, but the ruins of old walls; in the fields adjacent to which they continue to find Roman coins, as they formerly found teſſellated pavements. In memory of St Alban, Offa, king of the Mercians, *anno* 795, erected an abbey, calling it *St Alban's*; and near it the town of the ſame name was afterwards built. The church of the abbey is remaining to this day: time and the weather have made it look like ſtone on the outſide; but if you break a bit off, the redneſs of the brick immediately appears. When the monaſteries were diſſolved, the townſmen paid £400 to prevent its being levelled with the ground, and have ſince converted it into a pariſh-church, which, for its largeneſs, beauty, and antiquity, claims a particular regard. It had a very noble font of ſolid braſs, in which the children of the kings of Scotland were uſed to be baptized; and was brought from Edinburgh, by Sir Philip Lea, when that city was in flames; but in the times of the late civil wars, it was taken away. Not many years ſince, a tomb was diſcovered in this church, ſaid to be that of Humphrey duke of Glouceſter: when the leaden coffin was opened, the body was pretty entire, being preſerved in a ſort of pickle. There was a ſtately croſs in the middle of the town, as there were in many other places where queen Eleanor's body reſted when it was brought out of the north for interment at Weſtminſter; but it has been demoliſhed, as ſome ſay, by the inhabitants. The market-days are Wedneſdays and Saturdays. W. Long. 0. 12. N. Lat. 51. 44.

ALBANUS MONS, (anc. geog.) now called *Mont Albano*, 16 miles from Rome, near where Alba Longa ſtood.

Albanus Mons, (anc. geog.) to the north of Iſtria, called *Albius* by Strabo; the extremity of the Alps, which, together with the mountains to the eaſt, joining it, called *Montes Bebii*, ſeparates the farther Liburnia and Dalmatia from Pannonia.

ALBA REGALIS. See Stul Weissenburgh.

ALBANY, a fortreſs belonging to the Britiſh, ſeated on the S. W. of Hudſon's bay. W. long. 84. 20. N. lat. 53. 20.

Albany, a town of North America, the capital of one of the ten counties of the province of New-York, which goes by the ſame name, is a well built place, conſidering the country. Here the ſachems, or the kings of the Five Nations of Iroquois, met the governors of the Britiſh plantations, when they entered into any treaty with them. W. Long. 44. 29. N. Lat. 42. 30.

ALBARAZIN, a ſtrong town, and one of the moſt ancient of the kingdom of Arragon in Spain. It is ſeated upon an eminence, near the river Guadelquivir, a little below its ſource, and on the frontiers of Valencia and New Caſtile. It is the ſeat of a biſhop, and produces the beſt wool in all Arragon. It is about 100 miles eaſt of Madrid. E. Long. 2. 10. N. Lat. 40. 32.

ALBARII, in antiquity, properly denoted thoſe who gave the whitening to earthen veſſels, &c. In which ſenſe they ſtood contradiſtinguiſhed from *Dealbatores*, who whitened walls.

ALBARIUM opus, in the ancient building, the incruſtation or covering of the roofs of houſes with white plaſter, made of mere lime. This is otherwiſe called *opus album*. It differs from *Tectorium*, which is a common name given to all roofing or ceiling, including even that formed of lime and ſand, or lime and marble; whereas *Albarium* was reſtrained to that made of lime alone.

ALBATI equi, an appellation given to ſuch horſes, in the games of the ancient circus, as wore white furniture, in contradiſtinction from the *Veneti*, *Praſini*, and *Ruſſeti*. See Veneti, Prasini, &c.

ALBATROSS, in ornithology, a ſpecies of the diomedea. See Diomedea.

ALBAZIN, a town of Greater Tartary, with a ſtrong caſtle: It is ſituated upon the river Amur, or Yamour, and belongs to the Muſcovites. E. long. 103. 30. N. lat. 54. 0.

ALBE, a ſmall piece of money, current in Germany, worth only a French ſol and ſeven deniers.

ALBEMARLE, or Aumarle, a town of France, in Upper Normandy, and in the territory of Caux, from whence the noble family of Keppel takes the title of *Earl*. The ſerges of this town are in high eſteem. It is ſeated on the declivity of a hill, on the confines of Picardy, 35 miles N. E. of Rouen, and 70 N. W. of Paris. E. Long. 2. 21. N. Lat. 49. 50.

Albemarle, the moſt northern part of the province of North Carolina, in America.

ALBENGUA, a town of Italy, in the territory of Genoa. It is the ſee of a biſhop; and is a very ancient handſome town, but not well peopled on account of the inſalubrity of the air. However, it is ſeated in a very beautiful plain, which is well cultivated; and the outſide of the town is ſurrounded with olive-trees. It is a ſea-port, about 38 miles S. W. of Genoa. E. Long. 8. 13. N. Lat. 44. 4.

ALBERONI (Julius), the ſon of a poor gardener, in the ſuburbs of Placentia, born in 1664; who, by his great abilities and good fortune, roſe from this low original, to the employment of firſt miniſter of ſtate at the court of Spain, and to the dignity of cardinal. He rouſed that kingdom out of the lethargy it had ſunk into for a century paſt; awakened the attention, and raiſed the aſtoniſhment, of all Europe, by his projects; one of which was to ſet the Pretender on the throne of Great Britain. He was at length deprived of his employment, and baniſhed to Rome: he died in 1752, at the great age of 89. His *Teſtament Politique*, collected from his memoirs and letters, was publiſhed at Lauſanne in 1753.

ALBERTI (Leone Battiſta), was deſcended from a noble family in Florence; and was perfectly acquainted with painting, ſculpture, and architecture. He wrote of all three in Latin; but his ſtudies did not permit him to leave any thing conſiderable behind him in painting. He was employed by Pope Nicholas V. in his buildings, which he executed in a beautiful manner; and his work on architecture, which conſiſts of ten books, is greatly eſteemed. He alſo wrote ſome treatiſes of morality, and a piece on arithmetic. He died in 1485.

ALBERTUS (Magnus), a Dominican friar, and afterwards archbiſhop of Ratiſbon, was one of the moſt learned men and moſt famous doctors of the 13th century. He was by the ignorant charged with being a magician, and making a machine reſembling a man, which they fooliſhly imagined explained all the difficulties he propoſed to it. He died at Cologne, November 15. 1280. His works were printed at Lyons, in 1651, in 21 volumes in folio.

ALBERTUS, a gold coin, worth about 14 French livres: it was coined during the adminiſtration of Albertus archduke of Auſtria.

ALBESIA, in antiquity, a kind of ſhields otherwiſe called *Decumana*. See Decumana.

ALBI, a city of France, the capital of the Albigeois, in Languedoc, and the ſee of an archbiſhop. The cathedral is dedicated to St Cecilia, and has one of the fineſt choirs in the kingdom. Here is a very valuable ſilver ſhrine, of exquiſite workmanſhip, of the Moſaic kind: it contains the reliques of St Clair, the firſt biſhop of this city. The chapel of this pretended ſaint is magnificent, and adorned with paintings. The Lice is a fine large walk without the city: what diſtinguiſhes this from all others, is a terras above a deep mall, which ſerves inſtead of a foſſe; it is bordered with two rows of very fine trees, which are kept in excellent order. There are four gates, through which you may view all the beauties of a delightful plain. At one end of this is the convent of the Dominicans. The archbiſhop's palace is very beautiful. The river waſhes its walls, and ſerves both for an ornament and defence. This city is ſeated on the river Tarn, 35 miles north-by-weſt of Toulouſe, and 250 ſouth of Paris. E. Long. 0. 52. N. Lat. 43. 56.

The Albigeois is a ſmall territory about 27 miles in length, and 20 in breadth, abounding in corn, woad, grapes, ſaffron, plums, and ſheep; and the inhabitants drive a great trade in dried prunes, crapes, a coarſe ſort of cloth, and wines of Gaillac. Theſe wines are the only ſorts hereabouts that are fit for exportation: they are carried down to Bourdeaux, and generally ſold to the Britiſh. They have likewiſe ſeveral coal-mines.

ALBIGENSES, in church-hiſtory, a ſect or party of reformers, about Toulouſe and the Albigeois in Languedoc, who ſprung up in the 12th century, and diſtinguiſhed themſelves by their oppoſition to the diſcipline and ceremonies of the Romiſh church.

This ſect had their name, it is ſuppoſed, either by reaſon there were great numbers of them in the dioceſe of Albi, or becauſe they were condemned by a council held in that city. In effect, it does not appear that they were known by this name, before the holding of that council. The *Albigenſes* were alſo called *Albiani*, *Albigeſei*, *Albii*, and *Albanenſes*, though ſome diſtinguiſh theſe laſt from them. Other names given to them are, *Henricians*, *Abelardiſts*, *Bulgarians*, &c. ſome on account of the qualities they aſſumed; others on that of the country from whence it is pretended they were derived; and others on account of perſons of note who adopted their cauſe, as Peter de Brius, Arnold de Breſſe, Abelard, Henry, *&c.* Berengarius, if not Wickliff himſelf, is by ſome ranked in the number. The *Albigenſes* are frequently confounded with the *Waldenſes*; from whom, however, they differ in many reſpects, both as being prior to them in point of time, as having their origin in a different country, and as being charged with divers hereſies, particularly Manicheiſm, from which the *Waldenſes* are exempt. But ſeveral Proteſtant writers have vindicated them from that imputation. Dr Allix ſhews, that a great number of *Manichees* did ſpread over the weſtern countries from Bulgaria; and ſettled in Italy, Languedoc, and other places, where there were alſo *Albigenſes*; by which means, being both under the imputation of *hereſy*, they came, either by ignorance or malice, to be counfounded, and called by the ſame common name, tho' in reality entirely different.

Other errors imputed to them by their opponents, the monks of thoſe days, were, That they admitted two Chriſts; one evil, who appeared on earth; the other good, who has not yet appeared: That they denied the reſurrection of the body; and maintained human ſouls to be dæmons impriſoned in our bodies, by way of puniſhment for their ſins: That they condemned all the ſacraments of the church; rejected baptiſm as uſeleſs; held the euchariſt in abhorrence; excluded the uſe of confeſſions and penance; maintained marriage unlawful; laughed at purgatory, prayers for the dead, images, crucifixes, &c.—There were likewiſe ſaid to be two claſſes of them; the Perfect, and the Believers. The perfect boaſted of their living in continence, of eating neither fleſh, eggs, nor cheeſe. The believers lived like other men, and were even looſe in their morals; but they were perſuaded they ſhould be ſaved by the faith of the perfect, and that none were damned who received impoſition of hands from them. But from theſe charges alſo they are generally acquitted by Proteſtants; who conſider them as the pious inventions of the Romiſh church, whoſe members deem it meritorious by any means to blacken heretics.

However this be, the Albigenſes grew ſo formidable, that the Catholics agreed upon a holy league or croiſade againſt them. They were at firſt ſupported by Raimond, count of Toulouſe. Pope Innocent III. deſirous to put a ſtop to their progreſs, ſent a legate into their country; which failing, he ſtirred up Philip Auguſtus, king of France, and the other princes and great men of the kingdom, to make war upon them. Upon this the count of Toulouſe, who had ſided with them, made his ſubmiſſion to the pope, and went over to the Catholics: but ſoon after, finding himſelf plundered by the croiſaders, he declared war againſt them, and was joined by the king of Arragon. His army was defeated at the ſiege of Muret, where he himſelf was killed, and the defeat followed by the ſurrender of the city of Toulouſe, and the conqueſt of the greateſt part of Languedoc and Provence. His ſon Raimond ſucceeded him; who agreed with the king and the pope to ſet up the inquiſition in his eſtates, and to extirpate the Albigenſes. In an aſſembly held at Milan, the archbiſhop of Toulouſe drew up articles; agreeable to which the count made a moſt ample declaration againſt them, which he publiſhed at Toulouſe in 1253. From this time the Albigenſes dwindled by little and little, till the times of the reformation; when ſuch of them as were left fell in with the Vaudois *, and became conformable to the doctrine of Zuinglius and the diſcipline of Geneva.

The curious reader who deſires to know more concerning the hiſtory of the *Albigenſes*, may conſult *Prateol.* Elench. Hær.—For the perſecutions, wars, and croiſades raiſed againſt them, ſee *Limborch.* Hiſt. Inquiſit. l. 1. c. 8. ſeq. Act. Erud. Lipſ. 1693. p. 324. ſeq. *Kuſter*, Bibl. Nov. Libr. T. 3. p. 33. *Du Pin*, Bibl. Eccleſ. T. 10. p. 166. Jour. des Scav. T. 26. p. 109. T. 28. p. 481. Bibl. Choiſ. T. 27. p. 42. Holy Inquiſ. c. 3. ſect. 1. p. 51. Ouvr. des Scav. Jan. 1694. p. 238. —The lawfulneſs of perſecuting them, Jour. des Scav. T. 13. p. 105.—Colloquies and councils againſt them, *Allix*, Rem. Hiſt. Albigenſ. c. 15. ſeq. Act. Erud. Lip. 1693. p. 173.—Their Manicheiſm refuted, *Allix*, ubi ſupra, c. 11. Act. Erud. Lipſ. an. 1693. p. 171. *Allix*, Rem. Hiſt. Piedm. c. 15. Act. Erud. Lipſ. 1691. p. 261. *Baſnage*, Hiſt. de la Relig. c. 4. & 5. Act. Erud. Lipſ. 1690. p. 399. Ouvr. des Scav. Jan. 1690. p. 221. ſeq. Bibl. Choiſ. T. 27. p. 44.—Their merits as reformers, Act. Erud. Lipſ. 1693. p. 173. ſeq. Mem. de Trev. 1717. p. 1375. Bibl. Univ. T. 9. p. 33. As ſaints and martyrs, Hiſt. Crit. Rep. Lett. T. 4. p. 19. Jour. des Scav. T. 35. p. 385.

Albigenses is alſo a name ſometimes given to the followers of Peter Vaud, or Waldo; and hence ſynonimous with what we more properly call *Waldenſes*, or Poor Men of Lyons. In this ſenſe the word is applied by Camerarius, Thuanus, and ſeveral other writers. The reaſon ſeems to be, that the two parties agreed in their oppoſition to the papal innovations and incroachments, though in divers other reſpects ſaid to be different enough. The biſhop of Meaux labours hard to ſupport a diſtinction between the two ſects, alleging that the *Albigenſes* were heretics and Manichees; whereas the *Waldenſes* were only ſchiſmatics, not heretics; being ſound as to articles of faith, and only ſeparating from the church of Rome on account of ceremonies and diſcipline. Dr Allix endeavours to ſet aſide the diſtinction; and ſhews, that both of them held the ſame opinions; and were equally condemned and held for heretics: and this not for points of faith, but for declaiming againſt the papal tyranny and idolatry, and holding the pope to be the Antichriſt; which laſt, according to M. de Meaux, conſtitutes nothing leſs than Manicheiſm. In this ſenſe the Lollards and Wickliffites in England were not only Albigenſes, but Manichees.

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* See *Vaudois*.

ALBINTEMELIUM, Albintimilium, (Tacitus;) or at full length, Albium Intemelium, (Pliny, Strabo); now *Vintimiglia*, ſituated in the ſouth-weſt of the territory of Genoa, near the borders of the county of Nice, with a port on the Mediterranean, at the mouth of the rivulet Rotta, almoſt about half-way between Monaco and S. Remo. E. Long. 7. 40. Lat. 43. 17.

ALBIOECE, or Alebece, (Pliny, Strabo;) otherwiſe called *Reii Apollinares*, from their ſuperſtitious worſhip of Apollo; alſo *Civitas Reienſium*; now *Riez*, in Provence, about 18 leagues to the north-eaſt of Toulon, on the north ſide of the rivulet Verdon; was originally a Roman colony, (Inſcription.) It is ſometimes written *Regium*. The people were called *Albici*, (Cæſar.) E. Long. 1. 0. Lat. 43. 20.

ALBINI, in antiquity, the workmen employed in what was called *Opus Albarium*. They made a different profeſſion from the *dealbatores* or *whiteners*.

ALBINOS, the name by which the Portugueſe call the white Moors, who are looked upon by the negroes as monſters. They are the iſſue of a white man and black woman, and at a diſtance might be taken for Europeans; but, when you come near them, their white colour appears like that of perſons affected with a leproſy.

ALBINOVANUS, a Latin poet, whom Ovid ſurnamed the *Divine*. There is now nothing of his extant, except an Elegy on Druſus, and another on the death of Mecænas.

ALBION, the ancient name of Britain *.

New Albion, a name given by Sir Francis Drake to California.

ALBISOLA, a ſmall town belonging to the republic of Genoa: here is a porcelain manufacture, and ſeveral country-houſes of the Genoeſe nobility. It was bombarded in 1745, by the Engliſh. E. Long. 8. 20. N. Lat. 44. 15.

ALBOGALERUS, in Roman antiquity, a white cap worn by the *flamen dialis*, on the top of which was an ornament of olive branches.

ALBORAK, amongſt the Mahometan writers, the beaſt on which Mahomet rode, in his journeys to heaven. The Arab commentators give many fables concerning this extraordinary vehicle. It is repreſented as of an intermediate ſhape and ſize between an aſs and a mule. A place, it ſeems, was ſecured for it in paradiſe, at the interceſſion of Mahomet; which, however, was in ſome meaſure extorted from the prophet, by Alborak's refuſing to let him mount him when the angel Gabriel was come to conduct him to heaven.

ALBOURG, a town of Denmark, in North Jutland, capital of the dioceſe of the ſame name, and a biſhop's ſee. It has this name, which ſignifies *eel-town*, on account of the great number of eels taken here. It is ſeated on a canal, 10 miles from the ſea, 30 north of Wiburg, and 50 north of Arhuys. It has an exchange for merchants, and a ſafe and deep harbour. They have a conſiderable trade in herrings and corn; and a manufactory of guns, piſtols, ſaddles, and gloves. E. Long. 29. 16. N. Lat. 56. 35.

ALBRICIUS, born at London, was a great philoſopher, a learned and able phyſician, and well verſed in all the branches of polite literature. He lived in the 11th century, and wrote ſeveral works in Latin, particularly, 1. Of the origin of the gods. 2. The virtues of the ancients. 3. The nature of poiſon, &c.

ALBUCA, Bastard star-of-Bethlehem, a genus of the monogynia order, belonging to the hexandria claſs of plants. Of this genus Linnæus reckons only two

Species. 1. The major, or ſtar-flower, with ſpear-ſhaped leaves. This is a native of Canada, and ſome other parts of North America: the root is bulbous; from whence ſhoot up eight or ten long, narrow, ſpear-ſhaped leaves. In the center of theſe ariſes a flower-ſtem, a foot or more in height, garniſhed with a looſe ſpike of greeniſh yellow flowers. After the flowers are paſt, the germen ſwells to a three-cornered capſule, having three cells filled with flat ſeeds. 2. The minor, or African ſtar-flower, is a native of the Cape of Good Hope. This hath alſo a pretty large bulbous root, from which ariſe four or five narrow awl-ſhaped leaves, of a deep green colour; the flower-ſtem, which comes from the center of the root, is naked, and rarely riſes more than eight or nine inches high, having five or ſix greeniſh-yellow flowers, growing almoſt in the form of an umbel at top: theſe are rarely ſucceeded by ſeeds in Britain.

Culture. The Canada albuca is hardy; ſo the roots may be planted about four inches deep in a border of light earth, where they will thrive, and produce their flowers late in the ſummer: but as the ſeeds do not often ripen in Britain, and the bulbs put out few offſets, the plants are not common in this country. The African ſort generally flowers twice a-year; firſt in March or April, and again in July or Auguſt; and if its roots are kept in pots filled with light earth, ſheltered under a hot-bed frame, they will flower even in winter; but the beſt method is to have a border in the front of a green-houſe, or ſtove, where the roots of moſt of the bulbous flowers may be planted in the full ground, and ſcreened in winter from froſt: in ſuch ſituations they thrive much better, and flower ſtronger, than when kept in pots.

ALBUGINEA tunica, in anatomy, the third or innermoſt coat or covering of the teſtes; it is likewiſe the name given to one of the coats of the eye.

ALBUGINEUS, in anatomy, a term ſometimes applied to the aqueous humour of the eye.

ALBUGO, or Leucoma, in medicine, a diſtemper occaſioned by a white opaque ſpot growing on the *cornea*

* See the article *Britain*.

nea of the eye, and obſtructing viſion *.

See *Medi-* ne, under 191.

ALBUM, in antiquity, a kind of white table, or regiſter, wherein the names of certain magiſtrates, public tranſactions, &c. were entered. Of theſe there were various ſorts; as the *album decurionum*, *album ſenatorum*, *album judicum*, *album prætoris*, &c.

Album *Decurionum*, was the regiſter wherein the names of the *decuriones* were entered. This is otherwiſe called *matriculatio decurionum.*

Album *Senatorum*, the liſt of ſenators names, which was firſt introduced by Auguſtus, and renewed yearly.

Album *Judicum*, that wherein the names of the perſons of thoſe *decuriæ* who judged at certain times, were entered.

Album *Prætoris*, that wherein the *formulæ* of all actions, and the names of ſuch judges as the prætor had choſen to decide cauſes, were written.

The high-prieſt entered the chief tranſactions of each year into an *album*, or table, which was hung up in his houſe for the public uſe.

Album *Græcum*, among phyſicians, the white dung of dogs, formerly preſcribed for inflammations of the throat, &c. but now juſtly deſpiſed.

ALBUMAZAR, a learned Arabian aſtronomer in the tenth century, who wrote a treatiſe, *Of the Revolution of the Years.*

ALBUMEN, the white of an egg. For its nature, origin, and office, ſee Egg.

The white of an egg, according to Boerhaave, makes an extraordinary menſtruum. Being boiled hard in the ſhell, and afterwards ſuſpended in the air by a thread, it reſolves and drops down into an inſipid, ſcentleſs liquor, which appears to be that anomalous unaccountable menſtruum ſo much uſed by Paracelſus; and will, though it contain nothing ſharp, oleaginous, or ſaponaceous, make a thorough ſolution of myrrh; which is more than either water, oil, ſpirits, or even fire itſelf, can effect.

A little putrid white of egg taken into the ſtomach, occaſions a nauſea, horror, fainting, vomiting, diarrhœa, and gripes; it inflames the bile, excites heat, thirſt, fever; and diſſolves the humours like the plague. On the contrary, the white of freſh-laid eggs, if taken while warm from the hen, is extremely nouriſhing to the infirm: it may be taken in luke-warm milk; but if any other heat is applied to it, the nutritious quality will be deſtroyed. The freſh white of egg prevents burns from riſing in bliſters, if it is uſed immediately after the accident: it mitigates inflammations of the eyes, and preſerves the face from ſun-burning. In pharmacy, it is uſed as a medium to render balſams and turpentines, &c. miſcible with aqueous fluids; but as it diſagrees with many ſtomachs when thus taken, a mucilage of gum arabic may ſupply its place, it being as good a medium in ſimilar circumſtances, and not apt to offend the tendereſt ſtomach.—Whites of eggs are alſo uſeful for clarifying liquors; to which purpoſe, being mixed and incorporated with the liquors to be clarified, and the whole afterwards boiled, the whites of eggs are by this means brought together and hardened, and thus carry off the groſs parts of the liquor along with them.

ALBUQUERQUE, a ſmall city in Spain, in the province of Eſtremadura, is ſeated on an eminence, nine miles from the frontiers of Portugal. It is commanded by an almoſt impregnable fortreſs, built on a high mountain, and ſerving to defend the town. It carries on a great trade in wool and woollen manufactures. It was taken by the allies of Charles king of Spain, in 1705. W. Long. 7. 0. N. Lat. 38. 52.

ALBURN, the Engliſh name of a compound colour, being a mixture of white and red, or reddiſh brown. Skinner derives the word, in this ſenſe, from the Latin *albus*, and the Italian *burno*, from *bruno*, brown.

ALCA, or Auk, in ornithology, a genus of the order of anſeres. The beak of this genus is without teeth, ſhort, convex, compreſſed, and frequently furrowed tranſverſely; the inferior mandible is gibbous near the baſe; the feet have generally three toes. The ſpecies of the alca are five.—1. The impennis, northern penguin, or great auk, with a compreſſed bill furrowed on each ſide, and an oval ſpot on each ſide of the eyes. According to Mr Martin, this bird breeds on the iſle of St Kilda; appearing there the beginning of May, and retiring the middle of June. It lays one egg, which is ſix inches long, of a white colour; ſome are irregularly marked with purpliſh lines croſſing each other, others blotched with black, and ferruginous about the thicker end: if the egg is taken away, it will not lay another that ſeaſon. Mr Macaulay informs us that it does not viſit that iſland annually, but ſometimes keeps away for ſeveral years together; and adds, that it lays its egg cloſe to the ſea-mark, being incapable, by reaſon of the ſhortneſs of its wings, to mount higher. The length of this bird, to the end of its toes, is three feet: but its wings are ſo ſmall, as to be uſeleſs for flight; the length, from the tip of the longeſt quill-feathers to the firſt joint, being only four inches and a quarter. This bird is obſerved by ſeamen never to wander beyond ſoundings; and according to its appearance they direct their meaſures, being then aſſured that land is not very remote. Thus the modern ſailors pay reſpect to auguries, in the ſame manner as Ariſtophanes * tells us thoſe of Greece did above 2000 years ago:

Great Auk, Pl. IX. fig. 6.

* *Aves*, 597.

> From birds, in ſailing men inſtructions take;
> Now lie in port; now ſail, and profit make.

2. The alle, little auk, or black and white diver, with a ſmooth conical bill, a white ſtreak on the belly and wings, and black feet. The bulk of this ſpecies exceeds not that of a black-bird.—3. The arctica, or puffin, with a compreſſed bill and four furrows; the orbit of the eyes and temples are white. The legs of this ſpecies are very ſmall; and placed ſo far behind as to diſqualify it from ſtanding, except quite erect, reſting not only on the foot, but the whole length of the leg. This circumſtance * makes the riſe of the puffin from the ground very difficult, and it meets with many falls before it gets on wing; but when that is effected, few birds fly longer or ſtronger. Theſe birds frequent the coaſts of ſeveral parts of Great Britain and Ireland; but no place in greater numbers than Prieſtholm Iſle, where their flocks may be compared to ſwarms of bees for multitude. Theſe are birds of paſſage; they reſort there annually about the fifth or tenth of April, quit the place (almoſt to a bird), and return twice or thrice before they ſettle to burrow and prepare for ovation and incubation. They begin to burrow the firſt week in May; but ſome few ſave themſelves that trouble, and diſlodge

Little Auk, fig. 8.

The Puffin.

* It attends every one of the genus. See the poſture of the Little Auk, fig. 8.

diſlodge the rabbits from their holes, taking poſſeſſion of them till their departure from the iſle. Thoſe which form their own burrows, are at that time ſo intent on the work as to ſuffer themſelves to be taken by the hand. This taſk falls chiefly to the ſhare of the males; who alſo aſſiſt in incubation. The firſt young are hatched the beginning of July. The old ones ſhew vaſt affection towards them; and ſeem totally inſenſible of danger in the breeding ſeaſon. If a parent is taken at that time, and ſuſpended by the wings, it will in a ſort of deſpair treat itſelf moſt cruelly, by biting every part it can reach; and the moment it is looſed, will never offer to eſcape, but inſtantly reſort to its unfledged young: this affection ceaſes at the ſtated time of migration, which is moſt punctually about the eleventh of Auguſt, when they leave ſuch young as cannot fly, to the mercy of the peregrine falcon, who watches the mouths of the houſe for the appearance of the little deſerted puffins, which, forced by hunger, are compelled to leave their burrows. They lay only one egg. The eggs differ much in form: ſome have one end very acute; others have both extremely obtuſe; all are white. Their fleſh is exceſſively rank, as they feed on ſea-weeds and fiſh, eſpecially ſprats: but when pickled and preſerved with ſpices, are admired by thoſe who love high-eating. Dr Caius tells us, that, in his days, the church allowed them in lent, inſtead of fiſh: he alſo acquaints us, that they were taken by means of ferrets, as we take rabbits: at preſent, they are either dug out, or drawn from their burrows by a hooked ſtick: they bite extremely hard; and keep ſuch faſt hold on whatever they faſten, as not to be eaſily diſengaged. Their noiſe, when taken, is very diſagreeable; being like the efforts of a dumb perſon to ſpeak. 4. The torda, or razor-bill, with four furrows on the bill, and a white line on each ſide running from the bill to the eyes. Theſe birds, in company with the guillemot, appear in our ſeas the beginning of February; but do not ſettle on their breeding places till they begin to lay, about the beginning of May. They inhabit the ledges of the higheſt rocks that impend over the ſea, where they form a groteſque appearance; ſitting cloſe together, and in rows one above another. They properly lay but one egg apiece, of an extraordinary ſize for the bulk of the bird, being three inches long: it is either white, or of a pale ſea-green, irregularly ſpotted with black: if this egg is deſtroyed, both the auk and the guillemot will lay another; if that is taken, then a third: they make no neſt, depoſiting their egg on the bare rock; and tho' ſuch multitudes lay contiguous, by a wonderful inſtinct each diſtinguiſhes its own. What is alſo matter of great amazement, they fix their egg on the ſmooth rock, with ſo exact a balance, as to ſecure it from rolling off; yet ſhould it be removed, and then attempted to be replaced by the human hand, it is extremely difficult, if not impoſſible, to find its former equilibrium. The eggs are food to the inhabitants of the coaſts they frequent; which they get with great hazard; being lowered from above by ropes, truſting to the ſtrength of their companions, whoſe footing is often ſo unſtable that they are forced down the precipice, and periſh together. 5. The pica, or black-billed auk, has the bill of the ſame form with the torda, but is entirely black. The cheeks, chin, and throat, are white: in all other reſpects it agrees with the former ſpecies.

Razor-bill,
Pl. IX. fig. 7.

The winter reſidence of this genus, and that of the guillemot *, is but imperfectly known: it is probable they live at ſea, in ſome more temperate climate, remote from land; forming thoſe multitudes of birds that navigators obſerve in many parts of the ocean: they are always found there at certain ſeaſons, retiring only at breeding time; when they repair to the northern latitudes, and during that period are found as near the pole as navigators have penetrated. During winter, razor-bills and puffins frequent the coaſt of Andaluſia, but do not breed there.

* See *Colymbus.*

ALCÆUS, a famous ancient lyric poet, born at Mitylene, in the iſland of Leſbos. Horace ſeems to think him the inventor of this kind of poeſy.

Ode xxii.
Lib. I.

> Now the Roman muſe inſpire,
> And warm the ſong with Grecian fire. *Francis.*

He flouriſhed in the 44th Olympiad, at the ſame time with Sappho, who was likewiſe of Mitylene. Alcæus was a great enemy to tyrants, but not a very brave ſoldier. He was preſent at an engagement, wherein the Athenians gained a victory over the Leſbians; and here, as he himſelf is ſaid to have confeſſed in one of his pieces, he threw down his arms, and ſaved himſelf by flight. Horace, who, of all the Latin poets, moſt reſembled Alcæus, has made the like confeſſion:

> With thee I ſaw Philippi's plain,
> Its fatal rout, a fearful ſcene!
> And dropp'd, alas! th' inglorious ſhield,
> Where valour's ſelf was forc'd to yield,
> Where ſoil'd in duſt the vanquiſh'd lay,
> And breath'd th' indignant ſoul away. *Francis.*

The poetical abilities of Alcæus are indiſputed; and though his writings were chiefly in the lyric ſtrain, yet his muſe was capable of treating the ſublimeſt ſubjects with a ſuitable dignity. Hence Horace ſays,

Ode vii.
Lib. II.

> Alcæus ſtrikes the golden ſtrings,
> And ſeas, and war, and exile, ſings.
> Thus while they ſtrike the various lyre,
> The ghoſts the ſacred ſounds admire:
> But when Alcæus lifts the ſtrain
> To deeds of war and tyrants ſlain,
> In thicker crowds the ſhadowy throng
> Drink deeper down the martial ſong. *Francis.*

Alcæus, an Athenian tragic poet, and, as ſome think, the firſt compoſer of tragedies. He renounced his native country Mitylene, and paſſed for an Athenian. He left ten pieces, one of which was Paſiphaë, that which he produced when he diſputed with Ariſtophanes, in the fourth year of the 97th Olympiad.

There is another **Alcæus** mentioned in Plutarch, perhaps the ſame whom Porphyrius mentions as a compoſer of ſatirical iambics and epigrams, and who wrote a poem concerning the plagiariſm of Euphorus the hiſtorian. He lived in the 145th Olympiad.

We are told likewiſe of one **Alcæus**, a Meſſenian, who lived in the reign of Veſpaſian and Titus. We know not which of theſe it was who ſuffered for his lewdneſs a very ſingular kind of death, which gave occaſion to the following epitaph:

> Ἀλκαιου ταφος ουτος, &c.
>
> This is Alcæus's tomb, who died by a radiſh,
> The daughter of the earth, and puniſher of Adulterers.

This puniſhment inflicted on adulterers*, was thruſting one of the largeſt radiſhes up the anus of the adulterer: or, for want of radiſhes, they made uſe of a fiſh † with a

* See the article *Adultery.*

† See Mu

a very large head, which Juvenal alludes to:

Quoſdam mæchos et mugilis intrat.
The mullet enters ſome behind.

Hence we may underſtand the menace of Catullus,

Ah! tum te miſerum, maliquc fati,
Quem attractis pedibus, patente porta,
Percurrent raphaniqac mugileſque. Epig. xv.

Ah! wretched thou, and born to luckleſs fate,
Who art diſcover'd by the unſhut gate!
If once, alas! the jealous huſband come,
The radiſh, or the ſea-fiſh, is thy doom.*

ALCAICS, in ancient poetry, a denomination given to ſeveral kinds of verſe, from Alcæus their inventor. The firſt kind conſiſts of five feet, *viz.* a ſpondee, or iambic; an iambic; a long ſyllable; a dactyle; another dactyle: ſuch is the following verſe of Horace,

Omnes | eo|dem cogimur, | omnium
Verſa|tur ur|nâ | ſerius | ocyus |
Sors exitura.

The ſecond kind conſiſts of two dactyles and two trochees: as,

Exili|um impoſi|tura | cymbæ.

Beſides theſe two, which are called *dactylic Alcaïcs*, there is another ſtyled ſimply *Alcaïc;* conſiſting of an epitrite; a coriambus; another coriambus; and a bacchius: the following is of this ſpecies,

Cur timet fla|vum Tiberim tan|gere, cur | olivum?

ALCAIC *Ode*, a kind of manly ode compoſed of ſeveral ſtrophes, each conſiſting of four verſes; the two firſt of which are always Alcaïcs of the firſt kind; the third verſe is a diameter hypercatalectic, or conſiſting of four feet and a long ſyllable; and the fourth verſe is an Alcaïc of the ſecond kind. The following ſtrophe is of this ſpecies, which Horace calls *minaces Alcæi camenæ.*

Non poſſidentem multa vocaveris
Recte beatum: rectius occupat
Nomen beati, qui deorum
Muneribus ſapienter uti, &c.

ALCAID, ALCAYDE, or ALCALDE, in the polity of the Moors, Spaniards, and Portugueſe, a magiſtrate, or officer of juſtice, anſwering nearly to the French provoſt, and the Britiſh juſtice of peace.—The alcaid among the Moors is veſted with ſupreme juriſdiction, both in civil and criminal caſes.

ALCALA DE GUADEIRA, a ſmall town of Spain, in Andaluſia, upon the river Guadeira. Here are abundance of ſprings, from whence they convey water to Seville by an aqueduct. W. long. 6. 16. N. lat. 37. 15.

ALCALA *de Henares*, a beautiful and large city of Spain, in new Caſtile, ſeated upon the river Henares, which waſhes its walls. It is built in a very agreeable plain, and is of an oval figure. The ſtreets are handſome and pretty ſtrait; one of them is very long, running from one end of the city to the other. The houſes are well built; and there are ſeveral ſquares, the largeſt of which is an ornament to the city; it is ſurrounded on all ſides with piazzas, where tradeſmen have their ſhops, to expoſe ſeveral ſorts of commodities to ſale, of which there is as great plenty and variety as in moſt towns of Spain. The univerſity was founded by cardinal Ximenes, archbiſhop of Toledo, about the beginning of the 16th century. The land about Alcala is watered by the Henares, well cultivated, and very fruitful, while that at a diſtance is dry and ſterile: it yields grain in plenty, very good muſcat wine, and melons of a delicious kind. Without the walls is a ſpring, the water of which is ſo pure, and ſo well taſted, that it is incloſed and ſhut up for the king of Spain's own uſe, from whence it is carried to Madrid.—This city is 10 miles ſouth-weſt of Guadalaxara, and 13 miles eaſt of Madrid. W. Long. 4. 20. N. Lat. 40. 30.

ALCALA-*Real*, a ſmall city of Spain, in Andaluſia, with a fine abbey. It is built on the top of a high mountain, in a mountainous country; and the road to it is incommodious, rough, and unequal; but to make amends for this, here are ſeveral kinds of exquiſite fruit and wine. W. Long. 4. 15. N. Lat. 37. 18.

ALCALY, or ALKALI. See CHEMISTRY, nº 23, 119, 184, 274, 316, 389.

ALCANIS, a town of Arragon in Spain, ſeated on the river Guadaloup, twelve miles from Caſpe. It was formerly the capital of the kingdom of the Moors; but being taken from them, it was made a commandery of the order of Calatrava. Here is a very remarkable fountain, which throws up water through 42 pipes. It is ſurrounded with gardens and fruit-trees, and defended with a good fortreſs. W. Long. 0. 5. N. Lat. 41. 0.

ALCANNA, in commerce, a powder prepared from the leaves of the Egyptian privet, in which the people of Cairo drive a conſiderable trade. It is much uſed by the Turkiſh women to give a golden colour to their nails and hair. In dyeing, it gives a yellow colour when ſteeped with common water, and a red one when infuſed in vinegar. There is alſo an oil extracted from the berries of alcanna, and uſed in medicine as a calmer.

ALCANTARA, a ſmall, but very ſtrong city of Eſtremadura, in Spain. It gives name to one of the three orders of knighthood. It is ſeated on the banks of the Tajo, or Tagus, 21 miles from Coria, in a very fruitful ſoil, and is celebrated for its bridge over that river. This was built in the time of the emperor Trajan, as appears by an inſcription over one of the arches, by the people of Luſitania, who were aſſeſſed to ſupply the expence: it is raiſed 200 feet above the level of the water; and though it conſiſts but of ſix arches, is 670 feet in length, and 28 in breadth. At the entrance of the bridge, there is a ſmall antique chapel hewn in a rock by the ancient Pagans, who dedicated it to Trajan, as the Chriſtians did to St Julian. This city was built by the Moors, on account of the convenience of this bridge; which is at a place where the Tajo is very deep, running between two high ſteep rocks: for this reaſon, they called it *Al-Cantara*, which, in their language, ſignifies *the Bridge*. It was taken from them in 1214, and given to the knights of *Calatrava*, who afterwards aſſumed the name of *Alcantara*. It was taken by the earl of Galloway, in April, 1706, and retaken by the French in November following. It is 45 miles from Madrid, and 125 from Seville. W. Long. 7. 12. N. Lat. 39. 30.

Knights of ALCANTARA, a military order of Spain, which took its name from the above mentioned city. They make a very conſiderable figure in the hiſtory of the expeditions againſt the Moors.

ALCAREZ, a ſmall city of La Mancha, in Spain, defended by a pretty ſtrong caſtle, and remarkable for an ancient aqueduct. It ſtands near the river Guardamena, and the ſoil about it is very fruitful. They have a breed of little running-horſes, which are very fleet and ſtrong. It is 25 miles north of the confines of Andaluſia, 108 ſouth of Cuenza, and 138 ſouth-by-eaſt of Madrid. W. Long. 1. 50. N. Lat. 38. 28.

ALCASSAR DO SAL, a town of Portugal, in Eſtremadura, which has a caſtle ſaid to be impregnable. It is indeed very ſtrong both by art and nature, being built on the top of a rock which is exceedingly ſteep on all ſides. Here is a ſalt-work which produces very fine white ſalt, from whence the town takes its name. The fields produce large quantities of a ſort of ruſhes, of which they make mats, which are tranſported out of the kingdom. W. long. 9. 10. N. lat. 38. 18.

ALCASSAR, a city of Barbary, ſeated about two leagues from Larache, in Aſga, a province of the kingdom of Fez. It was of great note, and the ſeat of the governor of this part of the kingdom. It was built by Jacob Almanzor, king of Fez, about the year 1180, and deſigned for a magazine and place of rendezvous for the great preparations he was making to enter Granada in Spain, and to make good the footing Joſeph Almanzor had got ſome time before. It is ſaid his father firſt invaded Spain with 300,000 men, moſt of whom he was obliged to bring back to Africa to quiet a rebellion that had broke out in Morocco. This done, he returned to Spain again with an army, as is ſaid, of 200,000 horſe, and 300,000 foot. The city is now fallen greatly to decay, ſo that of fifteen moſques there are only two that they make uſe of. The reaſon, probably, is the bad ſituation of the town; for it ſtands ſo low, that it is exceſſively hot in ſummer, and almoſt overflowed with water in the winter. This they affirm to be owing to a curſe of one of their ſaints. Here are a great number of ſtorks, who live very familiarly with the people, walking about the town, poſſeſſing the tops of the houſes and moſques without moleſtation; for they eſteem them ſacred birds, and account it ſinful to diſturb them. At preſent, the baſhaw of Tetuan appoints a governor to this town, which is the laſt of his dominions towards Mequinez. Near this city there is a high ridge of mountains, running towards Tetuan, whoſe inhabitants were never brought entirely under ſubjection; and whenever it was attempted, they revenged themſelves by infeſting the roads, and robbing and deſtroying the travellers; when they were purſued, they retired into their woody mountains, where none could ſafely follow them. Not far from hence is the river Elmahaſſen, famous for the battle fought between Don Sebaſtian king of Portugal, and the Moors; in which the Portugueſe were defeated, and their king ſlain. W. Long. 12 35. N. Lat. 35. 15.

ALCAZAR LEGUER, a town of Africa, in the kingdom of Fez, and in the province of Ilabat. It was taken by Alphonſo, king of Portugal, in 1468; but ſoon after that, it was abandoned to the Moors. It is ſeated on the coaſt of the ſtraits of Gibraltar. W. Long. 5. 30. N. Lat. 38. 0.

ALCAZER, a town of Spain, in New Caſtile, ſeated on the river Guardamana, which has a fortreſs on a high hill for its defence, and lies in a very fruitful country. It is 100 miles north-weſt of Carthagena. W. long. 2. 10. N. lat. 38. 15.

ALCE, ALCES, or ELK, in zoology, the trivial name of a ſpecies of the cervus, belonging to the order of mammalia pecora. See CERVUS.

ALCEA, the HOLLY-HOCK; a genus of the polyandria order, belonging to the monodelphia claſs of plants.

Species. Although Linnæus mentions two diſtinct ſpecies of this genus, *viz.* the *roſea* and *ficifolia*, he thinks, that the latter may perhaps be only a variety of the former; but Mr Miller affirms them to be diſtinct ſpecies, whoſe difference in the form of their leaves always continues: The leaves of the firſt ſort are roundiſh, and cut at their extremities into angles; thoſe of the ſecond are deeply cut into ſix or ſeven ſegments, ſo as to reſemble a hand. Cultivation produces almoſt an infinite variety of this plant, ſuch as double-flowered, ſingle-flowered, deep red, pale red, blackiſh red, white, purple, yellow, and fleſh-colour. The firſt ſpecies is a native of China, the ſecond grows alſo in Iſtria. Tho' natives of warm countries, they are hardy enough to thrive in the open air in Britian, and have for many years been ſome of the greateſt ornaments in gardens, towards the end of ſummer; but they have the inconvenience of growing too large for ſmall gardens, and requiring tall ſtakes to ſecure them from being broken by ſtrong winds. In large gardens, however, when properly diſpoſed, they make a fine appearance; for as their ſpikes of flowers grow very tall, there will be a ſucceſſion of them on the ſame ſtems more than two months: the flowers on the lower part of the ſpike appear in July; and as their ſtalks advance, new flowers are produced till near the end of September. When planted in good ground, the ſtalks will often riſe to the height of eight or nine feet; ſo that near ſix feet of each will be garniſhed with flowers, which, when double and of good colours, make a very beautiful appearance.

Culture. The holly-hock is propagated by ſeeds, which ſhould be carefully ſaved from thoſe plants whoſe flowers are double and of the beſt colours: for though the duplicity of the flowers, as well as their colour, are only accidental properties, yet the young plants will produce nearly the ſame kind of flowers with thoſe from which the ſeeds are taken, provided no plants with ſingle or bad-coloured flowers are permitted to grow near them; and as ſoon as ſuch appear they ought to be removed from the good ones, that their farina may not ſpread into the others, which would cauſe them to degenerate. The ſeeds ought to be gathered very dry, and remain in their capſules until ſpring; but care muſt be taken that no wet comes to them in winter, otherwiſe the covers would turn mouldy, and ſpoil their contents.—They ſhould be ſown in drills, about the middle of April, on a bed of light earth, and covered with earth of the ſame kind about half an inch deep. When the plants have put out ſix or eight leaves, they ſhould be tranſplanted into nurſery-beds, obſerving to water them until they have taken good root; after which they will require no farther care, but to keep them clean from weeds till October, when they ſhould be tranſplanted where they are to remain.

ALCEDO, or KINGFISHER, in ornithology, a genus of the order of picæ. The alcedo has a long, ſtrait, thick, triangular bill; with a fleſhy, plain, ſhort, flat tongue. There are ſeven ſpecies of the alcedo.

1. The iſpida, or common kingfiſher, haunts the ſhores of Europe and Aſia. It is not much larger than

Plate IX.

Fig. 1. AIR GUN.

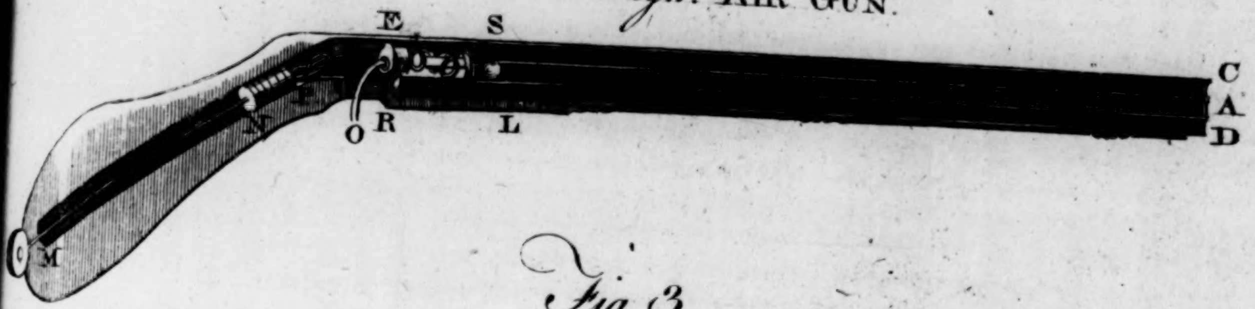
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Fig. 2.

Fig. 3.

MAGAZINE AIR GUN.

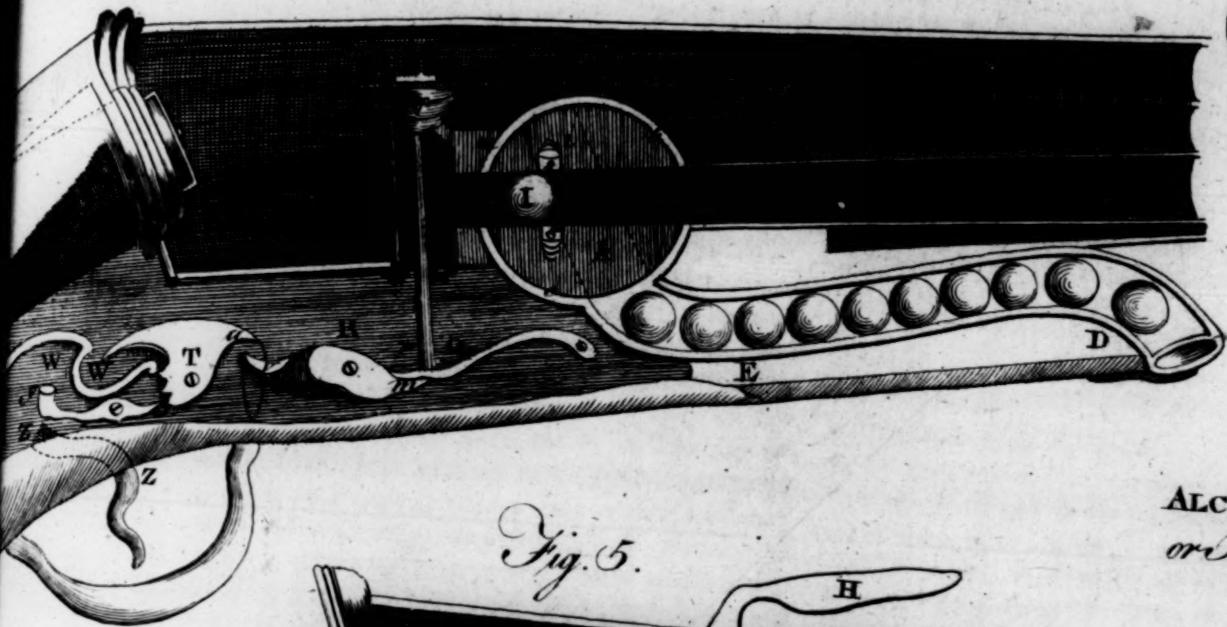


Fig. 4.

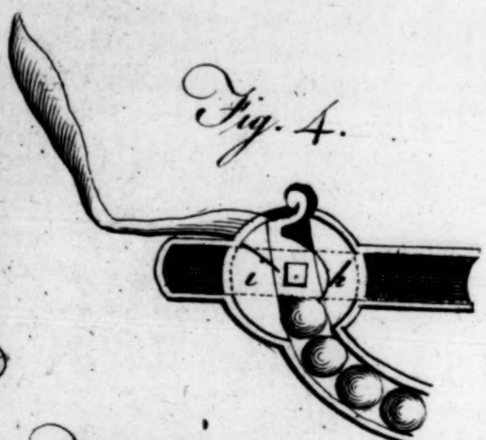


Fig. 9.

ALCEDO ISPIDA,
or King-fisher.

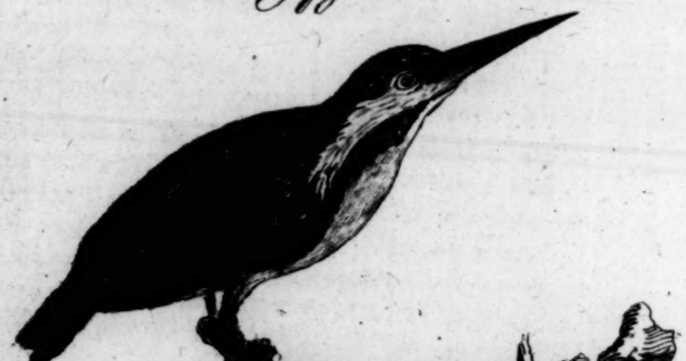


Fig. 5.

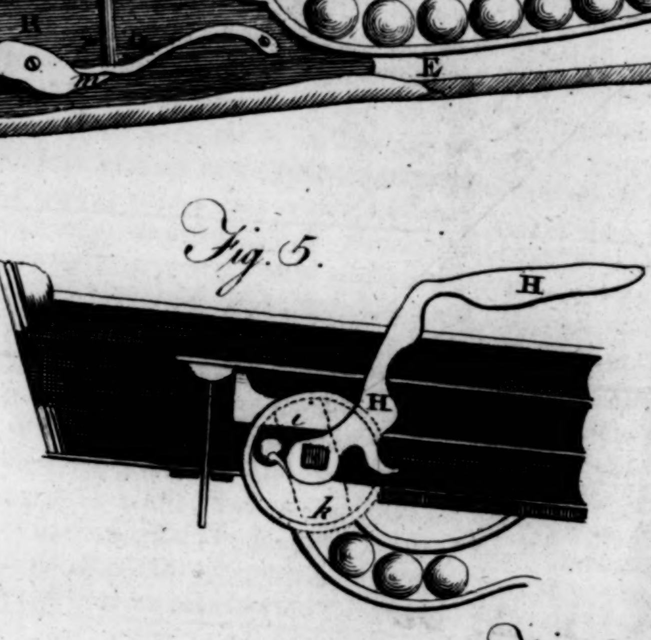


Fig. 8.

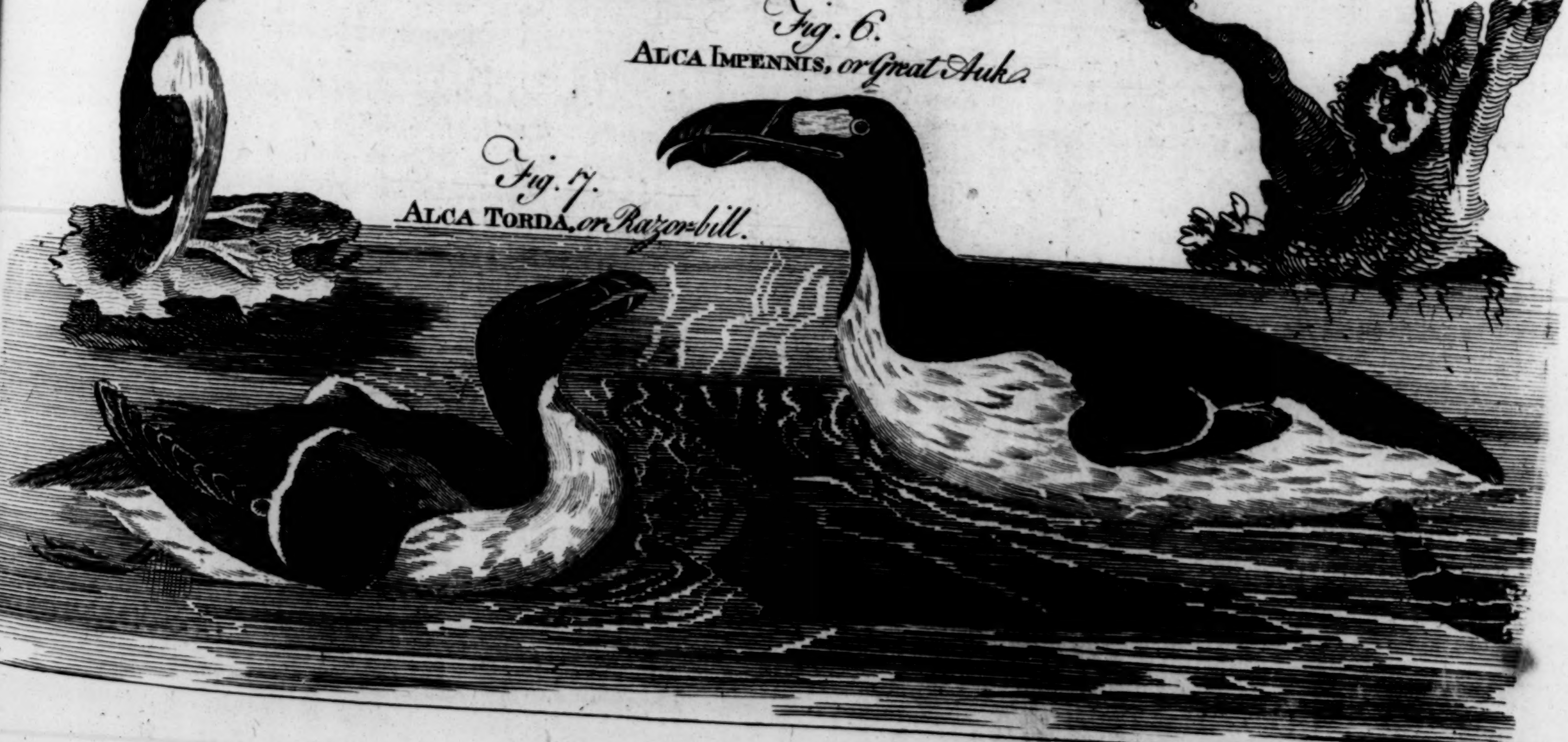
ALCA ALLÆ,
or Little Auk.

Fig. 6.

ALCA IMPENNIS, *or Great Auk.*

Fig. 7.

ALCA TORDA, *or Razor-bill.*



A Bell Sculpt.

3 MA 55

lcedo, or ngfiſher. a ſwallow; its ſhape is clumſy; the bill diſproportionably long; it is two inches from the baſe to the tip; the upper chap black, and the lower yellow. But the colours of this bird atone for its inelegant form: the crown of the head and the coverts of the wings are of a deep blackiſh green, ſpotted with bright azure; the back and tail are of the moſt reſplendent azure; the whole under-ſide of the body is orange-coloured; a broad mark of the ſame, paſſes from the bill beyond the eyes; beyond that, is a large white ſpot: the tail is ſhort, and conſiſts of twelve feathers of a rich deep blue; the feet are of a reddiſh yellow, and the three joints of the out-moſt toe adhere to the middle toe, while the inner-toe adheres only by one.

From the diminutive ſize, the ſlender ſhort legs, and the beautiful colours of this bird, no perſon would be led to ſuppoſe it one of the moſt rapacious little animals that ſkims the deep. Yet it is for ever on the wing, and feeds on fiſh; which it takes in ſurpriſing quantities, when we conſider its ſize and figure. It takes its prey after the manner of the oſprey, balancing itſelf at a certain diſtance above the water for a conſiderable ſpace, then darting into the deep, and ſeizing the fiſh with inevitable certainty. While it remains ſuſpended in the air, in a bright day, the plumage exhibits a beautiful variety of the moſt dazzling and brilliant colours. This ſtriking attitude did not eſcape the notice of the ancients; for Ibycus, as quoted by Athenæus, ſtyles theſe birds αλκυονες τανυσιπτεροι, the halcyons with expanded wings. It makes its neſt in holes in the ſides of the cliffs, which it ſcoops to the depth of three feet; and lays from five to nine eggs, of a moſt beautiful ſemitranſparent white: the neſt is very fetid, by reaſon of the remains of the fiſh brought to feed the young. The female begins to lay early in the ſeaſon; and excludes her firſt brood about the beginning of April. The male, whoſe fidelity exceeds even that of the turtle, brings her large proviſions of fiſh while ſhe is thus employed; and ſhe, contrary to moſt other birds, is found plump and fat at that ſeaſon. The male, that uſed to twitter before this, now enters the neſt as quietly and as privately as poſſible. The young ones are hatched at the expiration of 20 days; but are ſeen to differ as well in their ſize as in their beauty.

This ſpecies is the αλκυωναφωνος, or mute halcyon of Ariſtotle, which he deſcribes with more preciſion than is uſual with that great philoſopher: after his deſcription of the bird, follows that of its neſt, than which the moſt inventive of the ancients have delivered nothing that appears at firſt ſight more fabulous and extravagant. He relates, that it reſembled thoſe concretions that are formed by the ſea-water; that it reſembled the long-necked gourd; that it was hollow within; that the entrance was very narrow, ſo that, ſhould it over-ſet, the water could not enter; that it reſiſted any violence from iron, but could be broke with a blow from the hand; and that it was compoſed of the bones of the Βελονη, or ſea-needle. The neſt had medical virtues aſcribed to it; and from the bird was called *Halcyoneum*. In a fabulous age, every odd ſubſtance that was flung aſhore received that name; a ſpecies of tubular coral, a ſponge, a zoophite, and a miſcellaneous concrete, having by the ancients been dignified with that title from their imaginary origin*. Yet much of this ſeems to be founded on truth. The form of the neſt is juſtly deſcribed; and the materials which Ariſtotle ſays it was compoſed of, are not entirely of his own invention. Whoever has ſeen the neſt of the kingfiſher, will obſerve it ſtrewed with the bones and ſcales of fiſh; the fragments of the food of the owner and its young.—On the foundation laid by the philoſopher, ſucceeding writers formed other tales extremely abſurd; and the poets, indulging the powers of imagination, dreſſed the ſtory in all the robes of romance. This neſt was a floating one:

in. xxii. lib. v.

Alcedo, or kingfiſher.

> Incubat *halcyone* pendentibus æquore nidis. Ovid. *Met.* lib. xi.

It was therefore neceſſary to place it in a tranquil ſea, and to ſupply the bird with charms to allay the fury of a turbulent element during the time of its incubation; for it had, at that ſeaſon, power over the ſeas and the winds.

> Χ' αλκυνος ϛορησευντι τα κυματα, την τε θαλασσαν,
> Τον τε νοτον, τον τ' ευρον, ος εσχατα φυκια κινει'
> Α'λκυονης, γλαυκαις Νηρηισι ται τε μαλιϛα
> Ορνιθων εφιλαθεν. Theocrit. *Idyl.* vii. l. 57.
>
> May *Halcyons* ſmooth the waves, and calm the ſeas,
> And the rough ſouth-eaſt ſink into a breeze;
> *Halcyons*, of all the birds that haunt the main,
> Moſt lov'd and honour'd by the *Nereid* train. - Fawkes.

Theſe birds were equally favourites with Thetis as with the Nereids;

> Dilectæ *Thetidi* Halcyones. Virg. *Georg.* I. 399.

as if to their influence theſe deities owed a repoſe in the midſt of the ſtorms of winter, and by their means were ſecured from thoſe winds that diſturb their ſubmarine retreats, and agitated even the plants at the bottom of the ocean.

Such are the accounts given by the Roman and Sicilian poets. Ariſtotle and Pliny tells us, that this bird is moſt common in the ſeas of Sicily: that it ſat only a few days, and thoſe in the depth of winter; and during that period the mariner might ſail in full ſecurity; for which reaſon they were ſtyled *Halcyon days*.

> Perque dies placidos hiberno tempore ſeptem
> Incubat *Halcyone* pendentibus æquore nidis:
> Tum via tuta maris: ventos cuſtodit, et arcet
> Æolus egreſſu. Ovid. *Met.* lib. XI.
>
> *Alcyone*, compreſs'd,
> Seven days ſits brooding on her watery neſt,
> A wintry queen; her ſire at length is kind,
> Calms every ſtorm, and huſhes every wind. Dryden.

In after-times, theſe words expreſſed any ſeaſon of proſperity: theſe were the *Halcyon days* of the poets; the brief tranquillity, the *ſeptem placidi dies*, of human life.

The poets alſo made it a bird of ſong. Virgil ſeems to place it in the ſame rank with the linnet;

> Littoraque *Halyconem* reſonant, et *Acanthida* dumi.
> Georg. III. 338.

And Silius Italicus celebrates its muſic, and its floating neſt:

> Cum ſonat *Halcyone* cantu, nidoſque natantes
> Immota geſtat ſopitis fluctibus unda. *Lib.* XIV. 275.

But theſe writers ſeem to have transferred to our ſpecies, the harmony that belongs to the *vocal alcedo* *, one of the loſt birds of the ancients.

* Ariſt. hiſt. an. 892.

As the ancients have had their fables concerning this bird, ſo have the modern vulgar. It is an opinion generally received among them, that the fleſh of the kingfiſher will not corrupt, and that it will even baniſh all vermin. This has no better foundation than that which is ſaid of its always pointing, when hung up dead, with its breaſt to the north. The only truth which can be affirmed of this bird when killed is, that its fleſh is utterly unfit to be eaten; while its beautiful plumage preſerves its luſtre longer than that of any other bird we know.

The other ſpecies are, 2. The erathaca, with a ſhort tail, a blue back, a yellow bill, a purple head and rump, and the throat and oppoſite part of the neck white. It is a native of Bengal. 3. The alcyon with a ſhort black tail, white belly, and ferruginous breaſt. It is a native of America. Its cry, its ſolitary abode about rivers, and its manner of feeding, are much the ſame as of thoſe in Britain. It preys not only on fiſh, but likewiſe on lizards. 4. The todus, with a ſhort green tail, a blood-coloured throat, and a white belly. It is a native of America; and is the green ſparrow, or green humming-bird, of Edwards. 5. The ſmyrnenſis, with a ſhort green tail, ferruginous wings, and a green back. It is a native of Africa, and Aſia. 6. The rudis, with a brown ſhort tail variegated with white. It is a native of Perſia and Egypt. 7. The dea, with two very long feathers in the tail, a blackiſh blue body, and greeniſh wings. It is a native of Surinam. All theſe likewiſe dive in the water, and catch fiſh with their long beaks.

ALCHEMILLA, or Ladies-mantle, a genus of the monogynia order, belonging to the tetrandria claſs of plants. Of this genus there are three

Species. 1. The vulgaris, or common ladies-mantle, with leaves plaited like a fan, and yellowiſh-green bloſſoms. It grows naturally in paſture-lands in this as well as in moſt other countries in Europe. The leaves diſcover to the taſte a moderate aſtringency; and were formerly much eſteemed in ſome female weakneſſes, and in fluxes of the belly. They are now rarely made uſe of, tho' both the leaves and roots might doubtleſs be of ſervice in caſes where mild aſtringents are required. In the province of Smolandia in Gothland, they make a tincture of the leaves, and give it in ſpaſmodic or convulſive diſeaſes. Horſes, ſheep, and goats, eat it; cows are not fond of it; ſwine refuſe it.—2. The alpina, or cinque-foil ladies-mantle, with finger-ſhaped ſawed leaves, and greeniſh bloſſoms. It is a native of the mountainous parts of Europe. Goats and cows eat it; horſes, ſheep, and ſwine, refuſe it.—3. The minor, or leaſt ladies-mantle, with five ſmooth leaves growing at a joint and cut into many ſegments. It grows naturally in Sweden, Lapland, and other cold countries. Eaten by cows and goats; refuſed by horſes, ſheep, and ſwine.

Culture. Theſe plants have perennial roots, and annual ſtalks. They are eaſily propagated by parting of their roots, or ſowing their ſeeds in autumn. They ſhould have a moiſt ſoil and ſhady ſituation, and be kept clean from weeds; which is all the culture they require.

ALCHEMIST, a practitioner in alchemy.

ALCHEMY, that branch of chemiſtry which had for its principal objects, the tranſmutation of metals into gold; the panacea, or univerſal remedy; an alkaheſt, or univerſal menſtruum; an univerſal ferment; and many other things equally ridiculous†.

ALCIAT (Andrew), a great lawyer, who flouriſhed in the 16th century, born at Milan. He mixed much of polite learning in the explication of the laws, and happily drove out the barbarity of language which till then had reigned in the lectures and writings of lawyers; for which Thuanus highly praiſes him. He publiſhed a great many law-books, and ſome notes upon Tacitus. His Emblems have been much admired, and tranſlated into French, Italian, and Spaniſh; and ſeveral learned men have written commentaries on them.

ALCIBIADES, an Athenian general. It was the fate of this great man to live at a time when his country was a ſcene of confuſion. The Greeks, grown inſolent from their conqueſts in Perſia, turned their arms againſt each other, and bandied together under the conduct of the two moſt opulent ſtates Athens and Lacedæmon. Alcibiades, in the midſt of an expedition he had planned againſt the enemy of his country, was recalled home to anſwer ſome charge of a private nature; but fearing the violence of his enemies, inſtead of going to Athens, he offered his ſervices at Sparta, where they were readily accepted. By his advice the Lacedæmonians made a league with Perſia, which gave a very favourable turn to their affairs. But his credit in the republic raiſing jealouſies againſt him, he privately reconciled himſelf to his country, and took again the command of an Athenian army. Here victory, waiting as it were at his command, attended all his motions. The loſs of ſeven battles obliged the Spartans to ſue for peace. He enjoyed his triumphs, however, only a ſhort time at Athens. One unſucceſsful event made him again obnoxious to the malice of his citizens; and he found it expedient to retire from Athens. In his abſence the Spartans again took the lead, and at the fatal battle of Ægos entirely ſubdued the Athenian power. Alcibiades, though an exile, endeavoured to reſtore the power of his country; of which the Spartans having intelligence, procured him to be aſſaſſinated. He was a man of admirable accompliſhments, but indifferently principled; of great parts; and of an amazing verſability of genius.

ALCINOUS, king of the Phæacians, in the iſland now called *Corfu*, was ſon of Nauſithous, and grandſon of Neptune and Peribea. It is by his gardens this king has chiefly immortalized his memory. He received Ulyſſes with much civility, when a ſtorm had caſt him on his coaſt. The people here loved pleaſure and good cheer, yet were ſkilful ſeamen; and Alcinous was a good prince.

ALCMAER, a city of the United Provinces, ſeated in North Holland, about four miles from the ſea, fifteen from Haerlem, and eighteen from Amſterdam. It is a handſome city, and one of the cleaneſt in Holland. The ſtreets and houſes are extremely neat and regular, and the public buildings very beautiful. It had formerly two pariſh-churches, dedicated to St Matthew and St Lawrence. The latter had ſo high a tower, that it ſerved for a ſea-mark to the veſſels that were in the open ſea; but, in 1464, it tumbled down, and damaged the other church ſo much, that they were both demoliſhed in 1470, and one church was built in their ſtead, dedicated to the ſame ſaints. The Spaniards, under the command of Frederic of Toledo, ſon of the duke d'Alva, came to beſiege it, after they had taken Haerlem in 1573; but were forced to raiſe the ſiege, after three months lying before it, as well on account of the infection of the air as the ſtout reſiſtance of the inhabitants and ſoldiers; even the women

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† See *Chemiſtry*, n° 5, 10.

men ſignalizing themſelves bravely in its defence. It is recorded in the regiſter of this city, that, in the year 1637, one hundred and twenty tulips, with the off-ſets, ſold for 90,000 florins. The town has a very good trade in butter and cheeſe, of which a vaſt quantity is ſold every year, and is eſteemed the beſt in Holland. E. long. 4. 26. N. lat. 52. 28.

ALCMAN, a lyric poet, who flouriſhed in the 27th Olympiad. He was born at Sparta; and compoſed ſeveral poems, of which only ſome fragments are remaining, quoted by Athenæus and ſome other ancient writers. He was very amorous; accounted the father of gallant poeſy; and is ſaid to have been the firſt that introduced the cuſtom of ſinging love-ſongs in company. He is reported to have been one of the greateſt eaters of his age; upon which Mr Bayle remarks, that ſuch a quality would have been extremely inconvenient, if poetry had been at that time upon ſuch a footing as it has been often ſince, not able to procure the poet bread. He died of a ſtrange diſeaſe; for he was eat up with lice.

ALCMANIAN, in ancient lyric poetry, a kind of verſe conſiſting of two dactyles and two trochees; as,—

Virgini|bus pue|riſque | canto.

The word is formed from *Alcman*, the name of an ancient Greek poet, in great eſteem for his erotics or amorous compoſitions.

ALCMENA, the daughter of Electryo king of Mycenæ, and wife of Amphitryon. Jupiter putting on the ſhape of her huſband while he was abroad in the wars, begot Hercules upon her: he made that night as long as three ordinary ones.

ALCOA ARBOR, the name of a tree in St Helena, ſaid to emulate ebony.

ALCOCK (John), doctor of laws, and biſhop of Ely in the reign of king Henry VII. born at Beverly in Yorkſhire, and educated at Cambridge. He was firſt made dean of Weſtminſter, and afterwards appointed maſter of the rolls. In 1471, he was conſecrated biſhop of Rocheſter: in 1476, he was tranſlated to the ſee of Worceſter; and in 1486, to that of Ely, in the room of Dr John Morton, preferred to the ſee of Canterbury. He was a prelate of great learning and piety; and ſo highly eſteemed by king Henry, that he appointed him lord preſident of Wales, and afterwards lord chancellor of England. Alcock founded a ſchool at Kingſton upon Hull, and built the ſpacious hall belonging to the epiſcopal palace at Ely. He was alſo the founder of Jeſus-college in Cambridge, for a maſter, ſix fellows, and as many ſcholars. This houſe was formerly a nunnery, dedicated to St Radigund: and, as Godwin tells us, the building being greatly decayed, and the revenues reduced almoſt to nothing, the nuns had all forſaken it, except two; whereupon biſhop Alcock procured a grant from the crown, and converted it into a college. But Cambden and others tell us, that the nuns of that houſe were ſo notorious for their incontinence, that King Henry VII. and Pope Julius II. conſented to its diſſolution: Bale accordingly calls this nunnery *ſpiritualium meretricum cœnobium*, "a community of ſpiritual harlots." Biſhop Alcock wrote ſeveral pieces, amongſt which are the following: 1. *Mons Perfectionis.* 2. *In Pſalmos Penitentiales.* 3. *Homiliæ Vulgares.* 4. *Meditationes Piæ.* He died October 1st, 1500; and was buried in the chapel he had built at Kingſton upon Hull.

ALCOHOL, or ALKOOL, in chemiſtry, ſpirit of wine highly rectified *. It is alſo uſed for any highly rectified ſpirit.—Alcohol is extremely light and inflammable: It is a ſtrong antiſeptic, and therefore employed to preſerve animal ſubſtances.

ALCOHOL is alſo uſed for any fine impalpable powder.

ALCOHOLIZATION, the proceſs of rectifying any ſpirit. It is alſo uſed for pulverization.

ALCORAN, or AL-KORAN, the ſcripture, or bible, of the Mahometans. The word is compounded of the Arabic particle *al*, and *coran* or *koran*, derived from verb *caraa* or *karaa*, to read. The word therefore properly ſignifies, *the reading*; or rather, *that which ought to be read*. By this name the Mahometans denote not only the entire book or volume of the Koran, but alſo any particular chapter or ſection of it; juſt as the Jews call either the whole ſcripture, or any part of it, by the name of *Karah*, or *Mikra*, words of the ſame origin and import.

Beſides this peculiar name, the Koran is alſo honoured with ſeveral appellations common to other books of ſcripture: as, *al Farkan*, from the verb *foraka*, *to divide* or *diſtinguiſh*; not, as the Mahometan doctors ſay, becauſe thoſe books are divided into chapters or ſections, or diſtinguiſh between good and evil; but in the ſame notion that the Jews uſe the work *Perek*, or *Pirka*, from the ſame root, to denote a ſection or portion of ſcripture. It is alſo called *al Moſhaf*, *the volume*, and *al Kitab*, *the book*, by way of eminence, which anſwers to the *Biblia* of the Greeks; and *al Dhikr*, *the admonition*, which name is alſo given to the Pentateuch and Goſpel.

The Koran is divided into 114 larger portions of very unequal length, which we call *chapters*; but the Arabians *ſowar*, in the ſingular *ſura*; a word rarely uſed on any other occaſion, and properly ſignifying a row, order, or a regular ſeries; as a courſe of bricks in building, or a rank of ſoldiers in an army; and is the ſame in uſe and import with the Sura, or Tora, of the Jews, who alſo call the fifty-three ſections of the Pentateuch *Sedarim*, a word of the ſame ſignification.

Theſe chapters are not, in the manuſcript copies, diſtinguiſhed by their numerical order, but by particular titles, which are taken ſometimes from a particular matter treated of, or perſon mentioned therein; but uſually from the firſt word of note, exactly in the ſame manner as the Jews have named their Sedarim; though the word from which ſome chapters are denominated be very far diſtant, towards the middle, or perhaps the end, of the chapter; which ſeems ridiculous. But the occaſion of this appears to have been, that the verſe or paſſage wherein ſuch word occurs, was, in point of time, revealed and committed to writing before the other verſes of the ſame chapter which precede it in order; and the title being given to the chapter before it was completed, or the paſſages reduced to their preſent order, the verſe from whence ſuch title was taken did not always happen to begin the chapter. Some chapters have two or more titles, occaſioned by the difference of the copies.

Some of the chapters having been revealed at Mecca, and others at Medina, the noting this difference makes a part of the title: but the reader will obſerve, that ſeveral

* See *Chemiſtry*, nº 563.

veral of the chapters are ſaid to have been revealed partly at Mecca, and partly at Medina; and, as to others, it is yet a diſpute among the commentators to which of the two places they belong.

Every chapter is ſubdivided into ſmaller portions, of very unequal length alſo, which we cuſtomarily call *verſes*: but the Arabic word is *ayat*, the ſame with the Hebrew *ototh*, and ſignifies *ſigns* or *wonders*: ſuch as are the ſecrets of God, his attributes, works, judgements, and ordinances, delivered in thoſe verſes; many of which have their particular titles alſo, impoſed in the ſame manner as thoſe of the chapters.

Beſides theſe unequal diviſions of chapter and verſe, the Mahometans have alſo divided their Koran into ſixty equal portions, which they call *Ahzab*, in the ſingular *Hizb*, each ſubdivided into four equal parts; which is alſo an imitation of the Jews, who have an ancient diviſion of their Miſhma into ſixty portions called *Maſſictoth*. But the Koran is more uſually divided into thirty ſections only, named *Ajza*, from the ſingular *Joz*, each of twice the length of the former, and in the like manner ſubdivided into four parts. Theſe diviſions are for the uſe of the readers of the Koran in the royal temples, or in the adjoining chapels where the emperors and great men are interred. There are thirty of theſe readers belonging to every chapel, and each reads his ſection every day, ſo that the whole Koran is read over once a-day.

Next after the title, at the head of every chapter, except only the ninth, is prefixed the following ſolemn form, by the Mahometans called the *Biſmallah*, IN THE NAME OF THE MOST MERCIFUL GOD; which form they conſtantly place at the beginning of all their books and writings in general, as a peculiar mark or diſtinguiſhing characteriſtic of their religion, it being counted a ſort of impiety to omit it. The Jews, for the ſame purpoſe, make uſe of the form, *In the name of the* LORD, or, *In the name of the great* GOD; and the eaſtern Chriſtians that of, *In the name of the Father, and of the Son, and of the Holy Ghoſt*. But Mahomet probably took this form, as he did many other things, from the Perſian Magi, who uſed to begin their books in theſe words, *Benam Yezdan bakhſhaiſhgher dadar*; that is, *In the name of the moſt merciful juſt* GOD.

There are twenty-nine chapters of the Koran, which have this peculiarity, that they begin with certain letters of the alphabet, ſome with a ſingle one, others with more. Theſe letters the Mahometans believe to be the peculiar marks of the Koran, and to conceal ſeveral profound myſteries, the certain underſtanding of which, the more intelligent confeſs, has not been communicated to any mortal, their prophet only excepted. Notwithſtanding which, ſome will take the liberty of gueſſing at their meaning by that ſpecies of Cabala called by the Jews *Notarikon*, and ſuppoſe the letters to ſtand for as many words, expreſſing the names and attributes of God, his works, ordinances, and decrees; and therefore theſe myſterious letters, as well as the verſes themſelves, ſeem in the Koran to be called *ſigns*. Others explain the intent of theſe letters from their nature or organ, or elſe from their value in numbers, according to another ſpecies of the Jewiſh Cabala called *Gematria*; the uncertainty of which conjectures ſufficiently appears from their diſagreement. Thus, for example, five chapters, one of which is the ſecond, begins with theſe letters, A. L. M. which ſome imagine to ſtand for *Allah latif magid*, "GOD *is gracious and to be glorified*;" or, *Ana li minni*, i. e. *to me and from me*, viz. belongs all perfection, and proceeds all good; or elſe for *Ana Allah alam*, "*I am the moſt wiſe* GOD," taking the firſt letter to mark the beginning of the firſt word, the ſecond the middle of the ſecond word, and the third the laſt of the third word; or for *Allah*, *Gabriel*, *Mohammed*, the author, revealer, and preacher of the Koran. Others ſay, that as the letter A belongs to the lower part of the throat, the firſt of the organs of ſpeech; L to the palate, the middle organ; and M to the lips, which are the laſt organ; ſo theſe letters ſignify that God is the beginning, middle, and end, or ought to be praiſed in the beginning, middle, and end, of all our words and actions: or, as the total value of thoſe three letters, in numbers, is ſeventy-one, they ſignify, that, in the ſpace of ſo many years, the religion preached in the Koran ſhould be fully eſtabliſhed. The conjecture of a learned Chriſtian is at leaſt as certain as any of the former, who ſuppoſes thoſe letters were ſet there by the amanuenſis, for *Amar li Mohammed*, i. e. *At the command of Mohammed*, as the five letters prefixed to the nineteenth chapter ſeem to be there written by a Jewiſh ſcribe, for *Coh yaas*, i. e. *Thus he commanded*.

The Koran is univerſally allowed to be written with the utmoſt elegance and purity of language, in the dialect of the tribe of Koreiſh, the moſt noble and polite of all the Arabians, but with ſome mixture, though very rarely, of other dialects. It is confeſſedly the ſtandard of the Arabic tongue, and, as the more orthodox believe, and are taught by the book itſelf, inimitable by any human pen (though ſome ſectaries have been of another opinion), and therefore inſiſted on as a permanent miracle, greater than that of raiſing the dead, and alone ſufficient to convince the world of its divine original.

And to this miracle did Mahomet himſelf chiefly appeal for the confirmation of his miſſion, publicly challenging the moſt eloquent men in Arabia, which was at that time ſtocked with thouſands whoſe ſole ſtudy and ambition it was to excel in elegance of ſtyle and compoſition, to produce even a ſingle chapter that might be compared with it (A).

To the pomp and harmony of expreſſion ſome aſcribe all the force and effect of the Alcoran; which they conſider as a ſort of muſic, equally fitted with other ſpecies of that art to raviſh and amaze. In this Mahomet ſucceeded ſo well, and ſo ſtrangely captivated the minds of his audience, that ſeveral of his opponents thought it the effect of witchcraft and enchantment, as he himſelf complains.—Others have attributed the effect of the Alcoran to the frequent mention of rewards and puniſhments; heaven and hell occuring almoſt in every page. Some ſuppoſe, that the ſenſual pleaſures of paradiſe, ſo frequently ſet before the imaginations of the readers of the Alcoran, were what chiefly bewitched them. Tho', with

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(A) As the compoſition and arrangement of words, however, admit of infinite varieties, it can never be abſolutely ſaid that any one is the beſt poſſible. In fact, Hamzah Benahmed wrote a book againſt the alcoran with at leaſt equal elegance; and Moſelema another, which even ſurpaſſed it, and occaſioned a defection of a great part of the Muſſulmans. *Journ. de Scav.* tom. xiii. p. 280. *Ouvr. de Scav.* Nov. 1708. p. 404.

with regard to theſe, there is great diſpute whether they are to be underſtood literally or ſpiritually. Several have even allegorized the whole book.

The general deſign of the Koran was to unite the profeſſors of the three different religions then followed in the populous country of Arabia, (who, for the moſt part, lived promiſcuouſly, and wandered without guides, the far greater number being idolaters, and the reſt Jews and Chriſtians moſtly of erroneous and heterodox belief) in the knowledge and worſhip of one God, under the ſanction of certain laws, and the outward ſigns of ceremonies partly of ancient and partly of novel inſtitution, enforced by the conſideration of rewards and puniſhments both temporal and eternal; and to bring them all to the obedience of Mahomet, as the prophet and ambaſſador of God, who, after the repeated admonitions, promiſes, and threats, of former ages, was at laſt to eſtabliſh and propagate God's religion on earth, and to be acknowledged chief pontiff in ſpiritual matters, as well as ſupreme prince in temporal.

The great doctrine then of the Koran, is the unity of God; to reſtore which point Mahomet pretended was the chief end of his miſſion; it being laid down by him as a fundamental truth, That there never was, nor ever can be, more than one true orthodox religion. For, though the particular laws or ceremonies are only temporary, and ſubject to alteration, according to the divine direction; yet, the ſubſtance of it being eternal truth, is not liable to change, but continues immutably the ſame. And he taught, that, whenever this religion became neglected, or corrupted in eſſentials, God had the goodneſs to re-inform and re-admoniſh mankind thereof, by ſeveral prophets, of whom Moſes and Jeſus were the moſt diſtinguiſhed, till the appearance of Mahomet, who is their ſeal, and no other to be expected after him. The more effectually to engage people to hearken to him, great part of the Koran is employed in relating examples of dreadful puniſhments formerly inflicted by God on thoſe who rejected and abuſed his meſſengers; ſeveral of which ſtories, or ſome circumſtances of them, are taken from the Old and New Teſtaments, but many more from the apocryphal books and traditions of the Jews and Chriſtians of thoſe ages, ſet up in the Koran as truths in oppoſition to the ſcriptures, which the Jews and Chriſtians are charged with having altered: and indeed, few or none of the relations or circumſtances in the Koran were invented by Mahomet, as is generally ſuppoſed, it being eaſy to trace the greateſt part of them much higher, as the reſt might be, were more of thoſe books extant, and was it worth while to make the inquiry.

The reſt of the Alcoran is taken up in preſcribing neceſſary laws and directions, frequent admonitions to moral and divine virtues, the worſhip and reverence of the ſupreme being, and reſignation to his will. One of their moſt learned commentators diſtinguiſhes the contents of the Alcoran into *allegorical* and *literal*; under the former are comprehended all the obſcure, parabolical, and ænigmatical paſſages, with ſuch as are repealed, or abrogated; the latter, ſuch as are clear, and in full force.

The moſt excellent moral in the whole Alcoran interpreters ſay, is that in the chapter *Al Alraf*, *viz.* Shew mercy, do good to all, and diſpute not with the ignorant; or, as Mr Sale renders it, Uſe indulgence, command that which is juſt, and withdraw far from the ignorant. Mahomet, according to the authors of the *Keſchaf*, having begged of the angel Gabriel a more ample explication of this paſſage, received it in the following terms: "Seek him who turns thee out, give to him "who takes from thee, pardon him who injures thee; "for God will have you plant in your ſouls the roots of "his chief perfections." It is eaſy to ſee, that this commentary is copied from the Goſpel.—In reality, the neceſſity of forgiving enemies, though frequently inculcated in the Alcoran, is of a later date among the Mahometans than among the Chriſtians; among thoſe latter, than among the heathens; and to be traced originally among the Jews *. But it matters not ſo much who had it firſt, as who obſerves it beſt. The caliph Haſſan, ſon of Hali, being at table, a ſlave unfortunately let fall a diſh of meat reeking hot, which ſcalded him ſeverely. The ſlave fell on his knees, rehearſing theſe words of the Alcoran, "Paradiſe is for thoſe who reſtrain their anger." I am not angry with thee, anſwered the caliph. "And for thoſe who forgive offences "againſt them," continues the ſlave. I forgive thee thine, replies the caliph. "But above all, for thoſe "who return good for evil," adds the ſlave. I ſet thee at liberty, rejoined the caliph, and I give thee ten dinars.

There are alſo a great number of occaſional paſſages in the Alcoran, relating only to particular emergencies. For this advantage Mahomet had in the piecemeal method of receiving his revelation, that whenever he happened to be perplexed and gravelled with any thing, he had a certain reſource in ſome new morſel of revelation. It was an admirable contrivance of his, to bring down the whole Alcoran at once, only to the loweſt heaven, not to earth; ſince, had the whole been publiſhed at once, innumerable objections would have been made, which it would have been impoſſible for him to ſolve: but as he received it by parcels, as God ſaw fit they ſhould be publiſhed for the converſion and inſtruction of the people, he had a ſure way to anſwer all emergencies, and to extricate himſelf with honour from any difficulty which might occur.

That Mahomet was really the author and chief contriver of the Koran, is beyond diſpute; though it is highly probable that he had no ſmall aſſiſtance in his deſign from others, as his countrymen failed not to object to him: however, they differed ſo much in their conjectures as to the particular perſons who gave him ſuch aſſiſtance, that they were not able, it ſeems, to prove the charge; Mohammed, it is to be preſumed, having taken his meaſures too well to be diſcovered.

However it be, the Mahometans abſolutely deny the Koran was compoſed by their prophet himſelf, or any other for him. It is their general and orthodox belief, that it is of divine original; nay, that it is eternal and uncreated, remaining, as ſome expreſs it, in the very eſſence of God: that the firſt tranſcript has been from everlaſting by God's throne, written on a table of vaſt bigneſs, called the *preſerved table*, in which are alſo recorded the divine decrees paſt and future: that a copy from this table, in one volume on paper, was by the miniſtry of the angel Gabriel ſent down to the loweſt heaven, in the month of Ramadan, on the night of *power*: from whence Gabriel revealed it to Mahomet by parcels, ſome at Mecca, and ſome at Medina, at different times, during the ſpace of twenty-three years, as the exigency of affairs required; giving him, however, the conſolation to ſhew him the whole (which they tell us was bound in ſilk, and adorned with gold and precious ſtones of paradiſe) once a-year; but in the laſt year of his life he had the favour to ſee it twice. They ſay, that few chapters were delivered entire, the moſt part being revealed piecemeal, and written down from time to time by the prophet's amanuenſis in ſuch a part of ſuch or ſuch a chapter, till they were compleated, according to the directions of the angel. The firſt parcel that was revealed is generally agreed to have been the firſt five verſes of the ninety-ſixth chapter.

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* See Exod. xxiii. 4, 5.

After the new-revealed paſſages had been from the prophet's mouth taken down in writing by his ſcribe, they were publiſhed to his followers, ſeveral of whom took copies for their private uſe, but the far greater number got them by heart. The originals, when returned, were put promiſcuouſly into a cheſt, obſerving no order of time, for which reaſon it is uncertain when many paſſages were revealed.

When Mahomet died, he left his revelations in the ſame diſorder, and not digeſted into the method, ſuch as it is, in which we now find them. This was the work of his ſucceſſor Abu Becr; who, conſidering that a great number of paſſages were committed to the memory of Mahomet's followers, many of whom were ſlain in their wars, ordered the whole to be collected, not only from the palm-leaves and ſkins on which they had been written, and which were kept between two boards or covers, but alſo from the mouths of ſuch as had gotten them by heart. And this tranſcript, when completed, he committed to the cuſtody of Haſſa the daughter of Omar, one of the prophet's widows.

From this relation it is generally imagined that Abu Becr was really the compiler of the Koran; though, for aught appears to the contrary, Mahomet left the chapters complete as we now have them, excepting ſuch paſſages as his ſucceſſor might add or correct from thoſe who had gotten them by heart; what Abu Becr did elſe, being perhaps no more than to range the chapters in their preſent order, which he ſeems to have done without any regard to time, having generally placed the longeſt firſt.

However, in the thirtieth year of the Hegira, Othman being then caliph, and obſerving the great diſagreement in the copies of the Koran in the ſeveral provinces of the empire; thoſe of Irak, for example, following the reading of Abu Muſa al Aſhari, and the Syrians that of Macdad Ebn Aſwad; he, by the advice of the *companions*, ordered a great number of copies to be tranſcribed from that of Abu Becr, in Haſſa's care, under the inſpection of Zeid Ebn Thabet, Abd'allah Ebn Zobair, Said Ebn al As, and Ad'alrahman Ebn al Hareth the Makhzumite; whom he directed, that, wherever they diſagreed about any word, they ſhould write it in the dialect of the Koreiſh, in which it was at firſt delivered. Theſe copies, when made, were diſperſed in the ſeveral provinces of the empire, and the old ones burnt and ſuppreſſed. Though many things in Haſſa's copy were corrected by the abovementioned reviſers, yet ſome few various readings ſtill occur.

In fine, the book of the Alcoran is held in the higheſt eſteem and reverence among the Muſſelmans. They dare not ſo much as touch the Alcoran, without being firſt waſhed, or legally purified; to prevent which, an inſcription is put on the cover or label, *Let none touch but they who are clean.* It is read with great care and reſpect; being never held below the girdle. They ſwear by it; take omens from it on all weighty occaſions; carry it with them to war; write ſentences of it in their banners; adorn it with gold and precious ſtones; and knowingly ſuffer it not to be in the poſſeſſion of any of a different religion. Some ſay that it is puniſhable even with death, in a Chriſtian, to touch it; others, that the veneration of the Muſſelmans leads them to condemn the tranſlating it into any other language as a profanation: but theſe ſeem to be aggravations. The Mahometans have taken care to have their ſcripture tranſlated into the Perſian, the Javan, the Malayan, and other languages; though, out of reſpect to the original, theſe verſions are generally, if not always, interlineated.

See further concerning the hiſtory of the Alcoran, *Boulainviliers*, Vie de Mahom. p. 258. Act. Erudit. Lipſ. 1694, p. 382. & 1692, p. 331, ſeq.—Its excellency and uſe, *Reland*, Relig. Mahom. in Pref. Jour. Liter. T. 10. p. 29.—Its Characters and Confuſion, Ouvr. des Scav. Sept. 1704, p. 419. Jour. des Scav. T. 37. p. 39. 48. p. 87, T. ſeq.—Its Obſcurity and Difficulties, Mem. de Trev. 1714, p. 1147.—Its Doctrine of Chriſt, Phil. Tranſ. N° 154. p. 433. See alſo *Poſtellus* on its conformity with the Goſpel.—Contradictions in it, how ſolved, *D' Herbel.* p. 87.

Alcoran, is alſo figuratively applied to certain other books full of impieties and impoſtures.—In this ſenſe we meet with the *Alcoran* of the Cordeliers, which has made a great noiſe; wherein St Francis is extravagantly magnified, and put on a level with Jeſus Chriſt. The Alcoran of the Cordeliers is properly an extract of a very ſcarce book, entitled, The conformity of the life of the ſeraphic father St Francis with the life of Chriſt, publiſhed in 1510, *4to.*; ſince, at Bologna, in folio. Eraſmus Albertus, being by the elector of Brandenburg appointed to viſit a monaſtery of Franciſcans, found this book; and being ſtruck with the extreme folly and abſurdity of it, collected a number of curioſities out of it, and publiſhed them under the title of the *Alcoran* of the Franciſcans, with a preface by Martin Luther.

ALCORANISTS, among Mahometans, thoſe who adhere ſtrictly to the letter or text of the alcoran, from an opinion of its ultimate ſufficiency and perfection. The Perſians are generally *Alcoraniſts*, as admitting the alcoran alone for their rule of faith. The Turks, Tartars, Arabs, &c. beſides the alcoran, admit a multitude of traditions. The Alcoraniſts, among Mahometans, amount to much the ſame with the textuaries among the Jews. The Alcoraniſts can find nothing excellent out of the alcoran; are enemies of philoſophers, metaphyſicians, and ſcholaſtic writers. With them the alcoran is every thing.

ALCOVE, among builders, a receſs, or part of a chamber ſeparated by an eſtrade, or partition of columns, and other correſponding ornaments, in which is placed a bed of ſtate, and ſometimes ſeats to entertain company. Theſe alcoves are frequent in Spain; and the bed is raiſed two or three aſcents, with a rail at the foot.

ALCUINUS (Flaccus,) an eccleſiaſtic of the eighth century. Where he was born, is a matter of diſpute; but, according to the moſt probable opinion, it was in Yorkſhire. It is pretty certain, however, that he was educated firſt under Bede, and afterwards by Egbert archbiſhop of York, by whom he was made keeper of the library of that city (A). He thence roſe to be deacon of the church, and afterwards became abbot of Canterbury. In the year 793 he went over to France, upon the invitation of Charlemagne, by whom he was greatly careſſed, and amply provided for. He was not only honoured with his friendſhip and confidence, but became his inſtructor in rhetoric, logic, mathematics, and divinity. He attended him to the council of Francfort; and, at his return, was preſented with the abbeys of Ferrara, St Jodocus, and St Lupus. He retired at laſt to the abbey of St Martin at Tours, where he ſpent the latter part of his life, and died in the year 804. Doubtleſs, he was one of the beſt ſcholars and wiſeſt men of his time. France was chiefly indebted to him for her improvements in literature. The univerſities of Paris, Tours, Fulden, Soiſſons, and many others, owe to him their origin and increaſe; and to him was owing the inſtitution of learned academies, at leaſt the firſt one * we read of was ſet on foot by the emperor at his inſtigation. His works were collected and publiſhed by Andrew du Cheſne in one volume folio, Paris, 1617. They conſiſt of, 1. Tracts upon ſcripture. 2. Tracts upon doctrine, diſcipline, and morality. 3. Hiſtorical treatiſes, letters, and poems. Since this edition, there has been publiſhed an incredible number of tracts, poems, &c. aſcribed to this author, moſt of which, in all probability, were not his.

* See *Academy.*

ALCYON, the trivial name of a ſpecies of alcedo †.

† See *Alcedo.*

ALCYONIUM, an obſolete name of a ſubmarine plant. It is alſo uſed for a kind of coral, or aſtroites, frequently found foſſile in England.

ALCYONIUM STAGNUM, (anc. geogr.) a lake in the territory of Corinth, whoſe depth was unfathomable, and in vain attempted to be diſcovered by Nero: through this lake Bacchus is ſaid to have deſcended to hell, to bring back Semele; (Pauſanias).

ALCYONIUS (Peter), a learned Italian, who flouriſhed in the 16th century. He was well verſed in the Greek and Latin tongues, and wrote ſome pieces of eloquence which met with great approbation. He was corrector of the preſs a conſiderable time for Aldus Manutius, and is intitled to a ſhare in the praiſes given to the editions of that learned printer. He publiſhed a treatiſe concerning baniſhment, which contained ſo many fine paſſages intermixed with others quite the reverſe, that it was thought he had tacked to ſomewhat of his own, ſeveral fragments of a treatiſe of *Cicero de gloria;* and that afterwards, in order to ſave himſelf from being detected in this theft, he burnt the manuſcript of Cicero, the only one extant. Paulus Manutius, in his commentary upon theſe words of Cicero, "Librum tibi celeriter mittam de gloria, I will ſpeedily ſend you my treatiſe on glory;" has the following paſſage relating to this affair: "He means (ſays he) his two books On Glory, which were handed down to the age of our fathers; for Bernard Juſtinian, in the index of his books, mentions *Cicero de Gloria.* This treatiſe however, when Bernard had left his whole library to a nunnery, could not be found, though ſought after with great care: nobody doubted but Peter Alcyonius, who, being phyſician to the nunnery, was entruſted with the library, had baſely ſtole it. And truly, in his treatiſe Of Baniſhment, ſome things are found interſperſed here and there, which ſeem not to ſavour of Alcyonius, but of ſome higher author." The two orations he made after the taking of Rome, wherein he repreſented very ſtrongly the injuſtice of Charles V. and the barbarity of his ſoldiers, were excellent pieces. There is alſo an oration aſcribed to him, on the knights who died at the ſiege of Rhodes.

ALDBOROUGH, a ſea-port town in Suffolk, with a market on Saturdays. It is pleaſantly ſituated, in a dale, between a high hill to the weſtward, on which its large old-built church ſtands; the ſea to the eaſt, and its river, running ſouth-weſt. It is a large, long, ordinary town, made up of two or three ſtreets of low houſes, running parallel to each other. A quarter of a mile to the ſouth lies Slaughden, where they have a commodious key, with warehouſes for fiſh: more ſoutherly ſtill, they have conveniences for drying their north-ſea fiſh. Their employment in the fiſhery is their chief buſineſs, which is conſiderable in the ſeaſons for catching herrings and ſprats; and it is the only place in England for curing red ſprats. It is a town corporate, and ſends two members to parliament. Towards the ſea, it has ſome pieces of cannon planted for its defence. It is 88 miles north-eaſt from London. E. Long. 1. 32. N. Lat. 52. 50.

ALDBOROUGH, a market-town in the weſt riding of Yorkſhire, ſeated on the river Ouſe, 15 miles north-weſt of York, and 200 miles north of London. It ſends two members to parliament. W. Long. 0. 20. N. Lat. 54. 15. It was anciently a Roman city, called *Iſurium Brigantium;* and ſeveral coins and monuments of the Saxons and Romans have been diſcovered there.

ALDEBARAN, in aſtronomy, a ſtar of the firſt magnitude, called in Engliſh the *bull's-eye*, as making the eye of the conſtellation Taurus. Its longitude is 6 deg. 32 min. 9 ſec. of Gemini, and its latitude 5 deg. 29 min. 40 ſec. ſouth.

ALDER-TREE, in botany. See ALNUS.

ALDERHOLM, a pleaſant iſland of Sweden, formed by the three arms of a river running thro' Gentle, a town of Nordland, in Sweden. Here is a wharf, a repoſitory for planks and deals, two packing houſes, a large cuſtom-houſe for taking toll of the ſhips, an arſenal for cannon, and a granary.

ALDERMAN, in the Britiſh policy, a magiſtrate ſubordinate to the lord-mayor of a city or town-corporate. The number of theſe magiſtrates is not limited, but is more or leſs according to the magnitude of the place. In London they are 26; each having one of the wards of the city committed to his care. This office is for life; ſo that when one of them dies, or reſigns, a ward-mote is called, who return two perſons, one of whom the lord-mayor and aldermen chuſe to ſupply the vacancy. By the charter of the city of London, all the aldermen who have been lord-mayors, together with the three eldeſt ones not arrived at that dignity, are juſtices of the peace.

(A) William of Malmſbury calls this library *omnium liberalium artium armarium.* It was deſtroyed by fire in the reign of king Stephen, with great part of the city of York.

Alderman, among our Saxon anceſtors, was a degree of nobility anſwering to earl or count at preſent.

Alderman was alſo uſed, in the time of king Edgar, for a judge or juſtice; in which ſenſe, Alwin is called *aldermannus totius Angliæ*.

ALDERNEY, an iſland in the Britiſh channel, ſubject to the crown of Great Britain. It is about eight miles in compaſs, and is ſeparated from Cape la Hogue, in Normandy, by a narrow ſtreight, called the *Race of Alderney*, which is a very dangerous paſſage in ſtormy weather when the two currents meet; otherwiſe it is ſafe, and has depth of water for the largeſt ſhips. Thro' this ſtreight the French fleet made their eſcape, after their defeat at La Hogue, in 1692. It is a healthy iſland, has but one church, is fruitful both in corn and paſture, and is remarkable for a fine breed of cows. The inhabitants, for their greater ſafety, live together in a town of the ſame name. The number of houſes are ſaid to be 200, and the inhabitants 1000. It has but one harbour, called *Crabby*, which is at a good diſtance from the town; and is only fit for ſmall veſſels. To the weſt lie the range of rocks called the *Caſkets*, ſo dangerous to mariners. W. Long. 2. 17. N. Lat. 49. 50.

ALDHELM (St), biſhop of Shireburn in the time of the Saxon Heptarchy. He is ſaid to have been the ſon of Kenred, brother to Ina, king of the Weſt-Saxons; but, in the opinion of William of Malmſbury, his father was no more than a diſtant relation to the king. He was born and educated at Malmſbury in Wiltſhire; where he built a monaſtery, of which he himſelf was the firſt abbot. He was afterwards, in 705, by king Ina, promoted to the ſee of Shireburn, and conſecrated at Rome by Pope Sergius I. whom he is ſaid to have reproved for his incontinency. He was the firſt Engliſhman who wrote in Latin, and the firſt who introduced Latin poetry into this iſland. Bale gives him alſo the character of a ſkilful muſician. According to the monkiſh writers, he wrought many miracles. He died May 25th, 709. Malmeſbury ſays, that he might be juſtly deemed *ex acumine Græcum, ex nitore Romanum, et ex pompa Anglum*. And an ancient chronicler ſays, that he was an excellent harper, a moſt eloquent Saxon and Latin poet, a moſt expert chanter or ſinger, *doctor egregius*, and admirably well verſed in the ſcriptures and the liberal ſciences. Bede ſays of Aldhelm, that "he was a man of univerſal erudition, having an elegant ſtyle, and being wonderfully well acquainted with books." In fact, conſidering the cloud of ignorance by which he was ſurrounded, and the great difficulty of acquiring knowledge without proper inſtruction, Aldhelm was a very extraordinary man. From one of his letters to Hedda, biſhop of Wincheſter, concerning the nature of his ſtudies whilſt at Canterbury, he appears to have been indefatigably determined to acquire every ſpecies of learning in his power. For a copy of this curious epiſtle, ſee Henry's Hiſtory, vol. i. p. 318.—He wrote, 1. *De octo vitiis principalibus*. This treatiſe is extant in *Bibliotheca Patrum* of Caniſius. 2. *Ænigmaticum verſus mille*. This, with ſeveral other of his poems, was publiſhed by Martin Delrio at Mentz, 8vo, 1601. 3. A book addreſſed to a certain king of Northumberland, named Alfrid, on various ſubjects. 4. *De vita monachorum*. 5. *De laude ſanctorum*. 6. *De arithmetica*. 7. *De aſtrologia*. 8. A book againſt the miſtake of the Britons concerning the celebration of Eaſter; printed by Sonius, 1576. 9. *De laude virginitatis*. Manuſcript, in Bennet-college, Cambridge. Publiſhed among Bede's *Opuſcula*. Beſides many ſonnets, epiſtles, and homilies in the Saxon language.

ALDPORT, an ancient name for Mancheſter *.

ALDRICH (Robert), biſhop of Carliſle, was born at Burnham in Buckinghamſhire about the year 1493, and educated at Eaton-ſchool; from whence, in 1507, he was elected ſcholar of King's-college, Cambridge, where he took his degrees in arts, and was afterwards proctor of the univerſity. In 1525, he was appointed maſter of Eaton-ſchool, then became fellow of that college, and finally provoſt. In 1529, he went to Oxford, where, being firſt incorporated bachelor of divinity, in the following year he proceeded doctor in that faculty: in 1531, he was made arch-deacon of Colcheſter; in 1534, canon of Windſor; and the ſame year, regiſtrary of the order of the garter. He was conſecrated biſhop of Carliſle in the year 1537, and died at Horncaſtle in Lincolnſhire in 1556. He wrote, 1. *Epiſtola ad Gul. Hormannum*, in Latin verſe; printed in Horman's *Antiboſſicon*, Lond. 1521, of which book Pitts erroneouſly makes Aldrich the author. 2. *Epigrammata varia*. 3. *Latin verſes, and another epiſtle to Horman*, prefixed to the *Vulgaria puerorum* of that author, Lond. 1519, 4to. 4. *Anſwers to certain queries concerning the abuſes of the maſs*; alſo *about receiving the ſacrament*.

Aldrich (Dr Henry), an eminent Engliſh divine and philoſopher, born at London in 1647, was educated at Weſtminſter ſchool under the famous Dr Buſby, and admitted of Chriſt-church college, Oxford. He had a great ſhare in the controverſy with the Papiſts in the reign of James II. and biſhop Burnet ranks him among thoſe who examined all the points of popery with a ſolidity of judgment, clearneſs of argument, depth of learning, and vivacity of writing, far beyond any who had before that time written in our language. He rendered himſelf ſo conſpicuous, that at the revolution, when Maſſey the popiſh dean of Chriſt-church fled, his deanry was conferred on him. In this ſtation he behaved in an exemplary manner, and that fabric owes much of its beauty to his ingenuity: it was Aldrich who deſigned the beautiful ſquare called *Peckwater-Quadrangle*, which is eſteemed an excellent piece of architecture. In imitation of his predeceſſor Dr Fell, he publiſhed, yearly, a piece of ſome ancient Greek author, as a preſent to the ſtudents of his houſe: he publiſhed *A Syſtem of Logic*, with ſome other pieces; and the reviſing Clarendon's Hiſtory of the Rebellion, was intruſted to him and biſhop Spratt. He died about the year 1711.

ALDROVANDUS (Ulyſſes), profeſſor of philoſophy and phyſic at Bologna, the place of his nativity. He was a moſt curious inquirer into natural hiſtory, and travelled into the moſt diſtant countries on purpoſe to inform himſelf of their natural productions. Minerals, metals, plants, and animals, were the objects of his curious reſearches; but he applied himſelf chiefly to birds, and was at great expence to have figures of them drawn from the life. Aubert le Mire ſays, that he gave a certain painter, famous in that art, a yearly ſalary of 200 crowns, for thirty years and upwards; and that he employed at his own expence Lorenzo Bennini and Cornelius Swintus, as well as the famous engraver Chriſtopher Coriolanus. Theſe expences ruined his fortune, and at length reduced him to the utmoſt neceſſity; and it is ſaid that he died blind in an hoſpital at Bologna, at a great age, in 1605. Mr Bale obſerves, that antiquity does not furniſh us with an inſtance of a deſign ſo extenſive and ſo laborious as that of Aldrovandus, with regard to natural hiſtory; that Pliny has treated of more kinds of ſubjects, but only touches lightly on them, ſaying but a little upon any thing, whereas Aldrovandus has collected all he could meet with. His compilation, or that compiled upon his plan, conſiſts of thirteen volumes in folio, ſeveral of which were printed after his death. He himſelf publiſhed his Ornithology, or Hiſtory of Birds, in three folio volumes, in 1599; and his ſeven books Of Inſects, which make another volume of the ſame ſize. The volume Of Serpents, three Of Quadrupeds, one Of Fiſhes, that Of exanguious Animals, the Hiſtory of Monſters, with the Supplement to that of Animals, the treatiſe Of Metals, and the Dendrology or Hiſtory of Trees, were publiſhed at ſeveral times after the death of Aldrovandus, by the care of different perſons; and Aldrovandus is the ſole author only of the firſt ſix volumes of this work, the reſt having been finiſhed and compiled by others, upon the plan of Aldrovandus: a moſt extenſive plan, wherein he not only relates what he has read in naturaliſts, but remarks alſo what hiſtorians have written, legiſlators ordained, and poets feigned: he explains alſo the different uſes which may be made of the things he treats of, in common life, in medicine, architecture, and other arts; in ſhort, he ſpeaks of morality, proverbs, devices, riddles, hieroglyphics, and many other things which relate to his ſubject.

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* See Mancheſter.

ALDROVANDA, in botany, a genus of the pentandria order, belonging to the pentagynia claſs of plants; of which there is but one ſpecies. The calix is divided into five parts; the petals are five; and the capſule has five valves, with ten ſeeds. It is a native of Italy and the Indies; and has no Engliſh name.

ALDUABIS, (anc. geogr.) a river of Celtic Gaul, which riſing from mount Jura, ſeparating the Sequani from the Helvetii, and running through the county of Burgundy, or the Franche Comté, environs almoſt on every ſide the city of Beſançon; and running by Dole, falls into the Saone near Chalone. In Cæſar it is called *Alduaſdubis*; (in Ptolemy), *Dubis*: now *le Doux*.

ALE, a fermented liquor obtained from an infuſion of malt, and differing from beer chiefly in having a leſs proportion of hops *. This liquor, the natural ſubſtitute of wine in ſuch countries as could not produce the grape, was originally made in Egypt, the firſt planted kingdom, on the diſperſion from the eaſt, that was ſuppoſed unable to produce grapes. And, as the Noachian colonies pierced further into the weſt, they found, or thought they found, the ſame defect; and ſupplied it in the ſame manner. Thus the natives of Spain, the inhabitants of France, and the aborigines of Britain, all uſed an infuſion of barley for their ordinary liquor; and it was called by the various names of *Cælia* and *Ceria* in the firſt country, *Cereviſia* in the ſecond, and *Curmi* in the laſt; all literally importing only *the ſtrong water*.

There are various ſorts of ale known in Britain, particularly *pale* and *brown*: the former is brewed from malt ſlightly dried; and is eſteemed more viſcid than the latter, which is made from malt more highly dried or roaſted.

Pale ale brewed with hard waters, as thoſe of ſprings and wells, is judged the moſt wholeſome, in regard the mineral particles tend to prevent the coheſions of thoſe drawn from the grain, and enable them to paſs the proper ſecretions the better; ſofter waters, as thoſe of rivers, and rain, ſeem better ſuited to draw out the ſubſtance of high-dried malts, which retain many igneous particles, beſt abſorbed in a ſmooth vehicle.

In Staffordſhire, they have a ſecret of fining ale, in a very ſhort time. Plot conjectures it to be done by adding alum, or vinegar, in the working.

Ale is prepared various ways, and of various ingredients, as of wheat, rye, millet, oats, barley, the berries of the quick-bean, &c.

Some have found that the juice which bleeds from the birch or ſycamore, is of great uſe on this occaſion, applied inſtead of water. It makes one buſhel of malt go as far as four in the common way.

Some have a method of preparing ale, ſo that it will keep, carried to the Eaſt or Weſt Indies. The ſecret is, by maſhing twice with freſh malt; boiling twice; and, after ſhipping it, putting to every five gallons two new-laid eggs whole, to remain therein. It is ſaid, that, in a fortnight's time, the ſhells will be diſſolved; and the eggs become like wind-eggs; and that afterwards the white would diſappear, and the yoke remain untouched.

Phil. Tranſ. Nº xxvii.

Ale is generally held to be more diuretic than beer, in regard it is ſmoother, more ſoftening, and relaxing; ſo that where urine is to be promoted by facilitating the paſſage, ale is moſt likely to effect it.

Ale is flatulent; and hence ſometimes produces colics, and the cholera morbus: it is aceſcent; but it does not produce calcareous diſeaſes, as has been aſſerted.

If malt-liquor, of any degree of ſtrength, is become flat and tartiſh, as it is uſed, it ſhould be drawn out of the caſk into a jug, in which as many drams of powdered chalk is put as there are to be pints of liquor; thus a new ferment will be raiſed, a ſprightly taſte will be reſtored to the liquor, and its acidity will be deſtroyed. Tart liquors of this kind are apt to produce a dyſury, ſtrangury, or a gonorrhœa; in which caſes, a ſmall quantity of brandy may be taken.

The conſumption of ale in theſe kingdoms is incredible. It was computed twenty years ago at the value of four millions yearly, including Great Britain and Ireland.

Medicated Ales, thoſe wherein medicinal herbs have been infuſed, or added during the fermentation *.

Gill Ale, is that in which the dried leaves of gill or ground-ivy have been infuſed. It is eſteemed abſterſive and vulnerary, and conſequently good in diſorders of the breaſt and obſtructions of the viſcera.

Ale-*conner*, an officer in London, who inſpects the meaſures uſed in public-houſes. There are four aleconners, who are all choſen by the common-council of the city.

Ale-*ſilver*, a tax paid annually to the lord-mayor of London, by all who ſell ale within the city.

ALEA, in Roman antiquity, denotes in general all manner of games of chance; but, in a more reſtricted ſenſe,

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Brew-

* See *Pharmacy*, nº 381, &c.

ſenſe, was uſed for a particular game played with dice and tables, not unlike our backgammon.

ALEANDER (Jerome), cardinal and archbiſhop of Brindiſi, was born in 1480; and diſtinguiſhed himſelf at the beginning of the reformation, by the oppoſition he made to Luther: for being ſent into Germany as the pope's nuncio in 1519, he acted, as occaſion ſerved, in the character both of ambaſſador and doctor; and declaimed three hours together againſt Luther's doctrine before the diet of Worms, but could not prevent that celebrated reformer from being heard in that diet. He publiſhed ſeveral works, and died at Rome in 1542.

Aleander (Jerome), a learned man of the ſeventeenth century, born in the principality of Friuli, of the ſame family with the preceding. When he went to Rome, he was employed as ſecretary under cardinal Octavius Bandini, and diſcharged this office with great honour for almoſt twenty years. He afterwards, by the perſuaſion of Urban VIII. who had a great eſteem for him, became ſecretary to Cardinal Barberini, whom he accompanied to Rome when he went there in the character of legate *a latere*, and in whoſe ſervice he died in 1631. He was one of the firſt members of the academy of Humoriſts, wrote a learned treatiſe in Italian on the device of the ſociety, and diſplayed his genius on many different ſubjects. Barberini gave him a magnificent funeral at the academy of Humoriſts; the academiſts carried his corpſe to the grave; and Gaſpar Simeonibus, one of the members, made his funeral oration.

ALECTO, one of the furies, daughter of Acheron and the Night, or, as others would have it, of Pluto and Proſerpine.

ALECTORIA, a ſtone ſaid to be formed in the gall-bladders of old cocks, to which the ancients aſcribed many fabulous virtues. This is otherwiſe called *Alectorius Lapis*, ſometimes *Alectorolithos*, in Engliſh the *cock-ſtone*. The more modern naturaliſts hold the *alectorius lapis* to be originally ſwallowed down, not generated in, the ſtomach or gizzard of cocks and capons. It is known that many of the fowl-kind make a practice of ſwallowing pebbles, as it is ſuppoſed to be of ſervice in the buſineſs of trituration and digeſtion.

ALECTOROMANTIA, in antiquity, a ſpecies of divination performed by means of a cock. This is otherwiſe called *Alectryomancy;* of which there appear to have been different ſpecies. But that moſt ſpoken of by authors was in the following manner: A circle being deſcribed on the ground, and divided into twenty-four equal portions, in each of theſe ſpaces was written one of the letters of the alphabet, and on each of the letters was laid a grain of wheat; after which, a cock being turned looſe in the circle, particular notice was taken of the grains picked up by the cock, becauſe the letters under them, being formed into a word, made the anſwer deſired. It was thus, according to Zonaras, that Libanius and Jamblicus ſought who ſhould ſucceed the emperor Valens; and the cock eating the grains anſwering to the ſpaces ΘΕΟΔ, ſeveral whoſe names began with thoſe letters, as Theodotus, Theodiſtes, Theodulus, &c. were put to death; which did not hinder, but promote, Theodoſius to the ſucceſſion. But the ſtory, however current, is but ill ſupported: It has been called in queſtion by ſome, and refuted by others, from the ſilence of Marcellinus, Socrates, and other hiſtorians of that time.

A-LEE, in the ſea-language, a term only uſed when the wind, croſſing or flanking the line of a ſhip's courſe, preſſes upon the maſts and ſails ſo as to make her incline to one ſide, which is called the lee-ſide: hence, when the helm is moved over to this ſide, it is ſaid to be *a-lee*, or *hard-a-lee*.

ALEGAMBE (Philip), a celebrated Jeſuit, born at Bruſſels in 1592, diſtinguiſhed himſelf by publiſhing a Bibliotheque of the writers of his order, and died at Rome in 1652.

ALEGRETTE, a ſmall town of Portugal, in Alentejo, on the confines of Port Alegre, on the river Caja, which falls into the Guadiana, a little below Badajoz, near the frontiers of Spaniſh Eſtremadura. It is a very pretty town, and finely ſituated; ſeven miles ſouth-eaſt of Port Alegre, and thirty north of Elvas. W. Long. 5. 20. N. Lat. 39. 6.

ALEIUS CAMPUS, in ancient geography, (Homer, Strabo, Pliny); a plain in Cilicia, on this ſide the river Pyramus, near the mountain Chimera, famous for Bellerophon's wandering and periſhing there, after being thrown off Pegaſus; which is the reaſon of the appellation.

ALEMANIA, or Allemania, (anc. geog.) a name of Germany, but not known before the time of the Antonines, and then uſed only for a part. After the Marcomanni and their allies had removed from the Rhine, a rabble, or collection of people from all parts of Gaul, as the term *Alemanni* denotes, prompted either by levity or poverty, occupied the Agri, called *Decumates* by Tacitus, becauſe they held them on a tithe; now ſuppoſed to be the duchy of *Wirtemburg*. Such appear to be the ſmall beginnings of Alemania, which was in after-times greatly enlarged: but ſtill it was conſidered as a diſtinct part; for Caracalla, who conquered the Alemanni, aſſumed the ſurname both of *Alemannicus* and *Germanicus*.

ALEMBIC, a chemical veſſel, uſually made of glaſs, or copper, for condenſing the vapours that riſe in diſtillation; for the alembic is properly the head or upper part of the apparatus uſed in diſtilling; though it is often uſed to ſignify the whole. See Distilling.

ALEMBROTH, in the writings of the alchemiſts, a word uſed for a ſort of fixed alkaline ſalt, which had the power of the famous alkaheſt, in diſſolving bodies, opening the pores of moſt or all known ſubſtances, and thence, as well as by deſtroying ſulphurs, promoting the ſeparation of metals from their ores.—It is alſo uſed for a compound of corroſive mercury and ſal ammoniac. See Chemistry, n° 337.

ALENIO (Julius), a Jeſuit, born at Breſcia in the republic of Venice. He travelled into the eaſtern countries; and arrived at Maca in 1610, where he taught mathematics. From thence he went to the empire of China, where he continued to propagate the Chriſtian religion for thirty-ſix years. He was the firſt who planted the faith in the province of Xanſi, and he built ſeveral churches in the province of Fokien. He died in Auguſt 1649, leaving behind him ſeveral works in the Chineſe language.

ALENTEJO, a province of Portugal, between the rivers of Tajo and Guadiana: the ſoil is very fertile, and the inhabitants laborious and induſtrious. The principal town is Ebora.

ALENZON, a large handſome town of France, in lower Normandy, with the title of a duchy. It is ſurrounded with good walls, and flanked with towers. The caſtle was formerly a place of great conſequence, and has held out long ſieges. It has but one pariſh-church, which has a bold and noble front. Among the nunneries, that of St Clair is moſt remarkable. It is ſeated on the river Sarte, in a vaſt open plain, which produces all ſorts of corn and fruit. Near it there are quarries of ſtone fit for building, wherein are found a ſort like Briſtol ſtones. The linen made at Alenzon is very good, and ſells at Paris. It is 20 miles north of Mans, 63 ſouth-by-weſt of Rouen, and 88 ſouth-weſt of Paris. Lon. 0. 10. N. lat. 48. 25.

ALEPPO, or HALEB, the metropolis of Syria, is built on eight ſmall hills or eminences, on the higheſt of which the caſtle is erected, and is now generally agreed to be the ancient Beræa. This mount is of a conic form, and ſeems in a great meaſure to be raiſed with the earth thrown up out of a deep broad ditch which ſurrounds it. The ſuburbs to the north-north-eaſt are next in height to this, and thoſe to the weſt-ſouth-weſt are much lower than the parts adjacent and than any other part of the city. It is encompaſſed by an old wall conſiderably decayed, and by a broad ditch now in moſt places turned into gardens. It is about three miles and a half in circumference, but the ſuburbs eight.

The moſques in Aleppo are numerous, and ſome few of them magnificent. Before each of them is an area, with a fountain in the middle, deſigned for ablutions before prayers; and behind ſome of the larger there are little gardens. There are many large khans, or caravanſeras, conſiſting of a capacious ſquare, on all ſides of which are a number of rooms, built on a ground-floor, uſed occaſionally for chambers, ware-houſes, or ſtables. Above ſtairs there is a colonade or gallery on every ſide, in which are the doors of a number of ſmall rooms, wherein the merchants, as well ſtrangers as natives, tranſact moſt of their buſineſs. The ſtreets are narrow; but well paved, and kept very clean.

The bazars or market-places are long covered narrow ſtreets, on each ſide of which are a great number of ſmall ſhops, juſt ſufficient to hold the tradeſman and his goods, the buyer being obliged to ſtand without. Each ſeparate branch of buſineſs has a particular bazar, which is locked up, as well as the ſtreets, an hour and a half after ſun-ſet: but the locks are of wood, though the doors are caſed with iron. The ſlaughter-houſes are in the ſuburbs, open to the fields. The tanners have a khan to work in near the river. To the ſouthward in the ſuburbs they burn lime, and a little beyond that there is a village where they make ropes and catgut. On the oppoſite ſide of the river, to the weſtward, there is a glaſs-houſe, where they make a coarſe white glaſs, in the winter only, for the greateſt part of this manufacture is brought from a village thirty-five miles weſtward.

The city is ſupplied with good water from ſprings, near the banks of the river Heylen, about five miles to the north-eaſt, which is conveyed from thence by an aqueduct, and diſtributed all over the town by earthen pipes. This is ſufficient for drinking, cookery, &c. but the fountains are ſupplied by wells of brackiſh water, of which there is one in every houſe. Their fuel is wood and charcoal in the houſe; but they heat their bagnios with the dung of animals, leaves of plants, parings of fruit, and the like.

The inhabitants of Aleppo, though of different religions, ſeem to be much the ſame ſort of people. The number of ſouls in the city and ſuburbs is computed at about 235,000, of whom 200,000 are Turks, 30,000 Chriſtians, and 5000 Jews. Of the Chriſtians the greater number are Greeks, next to them the Armenians, then the Syrians, and laſtly the Maronites; each of whom have a church in the city called *Judida*, in which quarter, and the parts adjacent, moſt of them reſide. The common language is the vulgar Arabic, but the Turks of condition uſe the Turkiſh. Moſt of the Armenians can ſpeak the Armenian, ſome few Syrians underſtand Syriac, and many of the Jews Hebrew; but ſcarce one of the Greeks underſtand a word of Greek: however, in their manners, they all are much alike. Aleppo is 70 miles eaſt of Scanderoon, on the ſea-coaſt, and 175 north-by-eaſt of Damaſcus. E. long. 37. 40. N. lat. 36. 12.

ALERIA, ALALIA, or ALARIA, (anc. geog.) a town of Corſica, ſituated near the middle of the eaſt ſide of the iſland, on an eminence, near the mouth of the river Rotanus mentioned by Ptolemy; built by the Phocæans, (Diodorus Siculus.) Afterwards Sylla led a colony thither. It is now in ruins, and called *Aleria Diſtrutta*.

ALES (Alexander), a celebrated divine of the confeſſion of Augſbourg, born at Edinburgh the 23d of April 1500. He ſoon made a conſiderable progreſs in ſchool-divinity, and entered the liſts very early againſt Luther, this being then the great controverſy in faſhion, and the grand field wherein all authors young and old uſed to diſplay their abilities. Soon after, he had a ſhare in the diſpute which Patrick Hamilton maintained againſt the eccleſiaſtics, in favour of the new faith he had imbibed at Marpurgh: he endeavoured to bring him back to the Catholic religion; but this he could not effect, and even began himſelf to doubt about his own religion, being much affected by the diſcourſe of this gentleman, and ſtill more by the conſtancy he ſhewed at the ſtake, where David Beton archbiſhop of St Andrew's cauſed him to be burnt. Beginning thus to waver, he was himſelf perſecuted with ſo much violence, that he was obliged to retire into Germany, where he became at length a perfect convert to the Proteſtant religion. The change of religion which happened in England after the marriage of Henry VIII. with Anna Bullen, induced Ales to go to London, in 1535. He was highly eſteemed by Cranmer archbiſhop of Canterbury, Latimer, and Thomas Cromwel, who were at that time in high favour with the king. Upon the fall of theſe favourites, he was obliged to return to Germany; where the elector of Brandenburgh appointed him profeſſor of divinity at Francfort upon the Oder, in 1540. But leaving this place upon ſome diſguſt, he returned to Leipſic, where he was choſen profeſſor of divinity, and died in March 1565. He wrote a Commentary on St John, on the Epiſtles to Timothy, and on the Pſalms, &c.

ALESA, ALÆSA, or HALESA, (anc. geogr.) a town of Sicily, on the Tuſcan ſea, built, according to Diodorus Siculus, by Archonides of Herbita, in the ſecond year of the ninty-fourth olympiad, or four hundred and three years before Chriſt; ſituated on an eminence about a mile from the ſea: now in ruins. It enjoyed immunity from taxes under the Romans, (Diodorus, Cicero.) The inhabitants were called *Haleſini*, (Cicero, Pliny;) alſo *Aleſini*, and *Alæſini*.

ALESHAM, a ſmall neat town in Norfolk. It is 15 miles N. of Norwich, and 121 N. E. by N. of London. E. Long. 0. 30. N. Lat. 52. 53. The town conſiſts of about 400 pretty good houſes; but the ſtreets are narrow, though well paved.

ALESIA, (anc. geog.) called *Alexia* by Livy and others; a town of the Mandubii, a people of Celtic Gaul; ſituated, according to Cæſar, on a very high hill, whoſe foot was waſhed on two ſides by two rivers. The town was of ſuch antiquity, that Diodorus Siculus relates it was built by Hercules. It is ſuppoſed to be the city of *Aliſe*, in the duchy of Burgundy, not far from Dijon.

ALET, a town of France, in Lower Languedoc, with a biſhop's ſee. It is remarkable for its baths, and for the grains of gold and ſilver found in the ſtream which runs from the Pyrenean mountains, at the foot of which it ſtands. It is ſeated on the river Aude, 15 miles S. of Carcaſſone, and 37 N. W. of Narbonne. E. Long. 2. 5. N. Lat. 42. 59.

ALETRIS, in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants. Of this genus, botanical writers enumerate five ſpecies, *viz.* 1. The farinoſa, a native of Virginia, and other parts of North America. 2. The capenſis, a native of the Cape of Good Hope. 3. The hyacinthoides, or Guinea aloe. 4. The zeylanica, or Ceylon aloe. 5. The fragrans, or tree-aloe, a native of Africa. Of theſe only the firſt is ſo hardy as to outlive the winter in Britain, unleſs placed in a ſtove; and even this requires to be ſheltered under a frame. The flowers appear in June or July, of a whitiſh green colour. The third and fifth produce fine ſpikes of white flowers; thoſe of the third kind appearing in July, of the fifth in March or April. By proper management the laſt kind becomes a ſtately plant, riſing to the height of twelve or fourteen feet; the flowers open wide in the evening, and perfume the air of the ſtove. Theſe ſend out one or two heads, or tufts, towards their tops; which may be cut off; and after they have lain a week in the ſtove to heal the wounded parts, they may be planted for increaſe. The other ſpecies ſeldom or never flower in this country, nor does their appearance otherwiſe merit notice.

ALETUM, or ALETA, (anc. geogr.) a town of Celtic Gaul, now extinct. From its ruins aroſe St Malo, in Brittany, at the diſtance of a mile. Its ruins are called *Guich Aleth* in the Britiſh.

ALEXANDER THE GREAT, king of Macedonia. His father Philip laid the plan of that extenſive empire, which his ſon afterwards executed.—Philip, having made himſelf maſter of Greece, began to caſt his eyes upon Perſia, with a view to retaliate upon that haughty empire the injuries of former times. It was the popular topic of the day. But this prince was cut off in the midſt of his enterprize. Such, however, was the influence of Alexander in the aſſembly of the Grecian ſtates, that he was created general of their combined forces in the room of his father. Having made every needful preparation, at the head of a veteran army he invaded Aſia. The lieutenants of Darius, who was then king of Perſia, oppoſed him at the river Granicus, where Alexander obtained a complete victory, after which he purſued his march through Aſia. At Iſſus, near Scanderoon, he was met by Darius in perſon, at the head of a prodigious army. Here he obtained a ſecond victory; and took the camp of Darius, together with his family, whom he treated with the utmoſt humanity. Contrary to all the maxims of war, inſtead of purſuing Darius, he made an excurſion into Egypt; and, as far as appears, through no better motives than thoſe of vanity. Here he was acknowledged to be the ſon of Jupiter Ammon. In the mean time Darius recruited his ſtrength, and got together an army ſuperior to what he brought into the plain of Iſſus. Alexander having finiſhed his Egyptian expedition, traverſed Aſia, and paſſed the Euphrates. At Arbella, a town in Aſſyria, he met Darius. Here a deciſive battle was fought, which put all Perſia into the hands of Alexander. His ambition not being ſatisfied with the conqueſt of that vaſt country, he projected an expedition into India. Here he met with great oppoſition from Porus, a gallant prince, whom in the end he reduced. Beyond the Ganges lay a country ſtill unſubdued. He notified it to his army, that he propoſed to paſs the river. But theſe veterans, harraſſed with the fatigues, and ſeeing no end of their labour, mutinied, and refuſed to march further. The diſappointed chief was therefore obliged to return. At Babylon he propoſed to receive ambaſſadors, appoint governors, and ſettle his vaſt monarchy; but his exceſſes put an end to his life in the midſt of his deſigns, and in the flower of his age.—Alexander had a noble education under Ariſtotle, and other maſters of the firſt eminence; the good effects of which were ſeen in the early part of his life. No prince ever gave nobler inſtances of generoſity, candour, juſtice, prudence, and fortitude. But the tide of his ſucceſſes changed his manners; and he became luxurious, arrogant, cruel, and even brutal. With regard to his public character, he hath been as much the ſubject of different opinions, as any prince of antiquity. By ſome, his conqueſt of Perſia has been conſidered as the greateſt effort of herioſm. His Indian expedition has likewiſe been magnified as an appendage to one vaſt plan of univerſal commerce and legiſlation. But they ſeem to have a truer idea of Alexander, who conſider the whole ſcheme of his conqueſts as the project ſolely of ambition.

ALEXANDER AB ALEXANDRO, a Neapolitan lawyer, of great learning, who flouriſhed toward the end of the 15th and beginning of the 16th century. He followed the profeſſion of the law firſt at Naples, afterwards at Rome: but he devoted all the time he could ſpare to the ſtudy of polite literature; and at length he entirely left the bar, that he might lead a more eaſy and agreeable life with the muſes. The particulars of his life are to be gathered from his work intitled *Genialium Dierum:* We are there informed, that he lodged at Rome, in a houſe that was haunted; and he relates many ſurpriſing particulars about the ghoſt: he ſays alſo, that, when he was very young, he went to the lectures of Philelphus, who explained at Rome the Tuſculan queſtions of Cicero; he was there alſo when Nicholas Perot and Domitius Calderinus read their lectures upon Martial. The particular time when he died is not known; but he was buried in the monaſtery of the Olivets. Tiraquea wrote a learned commentary upon his work, which was printed at Lyons in 1587, and reprinted at Leyden in 1673, with the notes of Dennis Godfrey, Chriſtopher Colerus, and Nicholas Mercerus.

Alexander Severus, emperor of Rome, ſucceeded Heliogabalus about A. D. 222, when but 16 years of age. His mother's name was Mammæa, and by her advice he in a great meaſure regulated his conduct. He applied himſelf to the reformation of abuſes, the ſtate having been greatly diſordered by the vicious conduct of his predeceſſor; he was a moſt ſtrict lover of juſtice, an encourager of learning and learned men, and favourable to the Chriſtians. He made a ſucceſsful expedition againſt the Perſians; but endeavouring to reform his troops, which had grown very licentious under the late bad government, they murdered him at the inſtigation of Maximinus in the 29th year of his age, together with his mother, A. D. 235.

Alexander vi. (Pope), had four baſtards when he was cardinal, for one of which he had ſo great affection that he ſtuck at nothing to raiſe him. Deſigning to poiſon ſome cardinals, he was poiſoned himſelf, A. D. 1503. See Borgia.

Alexander vii. (Pope), whoſe real name was Fabio Chigi, was born at Sienna in 1599. His family finding him a hopeful youth, ſent him early to Rome, where he ſoon engaged in a friendſhip with the marquis Pallavicini, who recommended him ſo effectually to Pope Urban VIII. that he procured him the poſt of Inquiſitor at Malta. He was ſent Vice-legate to Ferrara, and afterward nuncio into Germany: there he had an opportunity of diſplaying his intriguing genius; for he was mediator at Munſter, in the long conference held to conclude a peace with Spain. Cardinal Mazarin had ſome reſentment againſt Chigi, who was ſoon after made a cardinal and ſecretary of ſtate by Innocent X. but his reſentment was ſacrificed to political views. In 1655, when a pope was to be choſen, Cardinal Sacchetti, Mazarin's great friend, finding it was impoſſible for him to be raiſed into St Peter's chair becauſe of the powerful oppoſition made by the Spaniſh faction, deſired Cardinal Mazarin to conſent to Chigi's exaltation. His requeſt was granted, and he was elected pope by the votes of all the 64 cardinals who were in the conclave: an unanimity of which there are but few inſtances in the election of popes. He ſhewed uncommon humility at his election, and at firſt forbad all his relations to come to Rome without his leave; but he ſoon became more favourable to his nephews, and loaded them with favours. It is aſſerted that he had once a mind to turn Proteſtant. The news-papers in Holland beſtowed great encomiums upon him; and acquainted the world, that he did not approve of the cruel perſecutions of the Waldenſes in Piedmont. There is a volume of his poems extant. He loved the *Belles-Lettres*, and the converſation of learned men. He was extremely fond of ſtately buildings; the grand plan of the college *Della Sapienza*, which he finiſhed, and adorned with a fine library, remains a proof of his taſte in architecture. He died in 1667.

Alexander (William), earl of Stirling, an eminent Scots ſtateſman and poet in the reigns of James I. and Charles I. who, after travelling with the duke of Argyle as his tutor or companion, wrote a poetical complaint of his unſucceſsful love of ſome beauty, under the title of *Aurora*. He then removed to the court of James VI. where he applied to the more ſolid parts of poetry, forming himſelf upon the plan of the Greek and Roman tragedians. In 1607, he publiſhed ſome dramatic performances, intitled *The Monarchic Tragedies*, dedicated to king James; who was ſo well pleaſed with them, as to call him his philoſophical poet. After this, he is ſaid to have written *A ſupplement* to complete the third part of Sir Philip Sidney's Arcadia; and in 1613, he produced a poem called *Doomſday, or the great day of judgment*. He was made gentleman-uſher to prince Charles, and maſter of the requeſts; was knighted; and obtained a grant of Nova Scotia, where he projected the ſettlement of a colony, but afterward ſold it to the French. In 1626, he was made ſecretary of ſtate for Scotland; was created firſt viſcount, and then earl, of Stirling; and died in 1640.

Alexander i. (St), whom St Ireneus reckons the fifth biſhop of Rome, ſucceeded St Evariſtus in the year 109, and died in the year 119. There is no account of his life; and the epiſtles which are attributed to him are ſuppoſititious.

Alexander ii. king of Scotland, ſucceeded his father William in 1213, at 16 years of age. He made an expedition into England, to oppoſe the tyranny of king John; who returned the viſit, and was offered battle by Alexander, but refuſed it. He took the city of Carliſle from Henry III. which was afterwards exchanged for Berwick. Alexander died in 1249, in the 51ſt year of his age, and 35th of his reign; and left for his ſucceſſor, his ſon——

Alexander iii. who was crowned king of Scotland in 1249. The Cummings, lords of Scotland, took arms againſt him; and taking him priſoner, confined him at Striveling: but he was afterwards releaſed by his ſubjects. He married the daughter of Henry III. king of England; and was at length killed by a fall from his horſe, on the 10th of April 1290, after having reigned 42, or according to others 37, years.

ALEXANDERS, in botany. See Smyrnium.

ALEXANDREA, (anc. geogr.) a mountain of Myſia, on the ſea-coaſt, forming a part of mount Ida, where Paris gave judgment on the three goddeſſes.

ALEXANDRETTA, by the Turks called *Scanderoon*; a town in Syria, at the extremity of the Mediterranean ſea. It is the port of Aleppo, from which it is diſtant 28 or 30 leagues. It is now little elſe but a heap of ruined houſes, chiefly inhabited by Greeks, who keep tippling-houſes for ſailors. The air is very unwholeſome; and therefore the better ſort of inhabitants, during the hot weather, live at a village called *Bayland*, on a mountain about ten miles off, where there is wholeſome water and excellent fruit. What ſurpriſes ſtrangers moſt, when they arrive at this place, are the pigeons which carry letters to Aleppo, which they reach in about three hours: theſe pigeons are of a ſingular kind *, and are very much celebrated throughout the eaſt. E. Long. 37. 5. N. Lat. 36. 35.

ALEXANDRIA, now *Scanderia*, by Athenæus called Χϱυση; a city of Lower Egypt, and for a long time its capital. This city was built by Alexander the Great, ſoon after the overthrow of Tyre, about 333 years before Chriſt. It is ſituated on the Mediterranean, twelve miles weſt of that mouth of the Nile anciently

* See *Columba*.

Alexandria. anciently called *Canopicum;* and lies in E. long. 30. 19. N. lat. 31. 10.

Alexander is ſaid to have been induced to build this city, on account of its being conveniently ſituated for a fine port; and ſo ſudden was his reſolution, that after he had directed where every public ſtructure was to be placed, fixed the number of temples, and the deities to whom they ſhould be dedicated, &c. there were no inſtruments at hand proper for marking out the walls, according to the cuſtom of thoſe times. Upon this, a workman adviſed the king to collect what meal was among the ſoldiers, and to ſift it in lines upon the ground, whereby the circuit of the walls would be ſufficiently marked out. This advice was followed; and the new method of marking out the walls was, by Ariſtander, the king's ſoothſayer, interpreted as a preſage of the city's abounding with all the neceſſaries of life. Nor was he deceived in his prediction; for Alexandria ſoon became the ſtaple, not only for merchandiſe, but alſo for all the arts and ſciences of the Greeks.

All authors agree, that this city was very commodiouſly ſituated. Its form reſembled that of a ſoldier's coat. The ſtreets were wiſely contrived, ſo as to admit the cooling breezes to refreſh the air. One large beautiful ſtreet paſſed from gate to gate, being 100 feet broad, and five miles long. It had a broad and high wall round it, ſo as to have the ſea cloſe on one ſide, and a great lake on the other, with a narrow paſs at each end.

The architect employed by Alexander in this undertaking was the celebrated Dinocrates, who had acquired ſo much reputation by rebuilding the temple of Diana at Epheſus. The city was firſt rendered populous by Ptolemy Soter, one of Alexander's captains, who, after the death of the Macedonian monarch, being appointed governor of Egypt, ſoon aſſumed the title of king, and took up his reſidence at Alexandria, about 304 years before Chriſt.

In the 30th year of Ptolemy Soter's reign, he took his ſon Ptolemy Philadelphus partner with him in the empire; and by this prince the city of Alexandria was much embelliſhed. In the firſt year of his reign the famous watch-tower of Pharos was finiſhed. It had been begun ſeveral years before by Ptolemy Soter; and, when finiſhed, was looked upon as one of the wonders of the world. The ſame year, the iſland of Pharos itſelf, originally ſeven furlongs diſtant from the continent, was joined to it by a cauſeway. This was the work of Dexiphanes, who completed it at the ſame time that his ſon put the laſt hand to the tower. The tower was a large ſquare ſtructure of white marble; on the top of which, fires were kept conſtantly burning, for the direction of ſailors. The building coſt 800 talents; which, if Attic, amounted to L. 165,000; if Alexandrian, to twice that ſum.

The architect employed in this famous ſtructure fell upon the following contrivance to uſurp the whole glory to himſelf.—Being ordered to engrave upon it the following inſcription, "King PTOLEMY to the Gods the Saviours, for the benefit of Sailors;" inſtead of the king's name he ſubſtituted his own, and then filling up the hollow of the marble with mortar, wrote upon it the abovementioned inſcription. In proceſs of time, the mortar being wore of, the following inſcription appeared: "SOSTRATUS the CNIDIAN, the ſon of DEXIPHANES, to the Gods the Saviours, for the benefit of Sailors."

Alexandria

This year alſo was remarkable for the bringing of the image of Serapis from Pontus to Alexandria. It was ſet up in one of the ſuburbs of the city called *Rhacotis*, where a temple was afterwards erected to his honour, ſuitable to the greatneſs of that ſtately metropolis, and called, from the god worſhipped there, *Serapeum.* This ſtructure, according to Ammianus Marcellinus, ſurpaſſed in beauty and magnificence all others in the world, except the capitol at Rome.—Within the verge of this temple was the famous Alexandrian library. It was founded by Ptolemy Soter, for the uſe of an academy he inſtituted in this city; and, by continual additions by his ſucceſſors, became at laſt the fineſt library in the world, containing no fewer than 700,000 volumes. The method followed in collecting books for this library, was, to ſeize all thoſe which were brought into Egypt by Greeks or other foreigners. The books were tranſcribed in the muſeum, by perſons appointed for that purpoſe; the copies were then delivered to the proprietors, and the originals laid up in the library. Ptolemy Euergetes, having borrowed from the Athenians the works of Sophocles, Euripides, and Æſchylus, returned them only the copies, which he cauſed to be tranſcribed in as beautiful a manner as poſſible; preſenting the Athenians at the ſame time with fifteen talents (upwards of L. 3000 Sterling) for the exchange.

As the muſeum was at firſt in that quarter of the city call *Bruchion*, near the royal palace, the library was placed there likewiſe; but when it came to contain 400,000 volumes, another library, within the Serapeum, was erected by way of ſupplement to it, and on that account called the *daughter* of the former. In this ſecond library 300,000 volumes, in proceſs of time, were depoſited; and the two together contained the 700,000 volumes already mentioned. In the war carried on by Julius Cæſar againſt the inhabitants of this city, the library in the Bruchion, with the 400,000 volumes it contained, was reduced to aſhes. The library in the Serapeum, however, ſtill remained; and here Cleopatra depoſited 200,000 volumes of the Pergamean library, which Marc Antony preſented her with. Theſe, and others added from time to time, rendered the new library at Alexandria more numerous and conſiderable than the former; and though it was often plundered during the revolutions and troubles of the Roman empire, yet it was again and again repaired, and filled with the ſame number of books.

This library continued to be of great fame and uſe in theſe parts, till the year 642, when the Saracens made themſelves maſters of Alexandria. At that time, John, ſurnamed *the grammarian*, a famous Peripatetic philoſopher, being in the city, and in high favour with Amri-Abnol-As, the Saracen general, begged of him the royal library. Amri replied, that it was not in his power to grant ſuch a requeſt; but that he would write to the khalif on that head; ſince, without knowing his pleaſure, he dared not to diſpoſe of a ſingle book. He accordingly wrote to Omar, who was then khalif, acquainting him with the requeſt of his friend: To which the ignorant tyrant replied, That if thoſe books contained the ſame doctrine with the koran, they could be of no uſe, ſince the koran contained all neceſſary truths; but if they contained any thing contrary to that book, they ought not to be ſuffered; and therefore, whatever their contents were, he ordered them to be deſtroyed. Purſuant to this order, they were diſtributed among the public baths; where, for the ſpace of ſix months, they ſerved to ſupply the fires of thoſe places, of which there was an incredible number in Alexandria.

This city, as we have already obſerved, ſoon became extremely populous; and was embelliſhed both by its own princes, and the Romans; but, like moſt other noted cities of antiquity, hath been the ſeat of terrible maſſacres. About 141 years before Chriſt, it was almoſt totally depopulated by Ptolemy Phyſcon. That barbarous monſter, without the leaſt provocation, gave free liberty to his guards to plunder his metropolis, and murder the inhabitants at their pleaſure. The cruelties practiſed on this occaſion cannot be expreſſed; and the few who eſcaped, were ſo terrified, that they fled into other countries. Upon this, Phyſcon, that he might not reign over empty houſes, invited thither ſtrangers from the neighbouring countries; by whom the city was repeopled, and ſoon recovered its former ſplendor. On this occaſion many learned men having been obliged to fly, proved the means of reviving learning in Greece, Aſia Minor, the iſlands of the Archipelago, and other places, where it was almoſt totally loſt.

The new inhabitants were not treated with much more kindneſs by Phyſcon than the old ones had been; for, on their complaining of his tyrannical behaviour, he reſolved on a general maſſacre of the young men. Accordingly, when they were one day aſſembled in the gymnaſium, or place of their public exerciſes, he ordered it to be ſet on fire; ſo that they all periſhed, either in the flames, or by the ſwords of his mercenaries, whom the tyrant had placed at all the avenues.

Though Julius Cæſar was obliged to carry on a war for ſome time againſt this city, it ſeems not to have ſuffered much damage, except the burning of the library already mentioned. Before Cæſar left Alexandria, in acknowledgment of the aſſiſtance he had received from the Jews, he confirmed all their privileges there, and even engraved his decree on a pillar of braſs. This, however, did not prevent the maſſacre of 50,000 of them in this city about the year of Chriſt 67.

The city of Alexandria ſeems to have fallen into decay ſoon after this, and to have forfeited many of its ancient privileges, though for what offence is not known; but when Adrian viſited Egypt, about the year 141, it was almoſt totally ruined. He repaired both the public and private buildings, not only reſtoring the inhabitants to their ancient privileges, but heaping new favours upon them; for which they returned him their ſolemn thanks, and conferred upon him what honours they could while he was preſent; but as ſoon as he was gone, they publiſhed the moſt bitter and virulent lampoons againſt him.

The fickle and ſatirical humour of the Alexandrians was highly diſliked by Adrian, though he inflicted no puniſhment upon them for it; but when they lampooned Caracalla, he did not let them eſcape ſo eaſily. That tyrant, in the year 215, when he viſited their city, having become the ſubject of their fooliſh ſatires, ordered a general maſſacre by his numerous troops, who were diſperſed all over the city. The inhuman orders being given, all were murdered, without diſtinction of age or ſex; ſo that in one night's time the whole city floated in blood, and every houſe was filled with carcaſes. The monſter, who occaſioned this, had retired during the night to the temple of Serapis, to implore the protection of that deity; and, not yet ſatiated with ſlaughter, commanded the maſſacre to be continued all the next day; ſo that very few of the inhabitants remained. As if even this had not been ſufficient, he ſtripped the city of all its ancient privileges; ſuppreſſed the academy; ordered all ſtrangers, who lived there, to depart; and that the few who remained might not have the ſatiſfaction of ſeeing one another, he cut off all communication of one ſtreet with another, by walls built for that purpoſe, and guarded by troops left there.

Notwithſtanding this terrible diſaſter, Alexandria ſoon recovered its former ſplendor, as Caracalla was murdered a ſhort time after. It was long eſteemed the firſt city in the world, next to Rome; and we may judge of its magnificence, and the multitude of people contained in it, from the account of Diodorus Siculus, who relates, that in his time, (44 years before Chriſt), Alexandria had on its rolls 300,000 freemen. Nor does it ſeem to have been at all inferior at the time it was taken by the Saracens; for the general above mentioned ſeems to have been aſtoniſhed at its wealth and beauty, as appears by the following paſſage in his letter to the khalif, mentioned by Eutychius: "I ſhall not pretend to give a particular deſcription of the city I have taken, nor ſend you an account of all the curious and valuable things contained in it. At preſent it will be ſufficient to obſerve, that I have found in it 4000 palaces; 4000 baths; 40,000 Jews that pay tribute; 400 royal *Circi*, or places ſet apart for public diverſions; and 12,000 gardeners, who ſupply the city with all kinds of herbs in great plenty."

At this time, according to the Arabian hiſtorians, Alexandria conſiſted of three cities, *viz. Menna*, or the port, which included Pharos, and the neighbouring parts; *Alexandria*, properly ſo called, where the modern Scanderia now ſtands; and *Nekita*, probably the Necropolis of Joſephus and Strabo.

After the city was taken, Amri, the Saracen general, thought proper to purſue the Greeks who had fled farther up the country; and therefore marched out of Alexandria, leaving but a very ſlender garriſon in the place. The Greeks, who had before fled on board their ſhips, being appriſed of this, returned on a ſudden, ſurpriſed the town, and put all the Arabs they found therein to the ſword: but Amri, receiving advice of what had happened, ſuddenly returned, and drove them out of it with great ſlaughter; after which the Greeks were ſo intimidated, that he had nothing farther to fear from them.—A few years after, however, Amri being deprived of his government by the khalif Othman, the Egyptians were ſo much diſpleaſed with his diſmiſſion, that they inclined to a revolt; and Conſtantine, the Greek emperor, having received intelligence of their diſaffection, began to meditate the reduction of Alexandria. For this purpoſe, he ſent one Manuel, an eunuch, and his general, with a powerful army, to retake that place; which, by the aſſiſtance of the Greeks in the city, who kept a ſecret correſpondence with the imperial forces while at ſea, and joined them as ſoon as they had made a deſcent, he effected, without any conſiderable effuſion of Chriſtian blood. The khalif, now perceiving his miſtake, immediately reſtored Amri to his former dignity. This ſtep was very agreeable to the natives; who having had experience of the military ſkill and bravery of this renowned general, and apprehending that they ſhould be called to an account by the Greeks for their former perfidious conduct, had petitioned Othman to ſend him again into Egypt.—Upon Amri's arrival, therefore, at Alexandria, the Copts, or natives, with the traitor Al-Mokawkas (who had formerly betrayed to Amri the fortreſs of Meſr) at their head, not only joined him, but ſupplied him with all kinds of proviſions, exciting him to attack the Greeks without delay. This he did; and, after a moſt obſtinate diſpute which laſted ſeveral days, drove them into the town, where, for ſome time, they defended themſelves with great bravery, and repelled the utmoſt efforts of the beſiegers. This ſo exaſperated Amri, that he ſwore, "If God enabled him to conquer the Greeks, he would throw down the walls of the city, and make it as eaſy of acceſs as a *bawdy-houſe*, which lies open to every body." Nor did he fail to execute this menace; for having taken the town by ſtorm, he quite diſmantled it, entirely demoliſhing the walls and fortifications. The lives of the citizens, however, were ſpared, at leaſt as far as lay in the general's power; but many of them were put to the ſword by the ſoldiers on their firſt entrance. In one quarter particularly, Amri found them butchering the Alexandrians with unrelenting barbarity; to which, however, by his ſeaſonable interpoſition, he put a ſtop, and on that ſpot erected a moſque, which he called the *moſque of mercy*.

From this time Alexandria never recovered its former ſplendor. It continued under the dominion of the khalifs till the year 924, when it was taken by the Magrebians, two years after its great church had been deſtroyed by fire. This church was called by the Arabs *Al Kaiſaria*, or *Cæſarea;* and had formerly been a pagan temple, erected in honour of Saturn, by the famous queen Cleopatra.

The city was ſoon after abandoned by the Magrebians; but in 928 they again made themſelves maſters of it: their fleet being afterwards defeated by that belonging to the khalif, *Abul Kaſem* the Magrebian general retired from Alexandria, leaving there only a garriſon of 300 men; of which *Thmaâl*, the khalif's admiral, being appriſed, he in a few days appeared before the town, and carried off the remainder of the inhabitants to an iſland in the Nile called *Abukair*. This was done, to prevent Abul-Kâſem from meeting with any entertainment at Alexandria, in caſe he ſhould think proper to return. According to Eutychius, above 200,000 of the miſerable inhabitants periſhed this year.

What contributed to raiſe Alexandria to ſuch a prodigious height of ſplendor as it enjoyed for a long time, was, its being the centre of commerce between the Eaſtern and Weſtern parts of the world. It was with the view of becoming maſter of this lucrative trade, that Alexander built this city, after having extirpated the Tyrians, who formerly engroſſed all the Eaſt-India traffic. Of the immenſe riches which that trade afforded, we may form an idea, from conſidering that the Romans accounted it a point of policy to oppreſs the Egyptians, eſpecially the Alexandrians; and after the defeat of Zenobia, there was a ſingle merchant of Alexandria who undertook to raiſe and pay an army out of the profits of his trade. The Greek emperors drew prodigious tributes from Egypt, and yet the khalifs found their ſubjects in ſo good circumſtances as to ſcrew up their revenues to three hundred millions of crowns.

Though the revolutions which happened in the government of Egypt, after it fell into the hands of the Mahometans, frequently affected this city to a very great degree; yet ſtill the excellence of its port, and the innumerable conveniences reſulting from the Eaſt-India trade, to whomſoever were maſters of Egypt, preſerved Alexandria from total deſtruction, even when in the hands of the moſt barbarous nations. Thus, in the 13th century, when the barbariſm introduced by the Goths, &c. began to wear off from the European nations, and they acquired a taſte for the elegancies of life, the old mart of Alexandria began to revive; and the port, though far from recovering its former magnificence, grew once more famous by becoming the centre of commerce: but having fallen under the dominion of the Turks, and the paſſage round the Cape of Good Hope being diſcovered by the Portugueſe in 1499, a fatal blow was given to the Alexandrian commerce, and the city has ſince fallen into decay.

At preſent, the city of Alexandria is reckoned to have about 14,000 or 15,000 inhabitants; a ſtrange colluvies of different nations, as well as from various parts of the Turkiſh empire. They are in general given to thieving and cheating; and (like their predeceſſors,) ſeditious above all others, were they not kept in awe by the ſeverity of their government. The Britiſh and French carry on a conſiderable commerce with them, and have each a conſul reſiding here. Some Venetian ſhips alſo ſail thither yearly, but with French colours, and under the protection of France. The ſubjects of thoſe kingdoms which keep no conſul here, are ſubjected to a tax by the Grand Signior: but the Jews have found out a method of indemnifying themſelves for this diſadvantage; namely, by ſelling their commodities cheaper than other foreigners can afford. They are alſo favoured by the farmers of the revenue; who know, that, if they do not pay ſome private regard to them, the Jews have it in their power to cauſe fewer merchandizes come into their port during the two years that their farm laſts.

The city is governed like others in the ſame kingdom *. It hath a ſmall garriſon of ſoldiers, part of which are Janiſaries and Aſſaffs; who are very haughty and inſolent, not only to ſtrangers, but to the mercantile and induſtrious part of the people, though ever ſo conſiderable and uſeful. The government is ſo remiſs in favour of theſe wretches, that Mr Norden informs us, one of them did not heſitate to kill a farmer of the cuſtoms, for refuſing to take leſs of him than the duty impoſed, and went off unpuniſhed; it being a common ſalvo among them, that what is done cannot be undone.

* See Eg

The preſent condition of Alexandria is very deſpicable, being now ſo far ruined, that the rubbiſh in many places overtops the houſes. The famous tower of Pharos has long ſince been demoliſhed; and a caſtle, called *Farillon*, built in its place. The cauſeway which joined the iſland to the continent is broken down, and its place ſupplied by a ſtone-bridge of ſeveral arches.

Some parts of the old walls of the city are yet ſtanding. They are flanked with large towers, about 200 paces diſtant from each other, with ſmall ones in the middle. Below are magnificent caſemates, which may ſerve for galleries to walk in. In the lower part of the towers is a large ſquare hall, whoſe roof is ſupported by thick columns of Thebaic ſtone. Above this are ſeveral rooms, over which there are platforms more than 20 paces ſquare.

The next piece of antiquity is the pillar of Pompey, ſaid to be built by Julius Cæſar in commemoration of his victory at Pharſalia. It ſtands upon an eminence, about 200 paces from the city, and is placed upon a ſquare pedeſtal about ſeven or eight feet high; and the pedeſtal ſtands upon a ſquare baſe, one of whoſe ſides is 20 feet. Sandys ſays, it is 36 palms round, and 86 in height, each palm conſiſting of nine inches. The ſhaft is a ſingle ſtone, by ſome called Theban marble, by others granite. On the top is a very fine capital. It is hard to ſay what machines they had in former times to raiſe ſuch a vaſt ſtone as this; for Thevenot, in his laſt viſit, by meaſuring the ſhadow, found it to be 75 royal feet of Paris, which is equal to 80 Engliſh. A few paces from hence ſtood Cæſar's palace: but the remains are only a few porphyry pillars, and the front, which is almoſt entire, and looks very beautiful. The palace of Cleopatra was built upon the walls facing the port, having a gallery on the outſide, ſupported by ſeveral fine columns. Not far from Cleopatra's palace are two obeliſks: one of theſe is thrown down, and almoſt buried in the ſand; and though the other ſtands upright, the pedeſtal is hid by the ſand that ſurrounds it. They are of granite; and each of the four ſides are covered with hieroglyphics. About 70 paces from Pompey's pillar, is the khalis, or the canal of the Nile, which was dug by the ancient Egyptians, to convey the water of the Nile to Alexandria, and fill the ciſterns under the city. On the ſide of the khalis, are gardens full of orange and lemon trees, and the fields are full of caper and palm trees. On the top of a hill is a tower, on which a centinel is always placed, to give notice, by means of a flag, of the ſhips that are coming into the port. From this hill may be ſeen the ſea, the whole extent of the city, and the parts round it.

On the ſouth-weſt ſide of the city, at a mile's diſtance, there are catacombs cut out of a rock, to enter which perſons muſt creep upon all four; but the roof is ten feet high: on each ſide are ſepulchres, cut out of the rock, of which there are four rows one above another. The bones in theſe places were very hard and looked very freſh. Over-againſt this there is another, that runs a long way, but will not admit a man to ſtand upright. Theſe were, doubtleſs, burying-places belonging to the city. The Romans called ſuch places catacombs. Alexandria is about 50 leagues north of Cairo. E. Long. 31. 15. N. Lat. 31. 12.

Alexandria, a ſtrong and conſiderable city of Italy, belonging to the duchy of Milan, with a good caſtle, built in 1178 in honour of Pope Alexander III. This pope made it a biſhopric, with ſeveral privileges and exemptions. Prince Eugene of Savoy took this city in 1706, after three days ſiege. The French took it in 1745; but the king of Sardinia, to whom it belongs by the treaty of Utrecht, retook it in 1746. The fortifications of the town are trifling, but the citadel is conſiderable. It is 15 miles ſouth-eaſt of Caſal, 35 north-by-weſt of Genoa, and 40 ſouth-by-weſt of Milan. E. Long. 8. 40. N. Lat. 44. 53. The country about this town is called the *Alexandrin*.

Alexandria, (an. geog.) a city of Arachoſia, called alſo *Alexandropolis*, on the river Arachotus, (Stephanus, Iſidorus Characenus.)—Another *Alexandria* in Gedroſia, built by Leonatus, by order of Alexander, (Pliny.)—A third *Alexandria* in Aria, ſituated at the lake Arias, (Ptolemy); but, according to Pliny, built by Alexander on the river Arius.—A fourth in the Bactriana, (Pliny.)—A fifth *Alexandria*, an inland town of Carmania, (Pliny, Ptolemy, Ammian.) —A ſixth *Alexandria*, or *Alexandropolis*, in the Sogdiana, (Iſidorus Characenus.)—A ſeventh in India, at the confluence of the Aceſines and Indus, (Arrian.) —An eighth called alſo *Alexandretta* near the Sinus Iſſicus, on the confines of Syria and Cilicia, now *Scanderoon* *, the port-town to Aleppo.—A ninth *Alexandria* of Margiana, which being demoliſhed by the barbarians, was rebuilt by Antiochus the ſon of Seleucus, and called *Antiochia* of Syria, (Pliny); watered by the river Margus, which is divided into ſeveral channels, for the purpoſes of watering the country, which was called *Zotale*. The city was ſeventy ſtadia in circuit, according to Pliny; who adds, that, after the defeat of Craſſus, the captives were conveyed to this place by Orodes, the king of the Parthians.—A tenth, of the Oxiana, built on the Oxus by Alexander, on the confines of Bactria, (Pliny.)—An eleventh, built by Alexander at the foot of mount Paropamiſus, which was called *Caucaſus*, (Pliny, Arrian.)—A twelfth *Alexandria* in Troas, called alſo *Troas* and *Antigonia*, (Pliny.)—A thirteenth, on the Iaxartes, the boundary of Alexander's victories towards Scythia, and the laſt that he built on that ſide.

ALEXANDRIAN, in a particular ſenſe, is applied to all thoſe who profeſſed or taught the ſciences in the ſchool of Alexandria. In this ſenſe, Clemens is denominated *Alexandrinus*, though born at Athens. The ſame may be ſaid of Apion, who was born at Oaſis; and Aroſtarchus, by birth a Samothracian. The chief Alexandrian philoſophers were, Amonius, Plotinus, Origen, Porphyry, Jamblicus, Sopater, Maximus, and Dexippus.

Alexandrian is more particularly underſtood of a college of prieſts, conſecrated to the ſervice of Alexander Severus after his deification. Lampridius relates, that, notwithſtanding Severus was killed by Maximin, the ſenate proſecuted his apotheoſis; and, for regularity of worſhip, founded an order of prieſts, or *ſodales*, under the denomination of *Alexandrini*.

Alexandrian, or *Alexandrine*, in poetry, a kind of verſe conſiſting of twelve, or of twelve and thirteen ſyllables alternately; ſo called from a poem on the life of Alexander, written in this kind of verſe by ſome French poet. Alexandrines are peculiar to modern poetry, and ſeem well adapted to epic poems. They are ſometimes uſed by moſt nations of Europe; but chiefly by the French, whoſe tragedies are generally compoſed of Alexandrines.

ALEXICACUS, ſomething that preſerves the bo-

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* See *Alexandretta*.

dy from harm or miſchief. The word amounts to much the ſame as *alexiterial*.

ALEXICACUS, in antiquity, was an attribute of Neptune, whom the tunny-fiſhers uſed to invoke under this appellation, that their nets might be preſerved from the ξιφιας, or ſword-fiſh, which uſed to tear them; and that he might prevent the aſſiſtance, which it was pretended the dolphins uſed to give the tunnies on this occaſion.

ALEXIPHARMICS, in medicine, are properly remedies for expelling or preventing the ill effects of poiſon: but ſome of the moderns having imagined that the animal ſpirits, in acute diſtempers, were affected by a malignant poiſon, the term has been underſtood to mean medicines adapted to expel this poiſon by the cutaneous pores, in the form of ſweat. In this ſenſe, alexipharmics are the ſame as ſudorifics.

ALEXITERIAL, among phyſicians, a term of much the ſame import with *alexipharmic*; though ſometimes uſed in a ſynonymous ſenſe with amulet.

ALEYN (Charles), an Engliſh poet in the reign of Charles I. In 1631, he publiſhed two poems on the famous victories of Creſci and Poictiers. He ſucceeded his father as clerk of the ordnance, and was commiſſary-general of the artillery to the king at the battle of Edgehill. The next piece he wrote was a poem in honour of Henry VII. and the victory that gained him the crown of England. In 1639, the year before he died, he tranſlated the hiſtory of Eurialius and Lucretia, from the Latin epiſtles of Æneas Sylvius.

ALFAQUES, among the Moors, the name generally uſed for their clergy, or thoſe who teach the Mahometan religion; in oppoſition to the Morabites, who anſwer to monks among Chriſtians.

ALFATERNA, (anc. geog.) the laſt town of Campania, beyond Veſuvius, (Diodorus); the ſame with *Nuceria*, which ſee. The inhabitants *Alſaterni*, (Pliny.)

ALFET, in our old cuſtoms, denotes a caldron full of boiling water, wherein an accuſed perſon, by way of trial or purgation, plunged his arm up to the elbow.

ALFORD, a town in Lincolnſhire, with a market on Tueſdays for proviſions and corn; and two fairs, on Whit-Tueſday, and November 8. for cattle and ſheep. It is ſeated on a ſmall brook that runs through the town, and is a compact place. It is ſix miles from the ſea, and 20 N. of Boſton. E. Lon. 0. 15. N. Lat. 53. 30.

ALFRED, or ÆLFRED, the Great, king of England, was the fifth and youngeſt ſon of Æthelwolf king of the Weſt Saxons, and was born at Wantage in Berkſhire in 849. He diſtinguiſhed himſelf, during the reign of his brother Ethelred, in ſeveral engagements againſt the Danes; and upon his death ſucceeded to the crown, in the year 871, and the 22d of his age. At his aſcending the throne he found himſelf involved in a dangerous war with the Danes, and placed in ſuch circumſtances of diſtreſs as called for the greateſt valour, reſolution, and all the other virtues with which he was adorned. The Danes had already penetrated into the heart of his kingdom; and before he had been a month upon the throne, he was obliged to take the field againſt thoſe formidable enemies. After many battles gained on both ſides, he was at length reduced to the greateſt diſtreſs, and was entirely abandoned by his ſubjects. In this ſituation, Alfred, conceiving himſelf no longer a king, laid aſide all marks of royalty, and took ſhelter in the houſe of one who kept his cattle. He retired afterwards to the iſle of Æthelingey in Somerſetſhire, where he built a fort for the ſecurity of himſelf, his family, and the few faithful ſervants who repaired thither to him. When he had been about a year in this retreat, having been informed that ſome of his ſubjects had routed a great army of the Danes, killed their chiefs, and taken their magical ſtandard (A), he iſſued his letters, giving notice where he was, and inviting his nobility to come and conſult with him. Before they came to a final determination, Alfred, putting on the habit of a harper, went into the enemy's camp, where, without ſuſpicion, he was every where admitted, and had the honour to play before their princes. Having thereby acquired an exact knowledge of their ſituation, he returned in great ſecrecy to his nobility, whom he ordered to their reſpective homes, there to draw together each man as great a force as he could; and upon a day appointed there was to be a general rendezvous at the great wood, called *Selwood*, in Wiltſhire. This affair was tranſacted ſo ſecretly and expeditiouſly, that, in a little time, the king, at the head of an army, approached the Danes, before they had the leaſt intelligence of his deſign. Alfred, taking advantage of the ſurpriſe and terror they were in, fell upon them, and totally defeated them at Æthendune, now Eddington. Thoſe who eſcaped fled to a neighbouring caſtle, where they were ſoon beſieged, and obliged to ſurrender at diſcretion. Alfred granted them better terms than they could expect: he agreed to give up the whole kingdom of the Eaſt-Angles to ſuch as would embrace the Chriſtian religion, on condition they ſhould oblige the reſt of their countrymen to quit the iſland, and, as much as it was in their power, prevent the landing of any more foreigners. For the performance thereof he took hoſtages; and when, in purſuance of the treaty, Guthrum, the Daniſh captain, came, with thirty of his chief officers, to be baptized, Alfred anſwered for him at the font, and gave him the name of *Æthelſtan*; and certain laws were drawn up betwixt the king and Guthrum for the regulation and government of the Danes ſettled in England. In 884, a freſh number of Danes landed in Kent, and laid ſiege to Rocheſter; but the king coming to the relief of that city, they were obliged to abandon their deſign. Alfred had now great ſucceſs; which was chiefly owing to his fleet, an advantage of his own creating. Having ſecured the ſea-coaſts, he fortified the reſt of the kingdom with caſtles and walled towns; and he beſieged and recovered from the

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(A) "This (ſays Sir John Spelman) was a banner with the image of a raven magically wrought by the three ſiſters of Hinguar and Hubba, on purpoſe for their expedition, in revenge of their father Lodebroch's murder, made, they ſay, almoſt in an inſtant, being by them at once begun and finiſhed in a noontide, and believed by the Danes to have carried great fatality with it, for which it was highly eſteemed by them. It is pretended, that being carried in battle, towards good ſucceſs it would always ſeem to clap its wings, and make as if it would fly; but towards the approach of miſhap, it would hang down and not move." *Life of Alfred*, p. 61.

the Danes the city of London, which he reſolved to repair, and keep as a frontier (B).

After ſome years reſpite, Alfred was again called into the field: for a body of Danes, being worſted in the weſt of France, came with a fleet of 250 ſail on the coaſt of Kent; and having landed, fixed themſelves at Appletree: ſhortly after, another fleet of 80 veſſels coming up the Thames, the men landed, and built a fort at Middleton. Before Alfred marched againſt the enemy, he obliged the Danes, ſettled in Northumberland and Eſſex, to give him hoſtages for their good behaviour. He then moved towards the invaders, and pitched his camp between their armies, to prevent their junction. A great body, however, moved off to Eſſex; and croſſing the river, came to Farnham in Surry, where they were defeated by the king's forces. Mean while the Danes ſettled in Northumberland, in breach of treaty, and notwithſtanding the hoſtages given, equipped two fleets; and, after plundering the northern and ſouthern coaſts, ſailed to Exeter, and beſieged it. The king, as ſoon as he received intelligence, marched againſt them; but before he reached Exeter, they had got poſſeſſion of it. He kept them, however, blocked up on all ſides; and reduced them at laſt to ſuch extremities, that they were obliged to eat their horſes, and were even ready to devour each other. Being at length rendered deſperate, they made a general ſally on the beſiegers; but were defeated, though with great loſs on the king's ſide. The remainder of this body of Danes fled into Eſſex, to the fort they had built there, and to their ſhips. Before Alfred had time to recruit himſelf, another Daniſh leader, whoſe name was Laf, came with a great army out of Northumberland, and deſtroyed all before him, marching on to the city of Werheal in the weſt, which is ſuppoſed to be Cheſter, where they remained the reſt of that year. The year following they invaded North-Wales; and after having plundered and deſtroyed every thing, they divided, one body returning to Northumberland, another into the territories of the Eaſt-Angles; from whence they proceeded to Eſſex, and took poſſeſſion of a ſmall iſland called *Mereſig*. Here they did not long remain: for having parted, ſome ſailed up the river Thames, and others up the Lea-road; where drawing up their ſhips, they built a fort not far from London, which proved a great check upon the citizens, who went in a body and attacked it, but were repulſed with great loſs: at harveſt-time the king himſelf was obliged to encamp with a body of troops in the neighbourhood of the city, in order to cover the reapers from the excurſions of the Danes. As he was one day riding by the ſide of the river Lea, after ſome obſervation, he began to think that the Daniſh ſhips might be laid quite dry: this he attempted, and ſucceeded; ſo that the Danes deſerted their fort and ſhips, and marched away to the banks of the Severn, where they built a fort, and wintered at a place called *Quatbrig* (C). Such of the Daniſh ſhips as could be got off, the Londoners carried into their own road; the reſt they burnt and deſtroyed.

Alfred enjoyed a profound peace during the three laſt years of his reign, which he chiefly employed in eſtabliſhing and regulating his government, for the ſecurity of himſelf and his ſucceſſors, as well as the eaſe and benefit of his ſubjects in general. After a troubleſome reign of 28 years, he died on the 28th of October A. D. 900; and was buried at Wincheſter, in Hyde-abbey, under a monument of porphyry.

All our hiſtorians agree in diſtinguiſhing him as one of the moſt valiant, wiſeſt, and beſt of kings that ever reigned in England; and it is alſo generally allowed, that he not only digeſted ſeveral particular laws ſtill in being, but that he laid the firſt foundation of our preſent happy conſtitution. There is great reaſon to believe that we are indebted to this prince for trials by juries; and the doomſday-book, which is preſerved in the exchequer, is thought to be no more than another edition of Alfred's book of Wincheſter, which contained a ſurvey of the kingdom. It is ſaid alſo, that he was the firſt who divided the kingdom into ſhires: what is aſcribed to him is not a bare diviſion of the country, but the ſettling a new form of judicature; for after having divided his dominions into ſhires, he ſubdivided each ſhire into three parts, called *trythings*. There are ſome remains of this ancient diviſion in the ridings of Yorkſhire, the laths of Kent, and the three parts of Lincolnſhire. Each trything was divided into hundreds or wapentakes; and theſe again into tythings, or dwellings of ten houſeholders: each of theſe houſeholders ſtood engaged to the king, as a pledge for the good behaviour of his family, and all the ten were mutually pledges for each other; ſo that if any one of the tything was ſuſpected of an offence, if the head boroughs or chiefs of the tything would not be ſecurity for him, he was impriſoned; and if he made his eſcape, the tything and hundred were fined to the king. Each ſhire was under the government of an earl, under whom was the reive, his deputy; ſince, from his office, called *ſhire-reive*, or *ſheriff*. And ſo effectual were theſe regulations, that it is ſaid he cauſed bracelets of gold to be hung up in the highways, as a challenge to robbers; and they remained untouched.

In private life, Alfred was the moſt amiable man in his dominions; of ſo equal a temper, that he never ſuffered either ſadneſs or unbecoming gaiety to enter his mind; but appeared always of a calm, yet cheerful diſpoſition, familiar to his friends, juſt even to his enemies, kind and tender to all. He was a remarkable œconomiſt of his time, and Aſſerius has given us an account

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(B) The Danes had poſſeſſed themſelves of London in the time of his father; and had held it till now as a convenient place for them to land at, and fortify themſelves in; neither was it taken from them but by a cloſe ſiege. However, when it came into the king's hands, it was in a miſerable condition, ſcarce habitable, and all its fortifications ruined. The king, moved by the importance of the place, and the deſire of ſtrengthening his frontier againſt the Danes, reſtored it to its ancient ſplendor. And obſerving, that, through the confuſion of the times, many, both Saxons and Danes, lived in a looſe diſorderly manner, without owning any government, he offered them now a comfortable eſtabliſhment, if they would ſubmit and become his ſubjects. This propoſition was better received than he expected; for multitudes growing weary of a vagabond kind of life, joyfully accepted ſuch an offer. *Chron. Sax.* p. 88.

(C) The king's contrivance is thought to have produced the meadow between Hertford and Bow; for at Hertford was the Daniſh fort, and from thence they made frequent excurſions on the inhabitants of London. Authors are not agreed as to the method the king purſued in laying dry the Daniſh ſhips: Dugdale ſuppoſes that he did it by ſtraitening the channel; but Henry of Huntingdon alleges, that he cut ſeveral canals, which exhauſted its water.

account of the method he took for dividing and keeping an account of it: he cauſed ſix wax-candles to be made, each of 12 inches long, and of as many ounces weight; on the candles the inches were regularly marked, and having found that one of them burnt juſt four hours, he committed them to the care of the keepers of his chapel, who from time to time gave him notice how the hours went: but as in windy weather the candles were waſted by the impreſſion of the air on the flame, to remedy this inconvenience, he invented lanthorns, there being then no glaſs in his dominions.

This prince, we are told, was 12 years of age before a maſter could be procured in the weſtern kingdom to teach him the alphabet; ſuch was the ſtate of learning when Alfred began to reign. He had felt the miſery of ignorance; and determined even to rival his cotemporary Charlemagne in the encouragement of literature. He is ſuppoſed to have appointed perſons to read lectures at Oxford, and is thence conſidered as the founder of that univerſity. By other proper eſtabliſhments, and by a general encouragement to men of abilities, he did every thing in his power to diffuſe knowledge throughout his dominions. Nor was this end promoted more by his countenance and encouragement, than by his own example and his writings. For notwithſtanding the lateneſs of his initiation, he had acquired extraordinary erudition; and, had he not been illuſtrious as a king, he would have been famous as an author. His works are, 1. *Breviarum quoddam collectum ex Legibus Trojanorum*, lib. I. A Breviary collected out of the Laws of the Trojans, Greeks, Britons, Saxons, and Danes; in one Book. Leland ſaw this book in the Saxon tongue, at Chriſt-church in Hampſhire. 2. *Viſi-Saxonum Leges*, lib. I. The laws of the Weſt-Saxons, in one book. Pitts tells us, that it is in Bennet-College library, at Cambridge. 3. *Inſtituta quædam*, lib. I. Certain Inſtitutes, in one book. This is mentioned by Pitts, and ſeems to be the ſecond capitulation with Guthrum. 4. *Contra Judices iniquos*, lib. I. An Invective againſt Unjuſt Judges, in one book. 5. *Acta Magiſtratuum ſuorum*, lib. I. Acts of his Magiſtrates, in one book. This is ſuppoſed to be the book of judgments mentioned by Horne; and was, in all probability, a kind of reports, intended for the uſe of ſucceeding ages. 6. *Regum Fortunæ variæ*, lib. I. The various Fortunes of Kings, in one book. 7. *Dicta Sapientum*, lib. I. The Sayings of Wiſe Men, in one book. 8. *Parabolæ et Sales*, lib. I. Parables and pleaſant Sayings, in one book. 9. *Collectiones Chronicorum*. Collections of Chronicles. 10. *Epiſtolæ ad Wulfſigium Epiſcopum*, lib. I. Epiſtles to Biſhop Wulfſig, in one book. 11. *Manuale Meditationum*. A Manual of Meditations.—Beſides theſe original works, he tranſlated many authors from the Latin, &c. into the Saxon language, *viz.* 1. Bede's Hiſtory of England, 2. Paulinus Oroſinus's Hiſtory of the Pagans. 3. St Gregory's Paſtoral, *&c.* The firſt of theſe, with his prefaces to the others, together with his laws, were printed at Cambridge, 1644. His laws are likewiſe inſerted in Spelman's Councils. 4. *Boetius de Conſolatione*, lib. V. Boetius's Conſolations of Philoſophy, in five books. Dr Plot tells us, king Alfred tranſlated it at Woodſtock, as he found in a MS. in the Cotton Library. 5. *Æſopi Fabulæ*. Æſop's Fables: which he is ſaid to have tranſlated from the Greek both into Latin and Saxon. 6. *Pſalterium Davidicum*, lib. I. David's Pſalter, in one book. This was the laſt work the king attempted, death ſurpriſing him before he had finiſhed it; it was however completed by another hand, and publiſhed at London in 1640, in quarto, by Sir John Spelman. Several others are mentioned by Malmſbury; and the old Hiſtory of Ely aſſerts, that he tranſlated the Old and New Teſtaments.

The life of this great king was firſt written by Aſſerius Menevenſis; and firſt publiſhed by Archbiſhop Parker, in the old Saxon character, at the end of his edition of Haſſingham's hiſtory, printed in 1674, fol.

ALGA, in botany, the trivial name of the lichen, fucus, and ſeveral other plants of the cryptogamia claſs.

ALGAGIOLA, a ſmall ſea-port town in the iſland of Corſica, fortified with walls and baſtions. It was almoſt deſtroyed by the malcontents in 1731, but has ſince been repaired. E. Long. 9. 45. N. Lat. 42. 20.

ALGAROT, in chemiſtry, an Arabic term for an emetic powder, prepared from regulus of antimony, diſſolved in acids, and ſeparated by repeated lotions in warm water.

ALGARVA, a province in the kingdom of Portugal, 67 miles in length, and 20 in breadth; bounded on the W. and S. by the ſea, on the E. by the river Guadiana, and on the N. by Alentejo. It is very fertile in figs, almonds, dates, olives, and excellent wines; beſides, the fiſhery brings in large ſums. The capital town is Pharo. It contains four cities, 12 towns, 67 pariſhes, and 61,000 inhabitants.

ALGEBRA,

Definition, and etymology.

A GENERAL method of computation, wherein ſigns and ſymbols, commonly the letters of the alphabet, are made uſe of to repreſent numbers, or any other quantities.

This ſcience, properly ſpeaking, is no other than a kind of ſhort-hand, or ready way of writing down a chain of mathematical reaſoning on any ſubject whatever; ſo that it is applicable to arithmetic, geometry, aſtronomy, menſuration of all kinds of ſolids, &c. and the great advantages derived from it appear manifeſtly to ariſe from the conciſeneſs and perſpicuity with which every propoſition on mathematical ſubjects can be wrote down in algebraic characters, greatly ſuperior to the tedious circumlocutions which would be neceſſary were the reaſoning to be written in words at length.

With regard to the etymology of the word *algebra*, it is much conteſted by the critics. Menage derives it from the Arabic *algiabarat*, which ſignifies the reſtitution of any thing broken; ſuppoſing that the principal part of algebra is the conſideration of broken numbers. Others rather borrow it from the Spaniſh, *algebriſta*, a perſon who replaces diſlocated bones; adding, that algebra has nothing to do with fraction. Some, with M. d'Herbelot, are of opinion, that algebra takes its name from Gebar, a celebrated philoſopher, chemiſt, and mathematician, whom the Arabs call Giaber, and who is ſuppoſed to have been the inventor. Others from *geſr*, a kind of parchment made of the ſkin of a camel, whereon Ali and Giafer Sadek wrote, in myſtic characters, the fate of Mahometaniſm, and the grand events that were to happen, till the end of the world. But others, with more probability, derive it from *geber*; a word whence, by prefixing the article *al*, we have formed *algebra*; which is pure Arabic, and properly ſignifies the reduction of fractions to a whole number. However, the Arabs, it is to be obſerved, never uſe the word *algebra* alone, to expreſs what we mean by it; but always add to it the word *macabelah*, which ſignifies oppoſition and compariſon: thus *algebra-almacabelah*, is what we properly call *algebra*.

Some authors define algebra, The art of ſolving mathematical problems; but this is rather the idea of analyſis, or the analytic art. The Arabs call it, *The art of reſtitution and compariſon*; or, *The art of reſolution and equation*. Lucas de Burgo, the firſt European who wrote of algebra, calls it, *Regula rei et cenſus*; that is, the rule of the root and its ſquare; the root with them being called *res*, and the ſquare *cenſus*. Others call it *Specious Arithmetic*; and ſome, *Univerſal Arithmetic*.

TORY. It is highly probable that the Indians or Arabians firſt invented this noble art: for it may be reaſonably ſuppoſed, that the ancient Greeks were ignorant of it; becauſe Pappus, in his mathematical collections, where he enumerates their analyſis, makes no mention of any thing like it; and, beſides, ſpeaks of a local problem, begun by Euclid, and continued by Apollonius, which none of them could fully reſolve; which doubtleſs they might eaſily have done, had they known any thing of algebra.

Diaphantus was the firſt Greek writer of algebra, who publiſhed thirteen books about the year 800, tho' only ſix of them were tranſlated into Latin, by Xylander, in 1575; and afterwards, *viz. anno* 1621, in Greek and Latin, by M. Bachet and Fermat, with additions of their own. This algebra of Diaphantus's only extends to the ſolution of arithmetical indeterminate problems.

Before this tranſlation of Diaphantus came out, Lucas Pacciolus, or Lucas de Burgo, a Minorite friar, publiſhed at Venice, in the year 1494, an Italian treatiſe of algebra. This author makes mention of Leonardus Piſanus, and ſome others, of whom he had learned the art; but we have none of their writings. He adds, that algebra came originally from the Arabs, and never mentions Diaphantus; which makes it probable, that that author was not then known in Europe. His algebra goes no farther than ſimple and quadratic equations.

After Pacciolus, appeared Stifelius, a good author; but neither did he advance any farther.

After him, came Scipio Ferreus, Cardan, Tartagilla, and ſome others, who reached as far as the ſolution of ſome cubic equations. Bombelli followed theſe, and went a little farther. At laſt came Nunnius, Ramus, Schoner, Salignac, Clavius, &c. who all of them took different courſes, but none of them went beyond quadratics.

In 1590, Vieta introduced what he called his *Specious Arithmetic*, which conſiſts in denoting the quantities, both known and unknown, by ſymbols or letters. He alſo introduced an ingenious method of extracting the roots of equations, by approximations; ſince greatly improved and facilitated by Raphſon, Halley, Simpſon, and others.

Vieta was followed by Oughtred, who, in his *Clavis Mathematica*, printed in 1631, improved Vieta's method, and invented ſeveral compendious characters, to ſhew the ſums, differences, rectangles, ſquares, cubes, &c.

Harriot, another Engliſhman, cotemporary with Oughtred, left ſeveral treatiſes at his death; and among the reſt, an Analyſis, or Algebra, which was printed in 1631, where Vieta's method is brought into a ſtill more commodious form, and is much eſteemed to this day.

In 1657, Des Cartes publiſhed his geometry, wherein he made uſe of the literal calculus and the algebraic rules of Harriot; and as Oughtred in his Clavis, and Marin. Ghetaldus in his books of mathematical compoſition and reſolution publiſhed in 1630, applied Vieta's arithmetic to elementary geometry, and gave the conſtruction of ſimple and quadratic equations; ſo Des Cartes applied Harriot's method to the higher geometry, explaining the nature of curves by equations, and adding the conſtructions of cubic, biquadratic, and other higher equations.

Des Cartes's rule for conſtructing cubic and biquadratic equations, was farther improved by Thomas Baker, in his *Clavis Geometrica Catholica*, publiſhed in 1684; and the foundation of ſuch conſtructions, with the application of algebra to the quadratures of curves, queſtions *de maximis et minimis*, the centrobaryc method of Guldinus, &c. was given by R. Sluſius, in 1668; as alſo by Fermat in his *Opera Mathematica*, Roberval in the *Mem. de Mathem. et de Phyſique*, and Barrow in his *Lect. Geomet.* In 1708, algebra was applied to the laws of chance and gaming, by R. de Montmort; and ſince by de Moivre and James Bernouilli.

The elements of the art were compiled and publiſhed by Kerſey, in 1671; wherein the ſpecious arithmetic, and the nature of equations, are largely explained, and illuſtrated by a variety of examples: the whole ſubſtance of Diaphantus is here delivered, and many things added concerning mathematical compoſition and reſolution from Ghetaldus. The like has been ſince done by Preſtet in 1694, and by Ozanam in 1703: but theſe authors omit the application of algebra to geometry; which defect is ſuplied by Guiſnec in a French treatiſe expreſly on the ſubject publiſhed in 1704, and l'Hopital in his analytical treatiſe of the conic ſections in 1707. The rules of algebra are alſo compendiouſly delivered by Sir Iſaac Newton, in his *Arithmetica Univerſalis*, firſt publiſhed in 1707, which abounds in ſelect examples, and contains ſeveral rules and methods invented by the author.

Algebra has alſo been applied to the conſideration and calculus of infinites; from whence a new and extenſive branch of knowledge has ariſen, called the *Doctrine of Fluxions*, or *Analyſis of Infinites*, or the *Calculus Differentialis*.

SECT. I. *Elementary Rules*.

In algebra, a letter of the alphabet may ſtand for any quantity whatever; whether length, breadth, thickneſs, 1 Notation.

neſs, ſolidity, *&c.* but when once a letter is appropriated to one particular kind of quantity, it cannot ſtand for any other, in that demonſtration, or piece of reaſoning. Thus, though the letter *a* may repreſent any quantity of water, earth, *&c.* yet if it is once appropriated to any of theſe, water, for inſtance, it cannot likewiſe repreſent earth; as this would produce confuſion. Each ſpecies of quantity, therefore, muſt be repreſented by a different letter.—As all quantities, concerning which we ſpeak, muſt be either known or unknown; and both theſe are frequently repreſented by letters in algebraic operations; it will be proper to uſe the firſt letters of the alphabet, a, b, c, &c. to repreſent one kind of quantities; and the laſt letters, x, y, z, to repreſent the others; that there may be as little danger of miſtake as poſſible.

2
Poſitive and negative quantities.

Beſides this obvious diviſion of quantity, into known and unknown; algebraiſts conſider quantities as poſitive or negative, ſimple or compound, roots or powers, rational or irrational.—Poſitive quantities are ſuch as, by their preſence, always denote an increaſe, or addition of ſomething which was not there before; and therefore they have always + *plus*, the ſign of addition, prefixed to them: but as quantity is generally ſpoken of in a poſitive ſenſe, the ſign is omitted before a ſingle letter, or before the firſt term of any ſeries of quantities expreſſed by letters. Thus, if *a* ſimply is wrote down, $+a$ is ſuppoſed to be meant; in like manner, in the ſeries $a+b+c$, &c. the firſt term or letter is always ſuppoſed to be poſitive. Negative quantities are intended to expreſs the difference between one poſitive quantity and another. By themſelves they cannot have any exiſtence, as they would be leſs than nothing, which is abſurd. Theſe quantities have always the ſign of ſubtraction, — *minus*, prefixed to them; whether they ſtand firſt or laſt. If a ſingle letter is marked with the ſign of ſubtraction, it is always ſuppoſed to have a reſpect to ſome other quantity which is not expreſſed. Thus, *a* by itſelf repreſents a poſitive quantity of any kind; $-a$ does not by itſelf repreſent any thing, but only the difference between the former *a*, or $+a$, and ſome other quantity which at that time is not expreſſed; but if another quantity, expreſſed by *b*, is wrote down before it, as $b-a$, this denotes the difference between *b* and *a*. The ſame thing would be denoted though the order of the terms were inverted; $b-a$ is the ſame with $-a+b$: but in writing the terms of an algebraic ſeries, poſitive quantities ought to precede negative ones; and thoſe which have like ſigns, whether + or —, ought always to be placed together.

3
Addition & ſubtraction.

By attending to this diſtinction between poſitive and negative quantities, addition and ſubtraction of algebraic characters will be very eaſy. Every letter in algebra is ſuppoſed to repreſent ſomething real, and the letter is only put for it; becauſe it is eaſier expreſſed than the name of the thing itſelf. Thus, ſuppoſe *a* to repreſent a gallon of water; if I want to add another gallon, or another *a*, to the firſt one, the ſum is two gallons; or, in algebraic ſhort-hand, $2a$. In like manner, if we want to add another *a*, the ſum will be $3a$. But if we want to add one ſpecies of quantity to another, as a pound of earth to a gallon of water, we muſt take one letter for the one ſpecies, and another for the other. Thus, let *a* repreſent the earth, and *b* the water; when theſe two are added together, the ſum is neither two pounds of earth, nor two gallons of water: the ſum of their literal repreſentatives, therefore, can neither be $2a$, nor $2b$; but $a+b$. Here it will be obſerved, that, where quantities of the ſame kind, expreſſed by the ſame letter, are added together, ſome arithmetical figures muſt be prefixed to the algebraic ones; and theſe numbers, called *coefficients*, or *unciæ*, are to be managed exactly in the ſame way, as in common arithmetic. Thus $a+a$ is $2a$, and $2a+3a$ is $5a$: *a* added to *b* can only be repreſented by $a+b$; in like manner, $7a$ added to $5b$ will neither make $12a$, nor $12b$; therefore, the ſum of theſe two can only be repreſented by $7a+5b$. When quantities occur which have contrary ſigns, there is a neceſſity for ſubtracting the one from the other, in order to come at the true ſum. Thus if a man has £10 of ſtock in hand, and £5 of debt; in order to come at his real worth, we muſt ſubtract the debt from the goods. If the £10 of goods is repreſented by $10a$, and the £5 of debt by $5a$; it is as plain, that the ſum muſt be only $10a-5a$, or $5a$. If diſſimilar letters occur, having contrary ſigns, they muſt be wrote down with the ſigns prefixed that are proper to each. Thus, the ſum of $2a$, $3a$, and $-7b$, is $2a+3a-7b$, or $5a-7b$; of $2a$, $5a$, $6b$, and $-7b$, is $2a+5a+6b-7b$, or $7a-b$, &c.

Subtraction of algebraic characters conſiſts only in changing the ſign of the quantity to be ſubtracted, and then following the above rules for addition. Thus, if I am to take $2a$ from $5a$, I change the ſign of the $2a$, and write it thus, $5a-2a$; adding theſe, I find the ſum to be $3a$, as already mentioned. If the letters are diſſimilar, they muſt be wrote down with the ſign of ſubtraction — between them: as, if I ſubtract *b* from *a*, the remainder will be $a-b$; but if I take $-b$ from *a*, I muſt change its ſign to +, and then the remainder is $a+b$. The reaſon is evident, from the former example. If a man has £10 in goods, and owes £5; if I want to take away his debt, I muſt add to his ſtock, or prevent the debt from affecting it, which is the ſame thing. If I repreſent the goods by *a*, and the debt by *b*, the true ſtate of his affairs will be repreſented by $a-b$. If I want to take away $-b$ from this, I muſt change its ſign to +; and then the $+b$ and $-b$ deſtroy one another: ſo that the remainder, after taking away the debt, is *a*, or £10; which is agreeable to truth.

4
Simple compound quantities.

Quantities are conſidered by algebraiſts as ſimple or compound. The ſimple quantities are ſuch as are repreſented by ſingle letters, as a, b, c, &c. Compound quantities ariſe only from the addition or ſubtraction of diſſimilar ſimple ones: thus, $a+b$, $b+c$, and all others connected by the ſigns + or —, are called *compound quantities*.

5
Multiplication.

By multiplication of ſimple quantities, compound ones are not produced: for letters are multiplied into one another by writing them down in connection, without any ſign, or with ×, the ſign of multiplication, between them; as $a\times b$, or ab, denotes the product of *a* multiplied into *b*. In algebra, the ſigns prefixed to the quantities, are objects of multiplication, as well as the letters or coefficients of the letters themſelves: thus, + multiplied into +, always gives + for the product; and — multiplied into — gives the ſame; but — into +, or + into —, give — for the product.

That + multiplied into + ſhould give +, or that + into — ſhould give — for the product, will readily be comprehended: but why — multiplied into — ſhould give +, is not ſo eaſily underſtood. Different methods have been uſed to illuſtrate the reaſon of this; but all of them ſeem involved in ſome degree of obſcurity, from which we hope the following will be altogether free.

6 hy—×— es + for product. We have already obſerved, that no quantity is in itſelf negative, but only as it ſtands in relation to another. Poſitive and negative quantities, therefore, ariſe only from addition and ſubtraction, but not from multiplication. Four inches in meaſure are a poſitive quantity in themſelves, and are poſitive or negative in algebraic writing according as they are added to or taken away from any thing. Negative quantities, therefore, are capable of being added or ſubtracted, but not of being multiplied, as negatives. Suppoſe one merchant owes £100, another £50, and a third buys the ſtock, and becomes liable for the debts of both. His capital will then be negatively affected by both debts; and if we call it a, the debt of the firſt merchant b, and of the ſecond c, his real worth will be expreſſed by $a-b-c$, and may be found by ſubtracting the ſum of the debts from his ſtock; but it is impoſſible to multiply the two debts together in any manner of way, ſo as to affect him by the product of the numbers; the reaſon is, becauſe we change the relation by multiplying them. In like manner, if we cut four inches from a ruler, theſe with reſpect to the whole ruler will be —4; but if we multiply the —4, or the part cut off, by itſelf, we produce +16 ſquare inches, which have not, nor can have, any relation to the ruler itſelf, but will become poſitive or negative with regard to another quantity, juſt as we pleaſe to add or ſubtract them. The caſe is different when a negative quantity is multiplied by a poſitive one; becauſe then the relation is not changed. Thus, in the former example, if we cut off four inches from a ruler, the quantity cut off is —4; if we multiply this —4 by +2, or, which is the ſame thing, want to add other four inches to thoſe already cut off, we muſt take them from the ruler, and thus the product will be —8.

In multiplication of algebraic characters, there is not the leaſt difficulty. The ſigns are multiplied as we have already mentioned; the coefficients, as in common arithmetic; and the letters, by writing them down without any ſign between them: thus, $2a$ multiplied into $3b$, produces $6ab$, or $6ba$; for the order of the letters is of no conſequence. If the multiplier and multiplicand are both compound quantities, each term of the firſt muſt be multiplied into all thoſe of the ſecond, and all the products added together: thus, if $a-b$ is to be multiplied by $a-b$, I firſt multiply by a, which produces $aa-ab$; I then multiply by $-b$, and the produce is $-ab+bb$; and, adding theſe two products together, we have $aa-2ab+bb$ for the total produce.

7 iviſion. Diviſion being the converſe of multiplication, what has been ſaid concerning the latter, will alſo ſerve to make the former eaſily underſtood. When the ſame letters are contained in the diviſor and dividend, there diviſion may properly take place: thus, if I am required to divide abc by a, the quotient will be bc; becauſe bc multiplied into a, produces abc the dividend. If I am to divide it by b, the quotient will be ac; becauſe $ac\times b$ is acb, or abc. With regard to the ſigns, they are to be managed ſo, that the ſign of the diviſor multiplied into that of the quotient may produce the ſign of the dividend; and it muſt always be carefully obſerved to change the ſign of that quantity which is ſubtracted from the dividend, whether the ſubtraction can properly take place or not. The coefficients, or pure numbers, are to be divided exactly as in common arithmetic. Suppoſe now it is required to divide $aa-2ab+bb$ by $a-b$, I begin with conſidering what ſign multiplied into that of the diviſor will give that of the dividend for a product: as they are both poſitive quantities, this muſt be +. I next conſider what letter multiplied into the firſt term of the diviſor will give the firſt term of the dividend for a product. This I find to be a; for $a\times a$ gives aa for the product. I then multiply this firſt term of the quotient into both terms of the diviſor; and behoved to do ſo, though there were three, four, or more terms in it. The product is $aa-ab$. Subtracting this product from the dividend, there remains $-ab+bb$ for a new dividend. I muſt now again conſider what ſign multiplied into that of the firſt term of the diviſor will give the ſign of the firſt term of the dividend; which I here find to be —. By again conſidering what letter multiplied into the firſt term of the diviſor will give the firſt term of the dividend for a product, I find it to be b; which multiplied into both terms of the diviſor, produces $-ab+bb$; which, ſubtracted from the new dividend, leaves no remainder.

If the letters are totally different, or the firſt term of the diviſor cannot be found in the dividend, there diviſion cannot take place; the quantities muſt in this caſe be wrote down with ÷ the ſign of diviſion between them, or placed the one over the other like fractions, as $a\div b$, $\frac{a}{b}$, $bd\div cf$, $\frac{bd}{cf}$, &c. but as long as the firſt term of the diviſor will divide the firſt term of the dividend, the operation may be continued; and ſometimes the quotient will run out to an infinite ſeries of terms, as in the following example:

$$
\begin{array}{l}
1+x)\ 1\ (1-x+xx-xxx,\ \&c. \\
\hspace{1.5em}\underline{1+x} \\
\hspace{1.5em}-x \\
\hspace{1.5em}\underline{-x-xx} \\
\hspace{3.5em}+xx \\
\hspace{3.5em}\underline{+xx+xxx} \\
\hspace{5.5em}-xxx \\
\hspace{5.5em}\underline{-xxx-xxxx} \\
\hspace{8.5em}+xxxx,\ \&c.
\end{array}
$$

8 Roots and powers what. If a quantity is multiplied into itſelf any number of times, the products are ſaid to be the *powers* of that quantity, which is called the *root*, with reſpect to them. The powers are diſtinguiſhed by the names of *ſquare*; *cube*, or third power; *biquadrate*, or fourth power; *ſurſolid*, or fifth power; *cube ſquared*, or ſixth power, &c. and are thus wrote: a^{1}, or ſimply a, the radical quantity; a^{2}, or a ſquared, or multiplied into itſelf; a^{3}, a cubed, or the ſquare of a multiplied by a; a^{4}, ſignifying the ſquare of a multiplied by itſelf, &c. The multiplying a quantity by itſelf any number of times is called *involving* that quantity to a certain height, the ſign of which is ⊚; and if the root of an involved quantity is required, the operation by which it is found is called *evolution*, and is expreſſed by the ſign ɯ.

9 Involution and evolution. Involution of a ſimple quantity is performed merely by writing it down with a figure above; as a^{3}, a^{6}, a^{7}, &c. expreſſing the height of the power to which it is

involved. Theſe figures are named the *indices*, or exponents of the powers. Involution of compound quantities is performed by continual multiplication; but any root, conſiſting of only two terms, ſuch as $a+b$, or $a-b$, (the firſt of which is called a *binomial*, and the ſecond a *reſidual* root) may be involved to any height, by the following rule.

The power muſt always conſiſt of one term more than is expreſſed by its index: that is, if it is required to raiſe $a+b$ to the ſquare, the power will conſiſt of three terms; if to the cube, of 4 terms; to the biquadrate, of 5; to the surſolid, of 6, &c. The firſt and laſt terms are both pure powers, without any coefficients, the one of the firſt and the other of the laſt term of the root, the indices of both which expreſs the height of the power. Thus, if I am to involve $a+b$ to the ſixth power, the firſt term muſt be a^6, and the laſt b^6. In the intermediate terms the index of a decreaſes, and that of b gradually increaſes, till it attains the ſame height that a had at firſt. The letters of the 6th power of $a+b$, therefore, without their coefficients, will ſtand thus:

$$a^6+a^5b+a^4b^2+a^3b^3+a^2b^4+ab^5+b^6.$$

To find the coefficients, multiply the index of any term into its coefficient, and divide by the number of terms; the quotient is the coefficient of the term immediately following. In the firſt term, the coefficient, though not expreſſed, is ſuppoſed to be 1. This multiplied by 6 the index, and divided by the number of terms 1, quotes 6 for the coefficient of the ſecond term, which therefore is $6a^5b$: multiplying then the index 5, by this coefficient 6, and dividing by 2, the number of terms, I have 15 for the coefficient of the third, and the term is $15a^4b^2$. Proceeding in this manner, I find the power required, to be

$$a^6+6a^5b+15a^4b^2+20a^3b^3+15a^2b^4+6ab^5+b^6.$$

The reſidual root, $a-b$, is involved by the very ſame rules; only the ſigns, inſtead of being conſtantly $+$, are $+$ and $-$ alternately; and thus the 6th power of $a-b$ will be

$$a^6-6a^5b+15a^4b^2-20a^3b^3+15a^2b^4-6ab^5+b^6.$$

If the root conſiſts of three or more terms, no rule can be formed by which the quantity can be ſo eaſily involved to the required height, as continual multiplication; becauſe there are ſuch a number of terms, and the letters are ſo intermingled with one another, that it would be difficult to remember the numerous directions neceſſary in ſuch a caſe: nor do ſuch tedious multiplications often occur; but where they do, it is proper to range the product according to the number of times that a certain letter is repeated in every term, which is called the ranging it according to the *dimenſions* of that letter. Thus, ſuppoſe I am to raiſe $a+b+c$ to the cube: by multiplying it twice, I find the product to be

$$a^3+3a^2b+3a^2c+6abc+3ab^2+3ac^2+3b^2c+3bc^2+b^3+c^3$$

This long line is exceedingly confuſed, and difficult to be comprehended at one view; but by ranging it according to the dimenſions of any of its letters, is much more plain and intelligible: according to the dimenſions of the letter a, it ſtands thus:

$$a^3\begin{matrix}+3b\\+3c\end{matrix}a^2\begin{matrix}+6bc\\+3b^2\\+3c^2\end{matrix}a\begin{matrix}+3b^2c\\+3bc^2\\+b^3\\+c^3\end{matrix}$$

As Evolution, or the extraction of roots, is properly the ſolution of a certain kind of equations, it will be more properly treated of, after the nature of equations in general, and the methods of ſolving the more ſimple ones, are conſidered.

In algebra, as in common arithmetic, fractions ariſe from the diviſion of quantities that are incommenſurable to one another, or thoſe of which the leſſer will not divide the greater without a remainder; but as the rules for adding, ſubtracting, multiplying, &c. of algebraic fractions are exactly the ſame with thoſe for performing the ſame operations on arithmetical ones, only making allowance for the difference between adding, ſubtracting, *&c.* letters, inſtead of figures, we refer to the article ARITHMETIC.

10 Surds, or irrational quantities.

Hitherto we have only conſidered ſuch quantities as muſt be ſuppoſed always to have a poſitive or real exiſtence, and conſequently can be expreſſed by a certain ſymbol; but, beſides theſe, there are other imaginary quantities, the exiſtence of which it is often neceſſary to ſuppoſe, though in fact they have not, nor cannot have, an exiſtence. Thus, if I am required to find a number which, multiplied into itſelf, will produce 16; it is eaſily found, and ſuch a number may be expreſſed by a: but if I am required to find one, which, multiplied by itſelf, will produce 15, it cannot be found by any art, and conſequently cannot be expreſſed by a letter. Quantities of this kind are denominated, by algebraiſts, *ſurds*, or *irrational* ones; and have the ſign $\surd$ prefixed to them, which denotes their imaginary exiſtence. This ſign denotes the extraction of a root; and the different kinds of roots deſired, are expreſſed by figures ſet over it. Thus, $\sqrt[2]{\ }$, or ſimply $\surd$, denotes that the ſquare root is deſired; $\sqrt[3]{\ }$, the cube-root, &c. Sometimes this ſign is prefixed to a number, or to an algebraic ſeries which is capable of affording a true rational root; but it then only denotes that the root hath not been extracted, and conſequently exiſts as yet only in idea. The prefixing this ſign to any letter makes no other difference with regard to addition, ſubtraction, multiplication, or diviſion, than cauſing the letter repreſent a different quantity than otherwiſe it would have done, and ſo muſt be added or ſubtracted by ſigns. Thus a added to a, makes $2a$; but a added to $\sqrt{a}$, is $a+\sqrt{a}$. Among themſelves ſurds are as eaſily managed as other quantities: for $\sqrt{a}+\sqrt{a}$ is $2\sqrt{a}$, and $\sqrt{a}-\sqrt{a}$ is 0; $\sqrt{a}+3\sqrt{a}-2\sqrt{a}$, is $2\sqrt{a}$; $\sqrt{a}\times 2b$, is $2b\sqrt{a}$; $8\sqrt{a}\div 2\sqrt{a}$, is 4; $10\sqrt{ba}\div 5\sqrt{b}$, is $2\sqrt{a}$, &c.—In the multiplying ſurds by themſelves, or involving them, we need ſometimes only throw away the radical ſign: thus $\sqrt{a}\,^{2}$ is a; but $\sqrt{a}\,^{3}$ is $a\sqrt{a}$; $\sqrt{a}\,^{4}$ is a^2, &c. When the root of any compound quantity is ſought, it muſt, beſides the radical ſign, have a line drawn over it, to denote that it is only to be reckoned a ſimple quantity; thus $\sqrt{ab+dd}$, &c. In caſes where irrational quantities of this kind occur, it will be proper to put ſome letter, as x, y, z, or any other not already uſed, for the ſurd, and let that ſymbol remain till the laſt ſtep of the operation, when the true value may be ſubſtituted in its place.

Surds, like fractions, may be reduced to their leaſt terms; or two unlike ſurd quantities may be reduced to two having the ſame denomination. To reduce a ſurd quantity to its loweſt terms, a certain rational root muſt be found in it, multiplied by a ſurd; the root muſt be extracted according to the rules hereafter given.

ven for evolution, and prefixed to the other quantity with the radical ſign. Thus, though no number multiplied into itſelf will produce 8, yet ſuch an imaginary quantity may be expreſſed otherwiſe than by $\surd 8$; for 8 contains the number 4, which is a perfect ſquare, and produced by multiplying 2 into itſelf. $\surd 8$ therefore is reduced to $\surd 4\times\surd 2$: but one of theſe is a perfect ſquare; and therefore $\surd 4\times\surd 2$ is $2\surd 2$, which is the ſurd in its loweſt terms. In like manner, $\surd 28$ is $\surd 4\times\surd 7$ or, $2\surd 7$; $\surd 18$ is $\surd 9\times\surd 2$, or $3\surd 2$. The ſame rule holds in algebraic quantities. $\surd 4a^2b$ is $\surd 4a^2\times\surd b$, or $2a\surd b$; $\surd 4a^2b^2$ is $\surd 4a^2\times\surd b^2$; which being both complete ſquares, the ſurd is reduced to $2a\times b$, or $2ab$.

This method of reducing ſurds is often very convenient for bringing them into leſs compaſs, ſo as to facilitate their addition or ſubtraction. Thus $\surd 18+\surd 32$, being reduced to their leaſt terms, become $3\surd 2+4\surd 2$, or $7\surd 2$; and $\surd 8a^2+\surd 50a^2-\surd 72a^2$, is reduced to $2a\surd 2+5a\surd 2-6a\surd 2$, or $a\surd 2$; $\surd 12a^2x+\surd 75a^2x$, becomes $2a\surd 3x+5a\surd 3x$, or $7a\surd 3x$, &c.

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uction
urds.

Surds are reduced to the ſame denomination, by involving them to a proper height; but in order to underſtand this the more readily, it is proper to take notice, that in any ſeries of powers, as a, a^2, a^3, a^4, a^5, a^6, &c. the addition of the indices is equivalent to the involution of the power, and the ſubtraction of the indices is equivalent to the diviſion of the powers by one another. Thus, by ſubtracting the index 4 from 7 in the powers a^4 and a^7, there remains a^3; which is the quotient of a^7 divided by a^4; as is evident from dividing $aaaaaaa$ b[illegible]a. In like manner, the diviſion of the indices anſwers to the extraction of the root: thus, to divide the index of a^6 by 2, is the ſame thing as to extract its ſquare root; to divide it by 3, is the ſame thing as to extract its cube root; the quotients being a^3 and a^2, anſwering to the powers aaa and aa. This diviſion cannot go farther in rational quantities, than that of 2 the index of the ſquare by itſelf. The quotient is 1, which is the index of $\surd a^2$, being a^1, or ſimply a. The ſquare or cube root of a, then, muſt be expreſſed by a diviſion of its index 1, by 2 or 3, and may be wrote $a^{\frac{1}{2}}$, $a^{\frac{1}{3}}$, as well as $\surd a$ and $\sqrt[3]{a}$. When ſurds are to be reduced to the ſame denomination, it will be moſt proper to write them with theſe fractional indices; the fractions have then only to be reduced to a common denominator, according to the rules of arithmetic: and thus, $a^{\frac{1}{2}}$ and $a^{\frac{1}{3}}$ will become $a^{\frac{3}{6}}$ and $a^{\frac{2}{6}}$. This reduction is convenient when ſurds are to be multiplied or divided by one another. For example; ſuppoſe I was to multiply the two abovementioned ſurds into one another, no more is neceſſary than to add the two indices together, after having reduced them to a common denominator, and the product is $a^{\frac{5}{6}}$; which intimates, that the product of $\surd a$ into $\sqrt[3]{3}$ is equivalent to $\sqrt[6]{a5}$; $\surd 2$ and $\sqrt[3]{3}$ will become $2^{\frac{3}{6}}$ and $3^{\frac{2}{6}}$, or $\sqrt[6]{2^3}$ and $\sqrt[6]{3^2}$, which is $\sqrt[6]{8}$ and $\sqrt[6]{9}$; multiplied together, they become $\sqrt[6]{72}$, &c.

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SECT. II. EQUATIONS, *or the application of the foregoing general rules to the ſolution of various kinds of problems.*

THE word *equation* implies no more than ſimply the making one thing equal to another, or aſſerting it to be ſo, if the aſſertion is really true; and, in fact, it is by this very ſimple operation that the moſt abſtruſe and difficult algebraic problems are reſolved. The method of noting down equations, or making the affirmation of equality, is by writing down the two quantities, with $=$, the ſign of equality, between them; and the quantities are then called the two different ſides of the equation. Thus, $a+b=c$; that is, the ſum of a and b is equal to the third quantity c, where $a+b$ are one ſide of the equation, and c is the other: $4+5-6=3$. Here, $4+5-6$ are one ſide, and 3 is the other ſide, of the equation.

It is needleſs to obſerve, that no problem can be reſolved by making falſe equations, or affirming a thing to be equal to what it is not: but tho' this will never be done intentionally, it is very often done by miſtake; and to prevent miſtakes of this kind, it will be always neceſſary to keep in view the following ſelf-evident axioms.

13
Axioms.

1. If equal quantities are added to equal quantities, the ſums will be equal. Thus, if a bottle contains a gallon of water, and a caſk contains another gallon; if a third gallon is poured into the bottle, and a fourth one into the caſk, there will be equal quantities of water in the bottle and the caſk.

2. If equal quantities are ſubtracted from, multiplied into, or divided by, equal quantities; the remainders, products, or quotients, will be equal.

In conformity to theſe axioms, it is plain, that an algebraiſt may do what he pleaſes with his equations, provided he does the ſame thing with both ſides of them: thus, if $a=4$, I may then ſay $2a=8$, $7a=28$, $a-4=4-4=0$; or $a\div 2=2$, $a\div 4=1$, $a\div 8=0,5$, &c. where every one of theſe equations is as true as the firſt; becauſe what is done to one ſide of the equation is likewiſe done to the other: but if I either add, ſubtract, multiply, or divide, one ſide, without doing ſo to the other, I evidently affirm a falſehood; for if $a=4$, then it is plain that if I multiply one ſide by 2, and only add 2 to the other, I make $2a=6$, or ſay that twice four is ſix.

As there is no ſcience whatever wherein people are more liable to miſtake, and to perplex themſelves, than algebraic operations, it will be very proper for young algebraiſts to number the ſteps of their operation, and on the left-hand margin to mark what is done in each ſtep, that a more full and diſtinct view of the whole may be at once obtained, and any miſtake more eaſily corrected, as in the following example.

$$\begin{array}{r|c|l} & 1 & a=6 \\ 1\times\bar{2} & 2 & 2a=12 \\ 2+b & 3 & 2a+b=12+b \\ 2\div 1 & 4 & \frac{2a}{a}=\frac{12}{6} \\ 2\circledast^{2} & 5 & 4a^2=144, \text{ \&c.} \end{array}$$

Here the figures on the margin denote what is done with each preceding ſtep, or equation; $1\times\bar{2}$ denotes that the firſt equation is multiplied, not by the ſecond equation, but by the number 2; which, for this reaſon, has a line drawn over it: $2+b$ ſignifies, that b is added to both ſides of the ſecond equation: $2\div 1$ ſignifies, that both ſides of the ſecond equation are divided by both ſides of the firſt: $2\circledast^{2}$, that both ſides of the ſecond equation are involved to the ſecond power or ſquare, &c.

In all equations there are ſome quantities ſuppoſed to be known, and others unknown: the deſign of the equation is to diſcover the value of the unknown quantities; in order to which they muſt be compared with thoſe quantities which are known; for if the equation conſiſts only of unknown quantities, it is impoſſible to know any thing about them.

14 Reduction of equations

The end propoſed in every equation is to place the unknown quantities all by themſelves on one ſide of the equation, and the known ones by themſelves on the other: when this is done, the equation is ſaid to be *reduced*, and the operation is at an end.

15 By tranſpoſition.

Equations may be reduced, (1.) By addition and ſubtraction; or, as it is commonly called, by *tranſpoſition*. This is performed by adding to, or ſubtracting from, both ſides of the equation, a quantity with which it is encumbered, and which tends to obſcure the true meaning. Thus, $x+6=7$; here the unknown quantity x is combined, by addition, with 6 a known one; which I want to get clear of, that I may know the preciſe value of x. For this purpoſe I make an equation of $6=6$, which I ſubtract from the former, and the work ſtands thus.

$$\begin{array}{r|c|l} & 1 & x+6=7 \\ & 2 & 6\quad=6 \\ \hline 1-2 & 3 & x=7-6=1 \end{array}$$

Here I find the true value of x, becauſe it ſtands alone upon one ſide, and a known quantity ſtands alone on the other. It is evident alſo, that if, inſtead of writing down the equation $6=6$, I only change the ſign of the known quantity, and carry it over to the other ſide of the equation with the ſign ſo changed, the event will be the ſame; for, if $x+6=7$, then undoubtedly $x=7-6$, or $6=7-x$. It is a rule, therefore, in algebra, That whatever quantity is carried over from one ſide of an equation to another, muſt have its ſign changed, whether it was + or —, and whether the quantity be known or unknown; it will then produce the effects of a poſitive or negative quantity, among thoſe to which it is carried, according as the ſign is changed from — to +, or from + to —. Suppoſe the following equation given,

$$\begin{array}{r|c|l} & 1 & 3x+5=2x+6 \\ 1-2x & 2 & x+5=6 \\ 2-5 & 3 & x=1 \end{array}$$

The reaſon of this operation is obvious: for carrying over $2x$ with its ſign changed, it meets with $3x$, which it deſtroys as far as it can; the remainder is then only x, which being ſtill combined with 5, makes the tranſpoſition again neceſſary, as in the former example.

16 By diviſion.

(2.) When the unknown quantity is combined with any known one by multiplication, it is neceſſary to divide both ſides of the equation by that quantity into which the unknown one is multiplied. Thus, ſuppoſe $4x=20$, I cannot make x ſtand alone upon one ſide of the equation, unleſs I divide $4x$ by 4; the quotient is x: and dividing the other ſide alſo by 4, we have $x=5$. In like manner, if $4x-2=8$, then, by tranſpoſition, $4x=8+2=10$, and, by diviſion, $x=\frac{10}{4}=2,5$, &c.

17 By multiplication.

(3.) If the unknown quantity is divided by any known one, both ſides of the equation muſt be multiplied by that quantity which divides the unknown one, in order to take away the fraction, without which the equation could not be conveniently reduced. With regard to fractional quantities, according to the rules of arithmetic, it is the ſame thing to multiply a fraction by its denominator, and merely to throw away that denominator; hence, if one ſide of an equation is divided by any quantity, and not another, it will be ſufficient to multiply by the dividing quantity that ſide of the equation which is not affected by it. This is equally evident with any of the former methods of reduction; for if $\frac{x}{2}=4$, then it is plain, that $x=8$, and ſo of others. If ſeveral fractional quantities occur in one, or both ſides of the equation, the ſame operation muſt be repeated with every one of them, as $\frac{x}{2}+\frac{x}{3}+\frac{x}{4}=6$; then $x+\frac{2x}{3}+\frac{2x}{4}=12$; and $3x+2x$, or $5x+\frac{6x}{4}=36$, and $20x+6x=144$; whence, by diviſion, $x=144\div26=5,5385$, nearly.

(4.) Reduction by involution takes place when the unknown quantity is under the radical ſign. In this caſe, in order to come at its value, both ſides of the equation muſt be involved to the power expreſſed by the index of the ſurd quantity, as $\sqrt{x}=4$: then, $x=16$, by involving both ſides of the equation to the ſquare; if $\sqrt[3]{x}=3$, then $x=27$, &c.

Theſe are all the methods of reduction that are applicable to ſimple equations, or thoſe where the unknown quantity is not multiplied by itſelf; in which caſe, very different methods are [illegible] be uſed, which ſhall be explained under quadratic, cubic, &c. equations: we muſt now take notice of the preliminary ſteps neceſſary to be taken in order to the ſolution of an algebraic problem.

18 Method of ſtating or writing down an algebraic problem.

The firſt thing to be done is to ſtate the queſtion, as it is called; or to write down in algebraic characters what is before expreſſed in the words at length. This will be moſt eaſily underſtood by the following example.

It is required to find a number, which being multiplied by 5, and 8 ſubtracted from the product, the remainder ſhall be 52.——As the thing here ſought is only one number, I put x, or any letter at pleaſure, for it: then, as the queſtion intimates that the number ſought is multiplied by 5, and 8 ſubtracted from the product, I do the ſame with the letter taken to repreſent it; and find the remainder to be $5x-8$: this therefore, by the queſtion, being equal to 52, I write it down in algebraic characters, thus, $5x-8=52$. By tranſpoſition $5x=52+8=60$; and by diviſion, $x=60\div5=12$, the number ſought.

When only one thing is ſought, generally the ſolution of algebraic problems is not difficult; but when two or more things are required to be diſcovered, the difficulty becomes proportionably greater. It is neceſſary, however, that where there are two or more unknown quantities, there ſhould be data ſufficient to find them all out; becauſe queſtions propoſed without ſufficient data, cannot be reſolved but in an indeterminate manner. Thus, if it be required to find two numbers x and y, with this ſingle condition, that their ſum ſhall be 100; it is evident, that the queſtion is capable of 99 different anſwers, each of which ſhall fulfil the condition required; for x may be 1, and y 99; or x may be 2, and y 98, &c. but if to the foregoing condition I add another, namely, that the difference of the two numbers required is 50, the queſtion is then properly *limited*, and capable only of one direct anſwer. If a third condition is required, ſuppoſe, that their product ſhould be 740; this condition is either ſuperfluous, becauſe the values of x and y may be found without it; or abſurd, as being inconſiſtent with the reſt. It is therefore a general rule in algebra, That where there are two unknown quantities, the problem muſt be laid down in ſuch a manner as to admit of two equations being formed from it, which ſhall neither be inconſiſtent with, nor conſequences of, one another; for if this laſt is the caſe, it is the ſame thing as tho' only one equation were given: for inſtance, if am required to find two numbers whoſe ſum is 100, and double their ſum 200, this laſt equation is only the firſt one doubled; and conſequently the queſtion is ſtill as unlimited as before.

19 termina- n of un- own ntities.

For the ſolution of problems where two or more quantities are concerned, there is one general rule which will certainly hold in all caſes, namely, to find a value of each of the unknown quantities from each of the equations, treating the other unknown quantity exactly as a known one. By this means we have two ſides of a new equation, where only one unknown quantity is concerned, the other being *exterminated*, as it is called, by the preceding operation; and it is evident, that if the equations are conſiſtent with one another, the value of the unknown quantity found by one equation, will be preciſely equal to that found by the other. We ſhall illuſtrate this by the preceding example, which, being ſtated, will be $x+y=100$, and $x-y=50$. By tranſpoſing the firſt equation, we have $x=100-y$; and by tranſpoſing the ſecond, $x=50+y$; it is plain, that x, though an unknown quantity, muſt always be equal to itſelf; and therefore the values of it obtained from both theſe equations will be equal to one another; of theſe therefore I form the new equation $100-y=50+y$: by tranſpoſition, we have firſt $100=50+2y$, and then $50=2y$; whence, by diviſion, $25=y$, and $100-y$, or $100-25=75=x$.

The ſame method is to be followed when there are three, or four unknown quantities; but the operation will then be much more tedious; becauſe, having formed a new equation in which one quantity is exterminated, we muſt ſtill continue to form new ones in order to exterminate the others, as in the following example.

It is required to find three numbers whoſe ſum is 130; if the third is multiplied by 3, and that product is ſubtracted from the ſum of the firſt and ſecond, the remainder will be 10; if the firſt is multiplied by 2, the ſecond by 3, theſe two products are added together, and 15 ſubtracted from the ſum, the remainder will be 7 times the third number.

Having put x, y, z, for the three numbers, the queſtion reſolves itſelf into the following equations.

$$\begin{array}{|l|l}
1 & x+y+z=130 \\
2 & x+y-3z=10 \\
3 & 2x+3y-15=7z
\end{array}$$

By tranſpoſing the firſt equation, we have $x=130-y-z$; by tranſpoſing the ſecond, $x=10+3z-y$; on tranſpoſing the third, and dividing by two, we have $x=\frac{7z+15-3y}{2}$. Theſe three values of x muſt neceſſarily be equal to one another; I therefore form a new equation from the firſt and third; then $130-y-z=\frac{7z+15-3y}{2}$. Reducing this equation by multiplication and tranſpoſition, it becomes $y=9z-245$. To have another value of y, I form a new equation from the ſecond and third values of x, or I might for the ſame purpoſe make an equation of the firſt and ſecond values of x; this will be $10+3z-y=\frac{7z+15-3y}{2}$. Reducing this equation in the ſame manner as before, we have $y=z-5$. We muſt now form a third equation from the two values of y already found; and thus we will have $9z-245=z-5$; from whence, by tranſpoſition and diviſion, we have $z=30$.

20 Extermination by ſubſtitution.

In the ſame manner we might now proceed to find the values of the other unknown quantities: but it is evident, that though this method muſt infallibly anſwer, a great deal of needleſs trouble is occaſioned by it in the preſent caſe; for, if, inſtead of finding the three values of x, I only find one from the firſt equation, and ſubſtitute that in place of the letter x in the ſecond, the quantity y will be exterminated at once. The value of x from the firſt equation is $x=130-y-z$, the ſecond equation is $x+y-3z=10$; writing therefore into this equation, $130-y-z$, in place of x, we have $130-y-z+y-3z=10$, where the poſitive and negative y deſtroy one another, and the equation becomes $130-4z=10$; whence, $4z=120$, and $z=30$. But it is plain, that the remarkable ſucceſs of this ſubſtitution depends entirely upon the circumſtance of a ſingle y in the ſecond equation; for had there been $2y$ there, the ſame advantage would not have been derived from following this method. There can therefore be no rules laid down for obtaining the ſolution of algebraic problems in the moſt eaſy manner poſſible; theſe muſt depend on the particular circumſtances of each problem; and hence there is no ſcience where the rational faculties and ingenuity are put to a greater ſtretch than in algebra, and no branch of education is more proper for producing a quickneſs of underſtanding, provided the algebraiſt does not loſe himſelf in the depths of his ſcience, in which caſe he will be quick-ſighted only to algebra itſelf.

As ſo much difficulty is occaſioned by a number of unknown quantities, it will ſeldom be proper to ſtate a queſtion with two unknown quantities, where one will anſwer the purpoſe, though ſometimes the unknown quantities may be made to diſappear ſurpriſingly, by proper management. On ſome occaſions, inſtead of chuſing a ſingle letter to repreſent an unknown quantity, it will be proper to expreſs it by a ſum, or a difference; as $x+y$, or $x-y$. As an example, we ſhall give three methods of ſolving the former problem, "Required to find two numbers whoſe ſum is 100, and difference 50." With one unknown quantity, the queſtion is ſtated in the following manner.

	1	$x=$ the leaſt number ſought.
	2	$100-x=$ the greateſt
$1-2$	3	$100-2x=50=$ their difference by queſtion
$3+2x$	4	$100=50+2x$
$4-50$	5	$50=2x$
$5\div 2$	6	$25=x$ the leaſt number ſought
	7	$100-x=100-25=75$, the greateſt number

With two unknown quantities this may be ſolved otherwiſe

therwiſe than by forming a new equation, thus:

	1	$x=$ greateſt number	
	2	$y=$ leaſt	
	3	$x+y=100$	by queſtion
	4	$x-y=50$	
$3+4$	5	$2x=150$	
$5\div 2$	6	$x=75$	
$3-4$	7	$2y=50$	
$7\div 2$	8	$y=25$	

Repreſenting one of the numbers by a ſum, and the other by a difference, the work will ſtand thus:

	1	$x+y=$ greateſt number	
	2	$x-y=$ leaſt	
$1+2$	3	$2x=100$,	by queſtion
$1-2$	4	$2y=50$	
$3\div 2$	5	$x=50$	
$4\div 2$	6	$y=25$	
	7	$x+y=75$	
	8	$x-y=25$	

Though this problem is ſo eaſily reſolved by all the three methods, that it is difficult to ſay which has the advantage; yet it is ſufficient to ſhew the prodigious diverſity of operation that muſt occur in the ſolution of algebraic problems, according as we uſe different methods. The laſt method is exceedingly proper, where equations have to be multiplied into one another, which is the origin of quadratic, cubic, and other high equations, of which we are now to treat.

21
Quadratic equations.

If an equation is multiplied into itſelf once, the produce is another equation, which is as ſtrictly juſt as the former: but after having reduced it by all the methods propoſed for the reducing ſimple equations, and having brought the unknown quantities to one ſide, and the known ones to the other, we are ſtill at a loſs; becauſe the unknown quantity being multiplied into itſelf, we know not what relation it bears to the known one. Thus, if the equation $a=12$ is multiplied once into itſelf, the produce is $a^2=144$; where the unknown quantity cannot be diſcovered till we know what number multiplied into itſelf will produce 144. The above equation is one of that kind called *quadratic* equations; and, from its conſiſting only of the literal quantity multiplied into itſelf, is called a *ſimple* quadratic: but if we multiply the equation $a+3=15$ once into itſelf, the product is $a^2+6a+9=225$; and reducing this by tranſpoſition, we have $a2+6a=216$, where the literal quantity is not only multiplied by itſelf, but by the number 6. This addition is called the *affection* of an equation, and the laſt mentioned one is of that kind called *quadratic affected equations*.

It is not to be ſuppoſed that any perſon would produce equations of this kind by multiplying ſuch ſimple ones as thoſe above mentioned; but very often the circumſtances of the queſtion oblige him to ſtate them in this manner, or they are unavoidably multiplied in the courſe of the operation. Thus, ſuppoſe it is required to find two numbers whoſe ſum is 100, and product 1875; by the common method, we have $x+y=100$, and $xy=1875$. From the firſt equation $x=100-y$, and from the ſecond $x=\frac{1875}{y}$; whence $100-y=1875\div y$. Reducing this, we have $100y-y^2=1875$. We do not get clear of this difficulty by uſing only one unknown quantity; for putting x for the one, and $100-x$ for the other, we come at once to the equation $100x-x^2=1875$. Neither is it to be totally avoided by making $x+y=$ one of the numbers, and $x-y=$the other; thus indeed, by the queſtion, we have $2x=100$, and $x^2-y^2=1875$; whence, by ſubſtituting the value of x, we have $y^2=625$; ſo that, though the equation is now only a ſimple quadratic, we muſt ſtill remain ignorant of the value of y, till we know what number multiplied into itſelf will produce 625. Here, however, we ſee the utility of ſometimes repreſenting unknown quantities by a ſum and a difference.

We have already obſerved, that, when literal powers are to be divided by one another, the diviſion is perfomed by ſubtracting their indices. The extraction of their roots, in like manner, is performed by dividing their indices by 2, 3, 4, &c. according as we want the ſquare, cube, or biquadrate root; ſo, if required to find the ſquare root of a^8, I divide its index 8 by 2, the quotient a^4 is the root required. If the root of any ſeries of terms is required, as of x^2+6x+9, we muſt proceed to find it by ſuppoſing it to be $a+b$. This root we involve to the ſquare, and then make the following equation $a^2+2ab+b^2=x^2+6x+9$. From this it is evident, that if a^2 correſponds with x^2, $2ab$ muſt correſpond with $6x$, and b^2 to 9: therefore, as x is the firſt term of the root, and correſponds with a, 6 the coefficient of x muſt correſpond with $2b$ the coefficient of a. Dividing, therefore, the coefficient of x in the ſecond term by 2, the quotient 3 is the ſecond term of the root, and the ſquare root of x^2+6x+9 is $x+3$. Hence we have an eaſy rule for completing an imperfect ſquare, viz. to take half the coefficient of the unknown quantity, multiply it by itſelf, and add it to both ſides of the equation, which will then be exact ſquares. Thus the affected quadratics are eaſily reduced to ſimple ones, as in the following example. Suppoſe, $x^2+14x=32$, then taking the half of 14 or 7, multiplying it by itſelf, and adding it to both ſides of the equation, we have $x^2+14x+49=81$. From the foregoing example we are ſure that the root of the literal part is $x+7$, and from the multiplication table we know that 9 multiplied into itſelf produces 81. Extracting the root on both ſides, therefore, we have $x+7=9$; whence $x=2$.

As long as the root of the number ſought does not exceed ſome of the 9 digits, there is no difficulty; but ſuppoſing it to conſiſt of many places of figures, a tedious operation is required, which will be beſt underſtood by an example. Suppoſe the following equation is given; $x^2=2985984$, I take $x=a+b$; whence $x^2=a^2+2ab+b^2$, which conſequently muſt be equal to the number given. The extraction of the root is now facilitated by the following conſideration, that no digit multiplied into itſelf can produce more than two places of figures. To aſcertain the number of places therefore in the root of the abovementioned number, I place a point over every third figure, beginning at the right hand, and the equation will ſtand thus:

$$a^2+2ab+b^2=\dot{2}9\dot{8}5\dot{9}8\dot{4}.$$

Hence I conclude, that the root required muſt conſiſt of 4 places of figures, or be above 1000. I next conſider what digit multiplied into itſelf will produce the neareſt ſquare under 2, the firſt figure of the power. Had the point been placed over the ſecond figure, I muſt have conſidered what digit multiplied into itſelf would have produced the neareſt ſquare under the firſt two figures. In the preſent caſe, I find it to be 1. I therefore ſuppoſe $a=1000$; multiply it by itſelf, and ſubtract it from the power, in the following manner:

$$\begin{array}{r} a^2+2ab+b^2=\dot{2}9\dot{8}5\dot{9}8\dot{4}\,(1000=a \\ a^2\ =1000000 \\ \hline 2ab+b^2=1985984 \end{array}$$

It now appears, that if this remainder was divided by $2a+b$, the quotient muſt be b; for $\overline{2a+b}\times b=2ab+bb$. But as b is ſtill unknown, I muſt firſt proceed with $2a$, as in common diviſion: but as it has ſomething to be added, I muſt have regard to this in chuſing the quotient figure; therefore, though in common diviſion I might chuſe 8 for the quotient, I only chuſe 7, a being $=1000$, $2a=2000$; and to find the other term b, the work will ſtand thus:

$$\begin{array}{r} 2a=2000 \\ b=\ \ 700 \\ \hline 2a+b=2700 \end{array}\left)\begin{array}{l} 1985984\ (700=b \\ 1890000\ \ =2ab+b^2 \\ \hline \ \ \ 95984 \end{array}\right.$$

To find the other figures of the root, I muſt now ſuppoſe $a=1700$; in which caſe, the former $a^2+2ab+b^2$ will now only be equivalent in value to a^2, and $95984=2ab+b^2$. The operation is now to be repeated; a being 1700, $2a$ is 3400; which I ſet as a new diviſor, and proceed as follows:

$$\begin{array}{r} 2a=3400 \\ b=\ \ \ \ 20 \\ \hline 2a+b=3420 \end{array}\left)\begin{array}{l} 95984\ (20=b \\ 68400\ \ =2ab+b^2 \\ \hline 27584 \end{array}\right.$$

I now make a third ſuppoſition, of $a=1720$, and proceed as before; thus,

$$\begin{array}{r} 2a=3440 \\ b=\ \ \ \ \ \ 8 \\ \hline 2a+b=3448 \end{array}\left)\begin{array}{l} 27584\ (8=b \\ 27584\ \ =2ab+b^2 \\ \hline \ \ \ \ \ 0 \end{array}\right.$$

Here there being no remainder, we find 1728 to be the true root of the number required; and if the above example is attended to, the reaſons of the arithmetical rules given for extracting roots will be ſufficiently underſtood. See ARITHMETIC.

22
ic equa-
s.

If the equations are multiplied into themſelves twice, the produce is called a *cubic* equation; and, like the quadratic, is either ſimple, or affected: thus, $x^3=1728$ is a ſimple cubic; $x^3-10x^2+3x=997474$, $x^3+10x=104$, &c. are cubic affected equations.

The ſolution of ſimple cubic equations, or the method of extracting the cube root, will eaſily be underſtood by an example of the ſame kind with that by which we illuſtrated the extraction of the ſquare root. If the cube root of any ſimple algebraic power is required, it is found by dividing the index of that power by 3, as already obſerved. If of any ſeries, the root muſt be ſuppoſed $=a+b$, as before; then, this involved to the cube, or $a^3+3a^2b+3ab^2+b^3$, will be equal to the cube propoſed. Let it be required to find the cube root of $x^3+18x^2+108x+216$. Here, taking $a+b=$ the root required, and involving it to the cube, we have $a^3+3a^2b+3ab^2+b^3=x^3+18x^2+108x+216$. From inſpection, it is evident, that if a^3 correſponds to x^3, $3a^2b$ muſt correſpond to $18x^2$, and conſequently that $b=18\div3=6$, the root of the cube required therefore muſt be $x+6$.

By attentively conſidering this, we may eaſily ſee how an algebraic cube can be completed. Let us ſuppoſe the equation $x^3+6x^2=32$ given, and it is required to complete the cube. Here it is plain that $b=2$, and conſequently that the cube which wants the terms equivalent to $3ab^2$ and b^3 will be completed by adding them. As $b=2$; they are eaſily found to be $12x+8$; and adding theſe to both ſides of the equation, we have $x^3+6x^2+12x+8=40+12x$. Both ſides of this equation are complete cubes; but it is impoſſible to reduce an affected cubic equation by completing its cube, as we reduce a quadratic equation by completing its ſquare: the reaſon is, becauſe the ſquare conſiſts but of three terms; if it wants the third, that can always be made up from the known quantity with which the unknown one is multiplied in the ſecond; if it wants both the ſecond and the third, it is a complete ſquare; but in a cube which conſiſts of four terms, the unknown quantity enters into them all except the laſt; and therefore, if any other than the laſt is wanting, the unknown quantity muſt again be added to both ſides of the equation, as in the laſt example. Some caſes may indeed occur, as the following, where the cube can be advantageouſly completed. Suppoſe the following equation is given; $x^3+12x^2+48x=448$. As theſe terms are equivalent to $a^3+3a^2b+3ab^2$, and only want b^3 to make it complete, we need only take the third of the coefficient of the ſecond term, and, involving it to the cube, add it to both ſides of the equation, which will then be $x^3+12x^2+48x+64=512$. By extracting the root, we have $x+4=8$, and $x=4$. Inſtances of this kind, however, occur ſo rarely, that we ſhould not have mentioned this had it not been to ſhew the reaſon why cubic equations cannot be ſolved on the ſame principles with quadratics.

If the cube root of a large number is to be extracted, the principles are the ſame with thoſe on which the extraction of the ſquare root depends, but the operation is more tedious. Let it be required to find the cube root of 5832. Taking $a+b=$ the root required, as before: we have then $a^3+3a^2b+3ab^2+b^3=5832$. The number of places in the root muſt be determined by points, as in the extraction of the ſquare root; but for the cube they muſt be placed at the interval of two figures from one another, becauſe the cube of ſome of the digits extends to three places of figures. I then chuſe the digit which produces the cube next leſs than that of the firſt one, two, or three figures of the reſolvend, according as the point happens to fall, for the ſignificant figure of a, annexing to it as many cyphers as there are places of figures in the root; then having cubed this and ſubtracted it, I take $3a^2$ for a diviſor, multiplying it by b, and adding $3ab^2$, and b^3, thus:

$$\begin{array}{rl} a^3+3a^2b+3ab^2+b^3= & \dot{5}83\dot{2}\left(\begin{array}{l}10=a\\ \ \ 8=b\end{array}\right. \\ a^3= & 1000 \\ \hline 3a^2=300)\ & 4832 \\ \hline 3a^2b= & 2400 \\ 3ab^2= & 1920 \\ b^3= & \ \ 512 \\ \hline 3a^2b+3ab^2+b^3= & \underline{4832} \\ & \ \ \ \ \ 0 \end{array}$$

Equations.

Here 18 is the root required; but had there been a remainder, *a* muſt have been taken =180, and the operation repeated. The finding of *b* is attended with much more difficulty in the cube than in the ſquare, on account of the great additions to be made; and the higher the powers, the greater is this difficulty: but as it is evident that an algebraic theorem will be ſufficient direction for the extraction of every root, however high the power may be involved, we ſhall take no farther notice of the evolution of ſimple powers; only that all powers whoſe indices are multiples of 2 and 3, may be evolved by repeated extractions of the ſquare or cube roots: thus, if I want the biquadrate root of any power, it is obtained by extracting the ſquare twice; if the root of the ſixth power, it may be had by extracting the ſquare thrice, or the cube twice; of the 8th power, by extracting the ſquare four times; of the 9th power, by extracting the cube root thrice, &c.; but the roots of the 5th, 7th, and 11th powers, can only be had by following an algebraic theorem conſtructed on purpoſe for themſelves.

23 **Different origins of high equations.**

Hitherto we have conſidered cubic and other high equations as originating from a continued multiplication of one ſimple equation into itſelf; but their moſt common original is from the multiplication of three or more different equations into one another. Thus, if we multiply the equations $x+1=5$, $x-3=1$, $x+2=6$, into one another, the cubic equation $x^3-7x-6=30$, and by tranſpoſition $x^3-7x=36$, will be produced. Here it is obſervable, that this equation wants the ſecond term, becauſe ſome of the numbers combined with *x* are negative, and others poſitive, and the negative and poſitive ones are exactly equal to one another. Had the negative quantity been either greater or leſs than the two poſitive ones, all the three terms would have remained in the product; and hence, when we ſee a cubic equation without the ſecond term, we may know that the poſitive and negative quantities combined with *x* in the ſimple equations, or *roots*, from which it is formed, have been exactly equal to one another.

Cubic equations in which the third term is wanting ariſe from the multiplication of a ſimple quadratic by $\overline{x\pm1}$, $\overline{x\pm2}$, $\overline{x\pm3}$, &c. thus $x^2\times\overline{x-1}=x^3-x^2$; $x^2\times\overline{x+2}=x^3+2x^2$, &c.

We have already obſerved, that the higher equations are produced by the terms of a queſtion which ſecretly oblige us either to ſtate it in equations already involved, or to involve them when we attempt their reduction. An example or two, we apprehend, will here be proper. Let it be required to find two numbers, of which, if the ſecond is ſubtracted from 220, and the remainder divided by the unknown number, the quotient will be the firſt number; alſo, if the ſecond is multiplied by itſelf, and the original number ſubtracted from the product, it will be 38 times the firſt.

	1	$x=$ the one number,	
	2	$y=$ the other,	
	3	$\frac{220-y}{y}=x$	by queſtion.
	4	$y^2-y=38x$	
$4\div38$	5	$\frac{y^2-y}{38}=x$	
$5=3$	6	$\frac{y^2-y}{38}=\frac{220-y}{y}$	
	7	$y^2-y=\frac{8360-38y}{y}$	
$7+y$	8	$y^3-y^2=8360-38y$	
$8+38y$	9	$y^3-y^2+38y=8360$	

By a little variation in the terms of this queſtion, a cubic equation, in which the third term is wanting, may be produced. Suppoſe two numbers, *x* and *y*, are required, of which 200 divided by the ſecond may equal the firſt; and the ſquare of the ſecond may be equal to 38 times the firſt + the ſecond. Here,

	1	$x=\frac{200}{y}$	by queſtion.
	2	$y^2=38x+y$	
$2-y$	3	$y^2-y=38x$	
$3\div38$	4	$\frac{y^2-y}{38}=x$	
$1=5$	5	$\frac{y^2-y}{38}=\frac{200}{y}$	
$5\times y$	6	$\frac{y^3-y^2}{38}=200$	
	7	$y^3-y^2=7600$	

If the ſimple equations, or roots, of which a cubic or other high equation is compoſed, are of ſuch a nature that one of them deſtroys itſelf and becomes =0, a new ſpecies of cubic will ariſe, which is capable of three different ſolutions, and conſequently a kind of indeterminate problem. If the equation is a biquadratic, it will have four ſolutions of this kind, of the fifth power five, and ſo on, the number of ſolutions always being expreſſed by the index of the power. This does not hold, however, in any other kind of equations than thoſe where one of the original ones deſtroys itſelf; as will appear from the following examples.

If we multiply the equations $x+1=5$, $x-1=4$, and $x-4=0$, into one another, we will produce the cubic equation, $x^3-4x^2-x+4=0$; or, by tranſpoſition, $x^3-4x^2-x=-4$. Here, *x* may either be $+1$, -1, or 4; for if either of theſe are ſubſtituted in place of *x*, it anſwers the terms of the queſtion. If $x=1$, then $x^3=1$; $-4x^2=-4$, and $-x=-1$; and $x^3-4x^2-x=1-4-1=-4$. If $x=-1$, then $x^3=-1$; $-4x^2=-4$, and $-x=+1$, according to the rules of ſubtraction; conſequently $x^3-4x^2-x=-1-4+1=-4$ as the equation imports. Laſtly, if $x=4$; then $x^3-4x^2-x=64-64-4=-4$, as in the other caſes. In like manner, in the equation $x^3-9x^2+26x=24$, the value of *x* may be either 2, 3, or 4; for if $x=2$, then $x^3-9x^2+26x=8-36+52=24$; if $x=3$, then $x^3-9x^2+26x=27-81+78=24$; and if $x=4$, then $x^3-9x^2+26x=64-144+104=24$; and ſo of others.

But, when cubics are formed from the multiplication of equations into one another, all of which have ſome poſitive value, it is evident, that then they can only have one true ſolution: and the reaſon is plain; becauſe, when any of the equations deſtroys itſelf, it likewiſe diſtroys the value of all the reſt, and the whole becomes =0; and were it not that algebra can repreſent imaginary beings as well as real ones, there could be nothing to work upon in ſuch a caſe. In ſuch equations, the abſolute number which conſtitutes their value is obtained from the continual multiplication of the known quantities combined with *x* into one another; or the laſt term tranſpoſed. Thus in the firſt example, $x^3-4x^2-x+4=0$, the number $+4$ is formed by the multiplication of $+1$, -1, and -4, wherewith x was combined, into one another; for $+1\times-1-1,=$ and $-1\times-4=+4$, according to the rules of multiplication. It is not poſſible, therefore, but that what has multiplied, muſt alſo divide; and as the taking $x-4=0$ deſtroys all the product on the other ſide which alone could have truly limited the value of x, it is the ſame thing as though we had taken $x-1=0$, $x+1=0$, and $x-4=0$, and multiplied them all into one another, or given x three different values originally.

We ſhall evidently ſee the difference betwixt the two ſpecies of cubics juſt now mentioned, by another example. The equations, $x-2=1$, $x-1=2$, and $x+2=5$, produce the following; $x^3-x^2-4x+4=10$, or by tranſpoſition, $x^3-x^2-4x=6$. Here, as the number 6 is not produced by the multiplication of -1, -2, and $+2$, into one another, the value of x muſt be different from any one of them: and it is found to be ſo upon trial; for ſuppoſing $x=-1$, then $x^3-x^2-4x=-1-1+4=2$. If $x=-2$, then $x^3-x^2-4x=-8-4+12=0$. If $x=+2$, then $x^3-x^2-4x=+8-4-12=-8$: but neither of theſe are agreeable to the terms of the queſtion; therefore x is neither -1, -2, nor $+2$. But if we take $x=3$, then $x^3-x^2-4x=27-9-12=6$, according to the queſtion; and this is therefore the only true value of x.

24 lution of h equa- ns.

Having thus explained at large the origin of all the different kinds of high equations that can poſſibly occur (for what is ſaid of cubics, applies equally to Biquadratics, or thoſe of any dimenſion whatever), we muſt now give ſome account of the different methods of obtaining an exact ſolution of them with as little trouble as poſſible. A ready method of doing this hath always been reckoned a deſideratum in algebra, and indeed is likely to continue ſo.——From what we have already ſaid, we hope it will be evident why a cube cannot be completed in a manner ſimilar to that of completing the ſquare in quadratic equations; another method hath therefore been choſen, namely, of deſtroying the ſecond and third terms, and thus reducing the affected cube to a ſimple one.

25 ſtruction the ſe- d term.

The deſtruction of the ſecond term is eaſily effected, and may be underſtood from the following conſiderations. (1.) In every cube whoſe root is a binomial, or expreſſible by $a+b$, the ſigns are all $+$; thus the cube of $a+b=a^3+3a^2b+3ab^2+b^3$. (2.) In a reſidual root, or $a-b$, the ſigns of the cube are $+$ and $-$ alternately; thus the cube of $a-b=a^3-3a^2b+3ab^2-b^3$. (3.) By adding the cube of a binomial to the cube of a reſidual, the ſecond and fourth terms always deſtroy one another, becauſe they have contrary ſigns; but the firſt and third remain, becauſe their ſigns are like, and they can only be deſtroyed by ſubſtracting the equations from one another: thus the ſum of the two cubes of $a+b$, and $a-b$, is $2a^3+6ab^2$; their difference is $6a^2b+2b^3$.

It hath already been obſerved, that the coefficient of the ſecond term of any cube is always equal to three times the known quantity forming one part of the root; as, if the root is $a+b$, the coefficient of a^2 in the ſecond term will be $3b$; if the root is $x+3$, the coefficient of the ſecond term will be $+9$; if it is $x-3$, the coefficient will be -9, &c. Let it now be required to deſtroy the ſecond term of the equation $x^3-12x^2+47x=-60$. Here, becauſe the ſign is negative, I ſuppoſe $x=a+4$, the third part of the coefficient of the ſecond term, and ſubſtitute this inſtead of x into all the terms of the equation, in the following manner:

	1	$x^3-12x^2+47x=-60$ by queſt.
	2	$x=a+4$ by ſuppoſition.
$2\circledcirc^{3}$	3	$x^3=a^3+12a^2+48a+64$
$2\circledcirc^{2}$ and $\times\overline{-12}$	4	$-12x^2=-12a^2-96a-192$
2×47	5	$47x=\qquad +47a+188$
$2+4+5$	6	$x^3-12x^2+47x=a^3-a+60$
$1=6$	7	$a^3-a+60=-60$
$7-\overline{60}$	8	$a^3-a=-120$

26 Difficulty of deſtroying the third term.

From this example it will eaſily appear when the aſſumed value of x ought to be a binominal, and when a reſidual, and the deſtroying the ſecond term of any equation can never be a matter of difficulty: but the deſtruction of the third term, it is plain, muſt depend upon quite other principles; for as its ſign remains always $+$ whether the root is binomial or reſidual, it cannot be deſtroyed by any addition of a poſitive; and as it is alſo generated from all the three ſteps of the new ſubſtitution, it is impoſſible to calculate matters ſo as to make the poſitive and negative terms at all times to deſtroy one another. In the laſt example, indeed, they have done ſo very nearly; and if the equation had been $a^3-12x^2+48x=-55$, they would have done ſo altogether, and the equation would have become $a^3=-125$; but this is evidently a mere accident.

27 Cardan's method.

A method of deſtroying the third term of cubics as well as the ſecond, has been invented by Cardan. It is very laborious: however, it ſhews in an eminent manner the powers of algebra, and how much a dextrous management of literal quantities may conduce to the reſolution of problems utterly impoſſible to be ſolved without them.

Before this method can be followed, the ſecond term muſt be deſtroyed as we have ſhewn above; then x muſt be ſuppoſed $=y+z$, and we proceed as in the following example.

	1	$x^3+7x=92$ by queſtion.
	2	$x=y+z$ by ſuppoſition.
$2\circledcirc^{3}$	3	$x^3=y^3+z^3+3yz\times\overline{y+z}=y^3+3y^2z+3yz^2+z^3$
$2\times\overline{7}$	4	$7x=7y+7z$
	5	$3yz=-7$ by ſuppoſition.
$5\times\overline{y+z}$	6	$\overline{y+z}\times 3yz=-7y-7z$
6 ſubſtituted into 1	7	$x^3=y^3+z^3-7y-7z$
$4+7$	8	$x^3+7x=y^3+z^3$
$5\div 3$	9	$yz=-7\div 3$
$9\circledcirc^{3}$	10	$y^3z^3=-343\div 27$
10×4	11	$4y^3z^3=-1372\div 27$
$1=8$	12	$y^3+z^3=92$
$12\circledcirc^{2}$	13	$y^6+2y^3z^3+z^6=8464$
$13-11$	14	$y^6-2y^3z^3+z^6=8514{,}814$
$14\,uw^{2}$	15	$y^3-z^3=92{,}275751$
$12+15$	16	$2y^3=184{,}275751$
$16\div 2$	17	$y^3=92{,}137876$
$17\,vw^{3}$	18	$y=4{,}5$ nearly
$12-15$	19	$2z^3=-0{,}137876$
$19\div 2$	20	$z^3=-0{,}068938$
$20\,vw^{3}$	21	$z=-0{,}5$ nearly
	22	$y+z=4=x$ by ſecond ſtep.

28 The product of two numbers not limited by their ſum.

In the above operation there is no difficulty, except in the aſſuming $3yz=-7$, after having determined

Equations.

$y+z$ to be $=x$: but it muſt be conſidered, that the product of two numbers is by no means determined by their ſum; for by making one of the numbers a fraction and the other an integer, by making one of them poſitive, and the other negative, we may fix their product, or any number of times their product, at what we pleaſe, without affecting their ſum in the leaſt. But we muſt be careful, if we have once aſſumed a ſum, not to aſſume a difference alſo; for that would determine the unknown quantities. Thus, having aſſumed $y+z=x$, we cannot aſſume $y-z=$ any known quantity, becauſe it might alter the value of y and z with regard to x; but though we aſſume any imaginable product, we only alter the value of y and z with regard to one another, which is of no conſequence.

From the above operation may be deduced a general rule for the ſolution of all cubics to which this method is applicable; which, as corrected by Mr Simſon, may be expreſſed in the following words. "Multiply the whole value of the equation by itſelf; divide the product by four; to the quotient add the cube of the coefficient of x in the third term (the ſecond being deſtroyed) divided by 27; extract the ſquare root of this ſum, to which add half the value of the equation, and extract the cube root of the whole. Divide, now, one third of the coefficient of x by the root juſt found; ſubtract the quotient from the diviſor, and the remainder is the value of x." For the better underſtanding this theorem, in the foregoing example, $x^3+7x=92$, let $a=7$, and $b=92$; then, the rule we have juſt now mentioned will ſtand thus in algebraic characters:

$$x=\overline{\frac{b}{2}+\sqrt{\frac{b^2}{4}+\frac{a^3}{27}}}\Bigg|^{\frac{1}{3}}-\frac{\frac{1}{3}a}{\overline{\frac{b}{2}+\sqrt{\frac{b^2}{4}+\frac{a^3}{27}}}\Bigg|^{\frac{1}{3}}}$$

29 Why it will not always ſucceed.

Though this theorem ſeems capable of reſolving every kind of cubic equation, yet one unlucky circumſtance deſtroys its utility in a great many caſes. For inſtance; let the equation $x^3-12x=-9$ be propoſed. Here, according to the theorem, I multiply -9 by itſelf, the product is $+81$; this, divided by 4 quotes, 20,25. I now divide the cube of -12, or -1728, by 27; and the quotient -64 added to $+20,25$, deſtroys it entirely, and leaves a remainder of $-44,25$. From this the ſquare root ought to be extracted; but this is impoſſible, becauſe it is a negative quantity, and is formed neither from the multiplication of a poſitive into itſelf, nor of a negative into itſelf, but of a poſitive into a negative. Here, therefore, the operation muſt ſtop; and it is eaſy from this example to ſee when Cardan's method will ſucceed, and when it will not.

30 Sir Iſaac Newton's method of diviſors.

Other methods have been invented of ſolving the higher equations; but all of them are exceſſively laborious, and even precarious. A very ingenious method was invented by Sir Iſaac Newton from finding the diviſors of the abſolute number by which the value of the equation is expreſſed; each of theſe was to be ſubſtituted in place of the unknown quantity, till ſome of them was found to anſwer the terms of the queſtion.

It is eaſily ſhown, indeed, that x muſt always be a diviſor of this number, and thus equations may be ſolved which could not be ſolved by Cardan's method; of which the laſt-mentioned one $x^3-12x=-9$, is an inſtance: for here, the only diviſors of -9 are, $+1$, -1, $+3$, -3, and $+9$, -9; and ſubſtituting theſe ſucceſſively in place of x, 3 will be found to anſwer, and is the true value of x. Notwithſtanding this advantage, however, when the number is large, it is exceſſively tedious to ſubſtitute all the diviſors; and indeed, as we may eaſily know within a figure or two of the true value, perhaps we might ſucceed as well by random trials as any other way. The laſt term, and conſequently the number of diviſors, however, may be leſſened by changing the equation into another, wherein a binomial or reſidual root is put for the unknown quantity; thus, in the equation $y^4-4y^3-8y+32=0$, if $x+1$ be ſubſtituted for y, it will become $x^4-16x^2-16x+21=0$.

31 Another method by finding an arithmetical progreſſion among the diviſors.

Another very curious method is, inſtead of ſubſtituting all the diviſors of the laſt term, to ſubſtitute ſucceſſively the terms of the arithmetical progreſſion 2, 0, -1, -2, &c. with the numbers thence reſulting; then find all the diviſors of each of theſe numbers, and write them down over againſt the number they divide. This being done, ſearch for one or more arithmetical progreſſions, either aſcending or deſcending, whoſe common difference is either unity, or ſome diviſor of the index of the higheſt power of x; that term of ſuch progreſſion which ſtands over againſt 0, if divided by the common difference, and ſubſtituted into the equation with the ſign + or —, according as the progreſſion from whence it was taken was aſcending or deſcending, will be one of the roots of the equation. If x has more values than one, there will be more arithmetical progreſſions. Sometimes indeed there will be deceptions by this method, and progreſſions will appear, which do not point out the true root; but theſe would fail if the ſubſtitution was continued two or three ſteps further: an example or two will ſufficiently illuſtrate this.

Let the equation given be $x^3+x=68$. By tranſpoſition it becomes $x^3+x-68=0$. Here I firſt ſuppoſe $x=2$; which being ſubſtituted, produces -58: then I ſuppoſe $x=1$, which produces 66; if $x=0$, then -68 is produced; with -1, then -70 is produced; with -2, 78 is produced; and ſo on. Having thus made the requiſite ſubſtitutions, they are wrote down with the terms of the arithmetical progreſſion from which they are produced, on one hand, and their diviſors on the other, thus:

		Diviſors	Progreſſion aſcending
2	—58	1. 2. 29. &c.	2
1	—66	1. 2. 3. 6. 11. &c.	3
0	—68	1. 2. 4. 17. &c.	4*
—1	—70	1. 2, 5. 7. &c.	5
—2	—78	1. 2. 3. 6. 13. &c.	6
—3	—98	1. 2. 7. 14. &c.	7

Among theſe diviſors only one progreſſion is diſcovered; and the number 4, pointing over againſt 0, ſhews 4 to be the only true root of the equation.—Let now the equation $x^4+x^3-29x^2-9x+180=0$ be propoſed, and the work will ſtand as follows.

		Diviſors	Progreſſions			
2	70	1. 2. 5. 7. 10. 14. 35. 70	1	2	5	7
1	144	1. 2. 3. 4. 6. 8. 9. 12,&c	2	3	4	6
0	180	1. 2. 3. 4. 5. 6. 9. 10,&c	3	4	3	5*
—1	160	1. 2. 4. 5. 8. 10. 16. 20,&c	4	5	2	4
—2	90	1. 2. 3. 5. 6. 9. 10. 15,&c	5	6	1	3

32 Why this method ſucceeds.

In this example there are four progreſſions, two aſcending, and two deſcending: which ſhow the four roots of the equation to be +3, +4, —3, and—5. The reaſon of our ſucceſs in this method is, that all the values of x muſt neceſſarily be diviſors of the abſolute number by which the value of the whole equation is expreſſed. When x is ſuppoſed $=0$, then that number ſtands alone; becauſe it cannot be affected by any of the values of x. The true roots of the equation muſt therefore lie in that line of diviſors oppoſite to 0. The progreſſions ſerve to point them out; becauſe, as $+1, +2$, or $-1, -2$, are ſucceſſively ſubſtituted in place of 0, there is a proportionable alteration in the value of the equation, and conſequently in the diviſors of the number by which it is expreſſed; and as long as the ſubſtitution is continued, uſing quantities that differ by one certain increaſe or decreaſe, the ſame progreſſion muſt continue among the diviſors.

A method of depreſſing biquadratic equations into cubic ones was invented by Des Cartes, which is publiſhed in Simpſon's algebra, together with an improvement: but as the difficulty of ſolving cubic equations is very little inferior to that of ſolving biquadratics, we think it unneceſſary to take farther notice of this, or any other method that is applicable to particular caſes; and ſhall therefore explain the method of ſolving equations by approximation, or by the converging ſeries; which, though ſufficiently laborious, will certainly anſwer in all caſes, and for every kind of equation.

al me-
y ap-
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Let the propoſed equation be $x^3+10x^2+50x=2600$. Here it is plain, that x cannot much exceed 10: making trial of 11, therefore, I find it too much, ſo that the true value of x muſt lie between 10 and 11. The difference between 10 and the true root, I call e, which is an unknown quantity; and for the more eaſy finding its value, I put r for 10, and ſay $x=r+e$, Then,

$$\begin{array}{r|c|l} & 1 & x^3=r^3+3r^2e+3re^2+e^3 \\ & 2 & 10x^2=10r^2+20re+10e^2 \\ & 3 & 50x= \qquad\qquad 50r+50e \\ 1+2+3 & 4 & x^3+10x^2+50x=r^3+3r^2e+3re^2+e^3+ \\ & & \qquad 10r^2+20re+10e^2+50r+50e. \end{array}$$

Becauſe e is of ſmall value in compariſon of r, and to avoid being involved in high equations, I reject all the powers of e above the firſt; and having thrown them out, the equation becomes x^3+10x^2+50x, or $2600=r^3+3r^2e+10r^2+20re+50r+50e$;—whence, by tranſpoſition, $2600-r^3-10r^2-50r=3r^2e+20re+50e$; and, by diviſion, $\frac{2600-r^3-10r^2-50r}{3r^2+20r+50}=e$.——As the value of r is known, I ſubſtitute that value into this new equation; and having made the diviſion, e is found to be 0,18 nearly. Having then aſſumed $r=10,18$, and ſubſtituted this value into the equation inſtead of 10, in order to find the value of e more exactly, it will come out $-0,0005347$; which added to 10,18, gives 10,1794653; and if this value is again ſubſtituted, we will have another value of e, which will determine the root ſtill more exactly; and ſo on, to as many places of decimals as we pleaſe.

It is not neceſſary, in the ſolution of equations by this method, to take r always the neareſt root leſs than juſt; the ſame purpoſe will be anſwered by taking it more than juſt, making $r-e=x$, and proceeding accordingly.

ALGEDO, the running of a gonorrhœa ſtopping ſuddenly after it appears. When it thus ſtops, a pain reaches to the anus, or to the teſticles, without their being ſwelled; and ſometimes this pain reaches to the bladder, in which caſe there is an urging to diſcharge the urine, which is with difficulty paſſed, and in very ſmall quantities at a time. The pain is continued to the bladder by the urethra; to the anus, by the acceleratory muſcles of the penis; and to the teſticles, by the vaſa deferentia, and veſiculæ ſeminales. In this caſe, calomel repeated ſo as to purge, brings back the running, and then all difficulty from this ſymptom ceaſes.

ALGENEB, a fixed ſtar, of the ſecond magnitude, in Perſeus's right ſide; its longitude is 27°, 46′, 12″, of Taurus, and its latitude 30°, 05′, 28″, north, according to Mr Flamſtead's catalogue.

ALGEZIRA, a town of Andaluſia in Spain, with a port on the coaſt of the Straits of Gibraltar. By this city the Moors entered Spain in 713; and it was taken from them in 1344, after a very long ſiege, remarkable for being the firſt in which cannon were made uſe of. It was called *Old Gibraltar*, and is about four leagues from the New. W. Long. 5. 2. N. Lat. 36. 0.

ALGHIER, or **Algeri**, a town in Sardinia, with a biſhop's ſee, upon the weſtern coaſt of the iſland, between Saſſeri and Boſa. Though it is not large, it is well peopled, and has a commodious port. The coral fiſhed for on this coaſt is in the higheſt eſteem of any in the Mediterranean. W. Long. 4. 2. Lat. 36. 0.

ALGIABARII, a Mahometan ſect of predeſtinarians, who attribute all the actions of men, good or evil, to the agency or influence of God. The Algiabarii ſtand oppoſed to the Alkadarii *. They hold abſolute degrees and phyſical premotion. For the juſtice of God in puniſhing the evil he has cauſed, they reſolve it wholly into his abſolute dominion over the creatures.

* See *Alkadarii.*

ALGIERS, a kingdom of Africa, now one of the ſtates of Barbary.—According to the lateſt and beſt computations, it extends 460 miles in length from eaſt to weſt, and is very unequal in breadth; ſome places being ſcarce 40 miles broad, and others upwards of 100. It lies between Long. 0. 16. and 9. 16. W. and extends from Lat. 36. 55. to 44. 50. N.—It is bounded on the north, by the Mediterranean; on the eaſt, by the river Zaine, the ancient Tuſca, which divides it from Tunis; on the weſt, by the Mulvya, and the mountains of Trava, which ſeparate it from Morocco; and on the ſouth by the Sahara, Zaara, or Numidian deſert.

1
Climate and ſoil.

The climate of Algiers is in moſt places ſo moderate, that they enjoy a conſtant verdure; the leaves of the trees being neither parched up by heat in ſummer, nor nipped by the winter's cold. They begin to bud in February; in April, the fruit appears in its full bigneſs; and is commonly ripe in May. The ſoil, however, is exceſſively various; ſome places being very hot, dry, and barren, on which account they are generally ſuffered to lie uncultivated by the inhabitants, who are very negligent. Theſe barren places, eſpecially ſuch as lie on the ſouthern ſide, and are at a great diſtance from the ſea, harbour vaſt numbers of wild creatures, as lions, tigers, buffaloes, wild boars, ſtags, porcupines, monkeys, oſtriches, &c. On account of their barrenneſs, they have but few towns, and thoſe thinly peopled; though ſome of them are ſo advantageouſly ſituated for trading with Bildulgerid and Negroland, as to drive a conſiderable traffic with them.

The Algerine kingdom made formerly a conſiderable part of the Mauritania Tingitana *, which was reduced to a Roman province by Julius Cæſar, and from him alſo called *Mauritania Cæſarienſis.*—In our general account of Africa, we have related, that the Romans were driven out of that continent by the Vandals; theſe by Beliſarius, the Greek emperor Juſtinian's general; and the Greeks in their turn by the Saracens. This laſt revolution happened about the middle of the ſeventh century; and the Arabs continued maſters of the country, divided into a great number of petty kingdoms or ſtates, under chiefs of their own chuſing, till the year 1051. This year, one Abu-beker-ben-Omar, or, as the Spaniſh authors call him, *Abu-Texefien*, an Arab of the Zinhagian tribe, being provoked at the tyranny of thoſe deſpots, gathered, by the help of his marabouts or ſaints, a moſt powerful army of malcontents, in the ſouthern provinces of Numidia and Libya. His followers were nicknamed *Marabites* or *Morabites;* by the Spaniards, *Almoravides;* probably from their being aſſembled principally by the ſaints who were alſo called *Morabites*. The khalif of Kayem's forces were at this time taken up with quelling other revolts in Syria, Meſopotamia, &c. and the Arabs in Spain engaged in the moſt bloody wars; ſo that Texefien having nothing to fear from them, had all the ſucceſs he could wiſh againſt the Arabian cheyks or petty tyrants, whom he defeated in many battles, and at laſt drove them not only out of Numidia and Libya, but out of all the weſtern parts, reducing the whole province of Tingitania under his dominion.

* See *Mauritania.*

2 Abu-Texefien ſubdues the Arab princes.

Texifien was ſucceeded by his ſon Yuſef, or Joſeph, a brave and warlike prince. In the beginning of his reign, he laid the foundation of the city of Morocco, which he deſigned to make the capital of his empire. While that city was building, he ſent ſome of his marabouts embaſſadors to Tremecen, (now a province of Algiers,) at that time inhabited by a powerful and inſolent ſect of Mahometans called *Zeneti*. The deſign of this embaſſy was to bring them back to what he called the *true faith;* but the Zeneti, deſpiſing his offers, aſſembled at Amaf, or Amfa, their capital, murdered the ambaſſadors, and invaded Joſeph's dominions with an army of 50,000 men.

3 Zeneti deſtroyed.

The king hearing of their infamous proceedings, ſpeedily muſtered his army, and led it by long marches into their country, deſtroying all with fire and ſword; while the Zeneti, inſtead of oppoſing his progreſs, retired as faſt as poſſible towards Fez, in hopes of receiving aſſiſtance from thence. In this they were miſerably deceived: the Fezzans marched out againſt them in a hoſtile manner; and coming up with the unhappy Zeneti, encumbered with their families and baggage, and ready to expire with hunger and wearineſs, they cut them all to pieces, except a ſmall number who were moſtly drowned in attempting to ſwim acroſs a river; and ſome others, who, in their flight, periſhed by falling from the high adjacent rocks. In the mean time Joſeph reduced their country to a mere deſart; which was, however, ſoon peopled by a numerous colony of Fezzans, who ſettled there under the protection of the reigning kings. In this war it is computed that near a million of the Zeneti, men, women, and children, loſt their lives.

The reſtleſs and ambitious temper of Joſeph did not let him remain long at peace. He quickly declared war againſt the Fezzans, reduced them to become his tributaries, and extended his conqueſts all along the mediterranean. He next attacked ſome Arabian cheyks who had not yet ſubmitted to his juriſdiction; and purſued them with ſuch fury, that neither the Libyan deſarts, nor ridges of the moſt craggy rocks, could ſhelter them from his arms. He attacked them in ſuch of their retreats, caſtles, and fortreſſes, as were till then deemed impregnable; and at laſt ſubdued them, to the great grief of the other African nations, who were greatly annoyed by the ravages committed by his numerous forces.

Thus was founded the empire of the Morabites: which, however, was of no long duration; that race being in the 12th century driven out by Mohavedin, a marabout. This race of prieſts was expelled by Abdulac governor of Fez; and he, in the 13th century, ſtripped of his new conqueſts by the Sharifs of *Haſcen*, the deſcendants of thoſe Arabian princes whom Abu-Texefien had formerly expelled.

4 Sharifs Haſcen

The better to ſecure their new dominions, the Sharifs divided them into ſeveral little kingdoms or provinces; and among the reſt the preſent kingdom of Algiers was divided into four, namely, *Tremecen*, *Tenez*, *Algiers proper*, and *Bujeyah*. The four firſt monarchs laid ſo good a foundation for a laſting balance of power between their little kingdoms, that they contiued for ſome centuries in mutual peace and amity; but at length the king of Tremecen, having ventured to violate ſome of their articles, Abul-Farez, king of Tenez, declared war againſt him, and obliged him to become his tributary. This king dying ſoon after, and having divided his kingdom among his three ſons, new diſcords aroſe; which Spain taking advantage of, a powerful fleet and army was ſent againſt Barbary, under the Count of Navarre, in 1505. This commander ſoon made himſelf maſter of the important cities of Oran, Bujeyah, and ſome others; which ſo alarmed the Algerines, that they put themſelves under the protection of Selim Eutemi, a noble and warlike Arabian prince. He came to their aſſiſtance with a great number of his braveſt ſubjects, bringing with him his wife Zaphira, and a ſon then about 12 years old. This however was not ſufficient to prevent the Spaniards from landing a number of forces near Algiers that ſame year, and obliging that metropolis to become tributary to Spain. Nor could Prince Selim hinder them from building a ſtrong fort on a ſmall iſland oppoſite to the city, which terrified their corſairs from ſailing either in or out of the harbour.

5 Alger danger the Spa ards.

To this galling yoke the Algerines were obliged to ſubmit, till the year 1516; when, hearing of the death of Ferdinand king of Spain, they ſent an embaſſy to *Aruch Barbaroſſa*, who was at this time no leſs dreaded for his valour than his ſurpriſing ſucceſs, and was then ſent on a cruize with a ſquadron of galleys and barks. The purport of the embaſſy was, that he ſhould come

6 Invite baroſſa.

come and free them from the Spaniſh yoke; for which they agreed to pay him a gratuity anſwerable to ſo great a ſervice. Upon this, Barbaroſſa immediately diſpatched 18 gallies and 30 barks to the aſſiſtance of the Algerines; while he himſelf advanced towards the city with 800 Turks, 3000 Jigelites, and 2000 Mooriſh volunteers. Inſtead of taking the neareſt road to Algiers, he directed his courſe towards *Sharſhel*, where *Haſſan*, another famed corſair, had ſettled himſelf. Him he ſurpriſed, and obliged to ſurrender; not without a previous promiſe of friendſhip: but no ſooner had Barbaroſſa got him in his power, than he cut off his head; and obliged all Haſſan's Turks to follow him in his new expedition.

On Barbaroſſa's approach to Algiers, he was met by prince Eutemi, attended by all the people of that metropolis, great and ſmall; who looked for deliverance from this abandoned villain, whom they accounted invincible. He was conducted into the city amidſt the acclamations of the people, and lodged in one of the nobleſt apartments of prince Eutemi's palace, where he was treated with the greateſt marks of diſtinction. Elated beyond meaſure with this kind reception, Barbaroſſa formed a deſign of becoming king of Algiers; and fearing ſome oppoſition from the inhabitants, on account of the exceſſes he ſuffered his ſoldiers to commit, murdered prince Eutemi, and cauſed himſelf to be proclaimed king; his Turks and Moors crying out as he rode along the ſtreets, "Long live King Aruch Barbaroſſa, the invincible king of Algiers, the *choſen of God* to deliver the people from the oppreſſion of the Chriſtians; and deſtruction to all that ſhall oppoſe, or refuſe to own him as their lawful ſovereign." Theſe laſt threatening words ſo intimidated the inhabitants, already apprehenſive of a general maſſacre, that he was immediately acknowledged king. The unhappy princeſs Zaphira, it is ſaid, poiſoned herſelf, to avoid the brutality of this new king, whom ſhe unſucceſsfully endeavoured to ſtab with a dagger.

Barbaroſſa was no ſooner ſeated on the throne, than he treated his ſubjects with ſuch cruelty, that they uſed to ſhut up their houſes and hide themſelves when he appeared in public. In conſequence of this, a plot was ſoon formed againſt him; but being diſcovered, he cauſed twenty of the principal conſpirators to be beheaded, their bodies to be buried in a dunghill, and laid a heavy fine on thoſe who ſurvived. This ſo terrified the Algerines, that they never afterwards durſt attempt any thing againſt either Barbaroſſa or his ſucceſſors.

In the mean time, the ſon of prince Eutemi having fled to Oran, and put himſelf under the protection of the marquis of Gomarez, laid before that nobleman a plan for putting the city of Algiers into the hands of the king of Spain. Upon this, young Selim Eutemi was ſent to Spain, to lay his plan before cardinal Ximenes; who having approved of it, ſent a fleet with 10,000 land forces, under the command of *Don Franciſco*, or, as others call him, *Don Diego de Vera*, to drive out the Turks, and reſtore the young prince. But the fleet was no ſooner come within ſight of land, than it was diſperſed by a ſtorm, and the greateſt part of the ſhips daſhed againſt the rocks. Moſt of the Spaniards were drowned; and the few who eſcaped to ſhore, were either killed by the Turks, or made ſlaves.

Though Barbaroſſa had nothing to boaſt on this occaſion, his pride and inſolence were now ſwelled to ſuch a degree, that he imagined himſelf invincible, and that the very elements conſpired to make him ſo. The Arabians were ſo much alarmed at his ſucceſs, that they implored the aſſiſtance of Hamidel Abdes king of Tenez, to drive the Turks out of Algiers. That prince readily undertook to do what was in his power for this purpoſe, provided they agreed to ſettle the kingdom on himſelf and his deſcendents. This propoſal being accepted, he immediately ſet out at the head of 10,000 Moors; and, upon his entering the Algerine dominions, was joined by all the Arabians in the country. Barbaroſſa engaged him, only with 1000 Turkiſh muſqueteers and 500 Granada Moors; totally defeated his numerous army; purſued him to the very gates of his capital, which he eaſily made himſelf maſter of; and, having given it up to be plundered by his Turks, obliged the inhabitants to acknowledge him as their ſovereign. This victory, however, was chiefly owing to the advantage which his troops had from their fire-arms; the enemy having no other weapons than arrows and javelins.

No ſooner was Barbaroſſa become maſter of the kingdom of Tenez, than he received an embaſſy from the inhabitants of Tremecen; inviting him to come to their aſſiſtance againſt their then regning prince, with whom they were diſſatisfied on account of his having dethroned his nephew, and forced him to fly to Oran; offering him even the ſovereignty, in caſe he accepted of their propoſal. The king of Tremecen, not ſuſpecting the treachery of his ſubjects, met the tyrant with an army of 6000 horſe and 3000 foot: but Barbaroſſa's artillery gave him ſuch an advantage, that the king was at length forced to retire into the capital; which he had no ſooner entered, than his head was cut off, and ſent to Barbaroſſa, with a freſh invitation to come and take poſſeſſion of the kingdom. On his approach, he was met by the inhabitants, whom he received with great complaiſance, and many fair promiſes; but beginning to tyrannize as uſual, his new ſubjects ſoon convinced him that they were not ſo paſſive as the inhabitants of Algiers. Apprehending, therefore, that his reign might prove uneaſy and precarious, he entered into an alliance with the king of Fez; after which, he took care to ſecure the reſt of the cities in his new kingdom, by garriſoning them with his own troops. Some of theſe, however, revolted ſoon after; upon which he ſent one of his corſairs, named *Eſcander*, a man no leſs cruel than himſelf, to reduce them. The Tremecenians now began to repent in good earneſt of their having invited ſuch a tyrant to their aſſiſtance; and held conſultations on the moſt proper means of driving him away, and bringing back their lawful prince *Abuchen Men*: but their cabals being diſcovered, a great number of the conſpirators were maſſacred in the moſt cruel manner. The prince had the good luck to eſcape to Oran, and was taken under the protection of the marquis of Gomarez, who ſent immediate advice of it to Charles V. then lately arrived in Spain, with a powerful fleet and army. That monarch immediately ordered the young king a ſuccour of 10,000 men, under the command of the governor of Oran; who, under the guidance of Abuchen Men, began his march towards Tremecen; and in their way they were joined by prince Selim, with a great number of Arabs and Moors. The firſt thing they reſolved upon, was, to attack the important fortreſs of *Calau*, ſituated between Tremecen and Algiers, and commanded by the corſair Eſcander at the head of about 300 Turks. They inveſted it cloſely on all ſides, in hopes Barbaroſſa would come out of Tremecen to its relief, which would give the Tremecenians an opportunity of keeping him out. That tyrant, however, kept cloſe in his capital, being embaraſſed by his fears of a revolt, and the politic delays of the king of Fez, who had not ſent the auxiliaries he promiſed. The garriſon of Calau, in the mean time, made a brave defence; and, in a ſally they made at night, cut off near 300 Spaniards. This encouraged them to venture a ſecond time; but they were now repulſed with great loſs, and Eſcander himſelf wounded: ſoon after which, they ſurrendered upon honourable terms; but were all maſſacred by the Arabians, except ſixteen, who clung cloſe to the ſtirrups of the king, and of the Spaniſh general.

Barbaroſſa being now informed that Abuchen Men, with his Arabs, accompanied by the Spaniards, were in full march to lay ſiege to Tremecen, thought proper to come out, at the head of 1500 Turks and 5000 Mooriſh horſe, in order to break his way through the enemy; but he had not proceeded far from the city, before his council adviſed him to return and fortify himſelf in it. This advice was now too late; the inhabitants being reſolved to keep him out, and open their gates to their own lawful prince as ſoon as he appeared. In this diſtreſs Barbaroſſa ſaw no way left but to retire to the citadel, and there defend himſelf till he could find an opportunity of ſtealing out with his men and all his treaſure. Here he defended himſelf vigorouſly; but his proviſions failing him, he took advantage of a ſubterranean back-way, which he had cauſed to be digged up for that purpoſe, and, taking his immenſe treaſure with him, ſtole away as ſecretly as he could. His flight, however, was ſoon diſcovered; and he was ſo cloſely purſued, that to amuſe, as he hoped, the enemy, he cauſed a great deal of his money, plate, jewels, &c. to be ſcattered all the way, thinking they would not fail to ſtop their purſuit to gather it up. This ſtratagem, however, failed, through the vigilance of the Spaniſh commander, who being himſelf at the head of the purſuers, obliged them to march on, till he was come up cloſe to him on the banks of the *Huexda*, about eight leagues from Tremecen. Barbaroſſa had juſt croſſed the river with his vanguard, when the Spaniards came up with his rear on the other ſide, and cut them all off; and then croſſing the water, overtook him at a ſmall diſtance from it. Here a bloody engagement enſued, in which the Turks fought like as many lions; but, being at length overpowered by numbers, they were all cut to pieces, and Barbaroſſa among the reſt, in the 44th year of his age, and four years after he had raiſed himſelf to the royal title of *Jigel* and the adjacent country; two years after he had acquired the ſovereignty of Algiers, and ſcarce a twelvemonth after the reduction of Tremecen. His head was carried to Tremecen, on the point of a ſpear; and Abuchen Men proclaimed king, to the joy of all the inhabitants. A few days after the fight, the king of Fez made his appearance at the head of 20,000 horſe, near the field of battle; but hearing of Barbaroſſa's defeat and death, marched off with all poſſible ſpeed, to avoid being attacked by the enemy.

10
Barbaroſſa defeated and killed by the Spaniards.

11
Succeede by Hay din.

The news of Barbaroſſa's death ſpread the utmoſt conſternation among the Turks at Algiers; however, they cauſed his brother Hayradin to be immediately proclaimed king. The Spaniſh commander now ſent back the emperor's forces, without making any attempt upon Algiers; by which he loſt the opportunity of driving the Turks out of that country; while Hayradin, juſtly dreading the conſequences of the tyranny of his officers, ſought the protection of the Grand Signior. This was readily granted, and himſelf appointed baſhaw or viceroy of Algiers; by which means he received ſuch conſiderable reinforcements, that the unhappy Algerines durſt not make the leaſt complaint; and ſuch numbers of Turks reſorted to him, that he was not only capable of keeping the Moors and Arabs in ſubjection at home, but of annoying the Chriſtians at ſea. His firſt ſtep was to take the Spaniſh fort abovementioned, which was a great nuiſance to his metropolis. The Spaniards held out to the laſt extremity; but being all ſlain or wounded, Hayradin eaſily became maſter of the place.

12
He takes Spaniſh

Hayradin next ſet about building a ſtrong mole for the ſafety of his ſhips. In this he employed 30,000 Chriſtian ſlaves, whom he obliged to work without intermiſſion for three years; in which time the work was completed. He then cauſed the fort he had taken from the Spaniards to be repaired, and placed a ſtrong garriſon in it, to prevent any foreign veſſels from entering the harbour without giving an account of themſelves. By theſe two important works, Hayradin ſoon became dreaded not only by the Arabs and Moors, but alſo by the maritime Chriſtian powers, eſpecially the Spaniards. The viceroy failed not to acquaint the Grand Signior with his ſucceſs, and obtained from him a freſh ſupply of money, by which he was enabled to build a ſtronger fort, and to erect batteries on all places that might favour the landing of an enemy. All theſe have ſince received greater improvements from time to time, as often as there was occaſion for them.

13
Succe by Haſ Aga.

In the mean time the Sultan, either out of a ſenſe of the great ſervices Hayradin had done, or perhaps out of jealouſy leſt he ſhould make himſelf independent, raiſed Hayradin to the dignity of baſhaw of the empire, and appointed Haſſan Aga, a Sardinian renegado, an intrepid warrior, and an experienced officer, to ſucceed him as baſhaw of Algiers. Haſſan had no ſooner taken poſſeſſion of his new government, than he began to purſue his ravages on the Spaniſh coaſt with greater fury than ever; extending them to the eccleſiaſtical ſtate, and others parts of Italy. But Pope Paul III. being alarmed at this, exhorted the emperor Charles V. to ſend a powerful fleet to ſuppreſs thoſe frequent and cruel piracies; and, that nothing might be wanting to render the enterprize ſucceſsful, a bull was publiſhed by his holineſs, wherein a plenary abſolution of ſins, and the crown of martyrdom, was promiſed to all thoſe who either fell in battle or were made ſlaves. The emperor on his part needed no ſpur; and therefore ſet ſail at the head of a powerful fleet conſiſting of 120 ſhips and 20 gallies, having on board 30,000 choſen troops, an immenſe quantity of money, arms, ammunition, &c. In this expedition many young nobility and gentry attended as volunteers, and among theſe many knights of Malta, ſo remarkable for

14
Charles Vth's e dition a gainſt A giers.

for their valour againſt the enemies of Chriſtianity. Even ladies of birth and character attended Charles in his expedition, and the wives and daughters of the officers and ſoldiers followed them with a deſign to ſettle in Barbary after the conqueſt was finiſhed. All theſe meeting with a favourable wind, ſoon appeared before Algiers; every ſhip diſplaying the Spaniſh colours on the ſtern, and another at the head, with a crucifix to ſerve them for a pilot.

15 giers in at con- nation.

16 ented mad het fur- ring.

17 iſh fleet oyed by m.

By this prodigious armament, the Algerines were thrown into the utmoſt conſternation. The city was ſurrounded only by a wall with ſcarce any outworks. The whole garriſon conſiſted of 800 Turks and 6000 Moors, without fire-arms, and poorly diſciplined and accoutred; the reſt of their forces being diſperſed in the other provinces of the kingdom, to levy the uſual tribute on the Arabs and Moors. The Spaniards landed without oppoſition, and immediately built a fort, under the cannon of which they encamped, and diverted the courſe of a ſpring which ſupplied the city with water. Being now reduced to the utmoſt diſtreſs, Haſſan received a ſummons to ſurrender at diſcretion, on pain of being put to the ſword with all the garriſon. The herald was ordered to extol the vaſt power of the emperor both by ſea and land, and to exhort him to return to the Chriſtian religion. But to this Haſſan only replied, that he muſt be a madman who would pretend to adviſe an enemy, and that the adviſed muſt ſtill act more madly who would take counſel of ſuch an adviſer. He was, however, on the point of ſurrendering the city, when advice was brought him that the forces belonging to the weſtern government were in full march towards the place; upon which it was reſolved to defend it to the utmoſt. Charles, in the mean time, reſolving upon a general aſſault, kept a conſtant firing upon the town; which, from the weak defence made by the garriſon, he looked upon as already in his hands. But while the *douwan*, or Algerine ſenate, were deliberating on the moſt proper means of obtaining an honourable capitulation, a mad prophet, attended by a multitude of people, entered the aſſembly, and foretold the ſpeedy deſtruction of the Spaniards before the end of the moon, exhorting the inhabitants to hold out till that time. This prediction was ſoon accompliſhed in a very ſurpriſing and unexpected manner: for, on the 28th of October 1541, a dreadful ſtorm of wind, rain, and hail, aroſe from the north, accompanied with violent ſhocks of earthquakes, and a diſmal and univerſal darkneſs both by ſea and land; ſo that the ſun, moon, and elements, ſeemed to combine together for the deſtruction of the Spaniards. In that one night, ſome ſay in leſs than half an hour, 86 ſhips and 15 galleys were deſtroyed, with all their crews and military ſtores; by which the army on ſhore was deprived of all means of ſubſiſting in theſe parts. Their camp alſo, which ſpread itſelf along the plain under the fort, was laid quite under water by the torrents which deſcended from the neighbouring hills. Many of the troops, by trying to remove into ſome better ſituation, were cut in pieces by the Moors and Arabs; while ſeveral galleys, and other veſſels, endeavouring to gain ſome neighbouring creeks along the coaſts, were immediately plundered, and their crews maſſacred by the inhabitants.

18 Siege of Algiers raiſed.

The next morning, Charles beheld the ſea covered with the fragments of ſo many ſhips, and the bodies of men, horſes, and other creatures, ſwimming on the waves; at which he was ſo diſheartened, that abandoning his tents, artillery, and all his heavy baggage, to the enemy, he marched at the head of his army, though in no ſmall diſorder, towards cape *Malabux*, in order to re-imbark in thoſe few veſſels which had outweathered the ſtorm. But Haſſan, who had cauſed his motions to be watched, allowed him juſt time to get to the ſhore, when he ſallied out and attacked the Spaniards in the midſt of their hurry and confuſion to get into their ſhips, killing great numbers, and bringing away a ſtill greater number of captives; after which he returned in triumph to Algiers, where he celebrated with great rejoicings his happy deliverance from ſuch diſtreſs and danger.

19 The mad prophet rewarded.

Soon after this, the prophet *Yuſef*, who had foretold the deſtruction of the Spaniards, was not only declared the deliverer of his country, but had a conſiderable gratuity decreed him, with the liberty of exerciſing his prophetic function unmoleſted. It was not long, however, before the marabouts, and ſome interpreters of the law, made a ſtrong oppoſition againſt him; remonſtrating to the baſhaw, how ridiculous and ſcandalous it was to their nation, to aſcribe the deliverance of it to a poor fortune-teller, which had been obtained by the fervent prayers of an eminent ſaint of their own profeſſion. But tho' the baſhaw and his douwan ſeemed, out of policy, to give into this laſt notion, yet the impreſſion which Yuſef's predictions and their late accompliſhment had made upon the minds of the common people, proved too ſtrong to be eradicated; and the ſpirit of divination and conjuring has ſince got into ſuch credit among them, that not only their great ſtateſmen, but their prieſts, marabouts, and ſantoons, have applied themſelves to that ſtudy, and dignified it with the name of *Mahomet's Revelations*.

20 Freſh calamities of the Spaniards.

The unhappy Spaniards had ſcarce reached their ſhips, when they were attacked by a freſh ſtorm, in which ſeveral more of them periſhed; one ſhip in particular, containing 700 ſoldiers, beſides ſailors, ſunk in the emperor's ſight, without a poſſibility of ſaving a ſingle man. At length, with much labour, they reached the port of *Bujeyah*, at that time poſſeſſed by the Spaniards, whither Haſſan king of Tunis ſoon after repaired, with a ſupply of proviſions for the emperor, who received him graciouſly, with freſh aſſurances of his favour and protection. Here he diſmiſſed the few remains of the Malteſe knights and their forces, who embarked in three ſhattered gallies, and with much difficulty and danger reached ther own country. Charles himſelf ſtaid no longer than till the 16th of November, when he ſet ſail for Carthagena, and reached it on the 25th of the ſame month. In this unfortunate expedition upwards of 120 ſhips and galleys were loſt, above 300 colonels and other land and ſea officers, 8000 ſoldiers and marines, beſides thoſe deſtroyed by the enemy on their reimbarkation, or drowned in the laſt ſtorm. The number of priſoners was ſo great, that the Algerines ſold ſome of them, by way of contempt, for an onion per head.

21 Haſſan reduces Tremecen.

Haſſan, elated with this victory, in which he had very little ſhare, undertook an expedition againſt the king of Tremecen, who, being now deprived of the aſſiſtance of the Spaniards, was forced to procure a peace by paying a vaſt ſum of money, and becoming tributary to him. The baſhaw returned to Algiers, laden with riches; and ſoon after died of a fever, in the 66th year of his age.

22
Bujeyah taken from the Spaniards.

From this time the Spaniards were never able to annoy the Algerines in any conſiderable degree. In 1555, they loſt the city of Bujeyah, which was taken by *Salha Rais*, Haſſan's ſucceſſor; who next year ſet out on a new expedition, which he kept a ſecret, but was ſuſpected to be intended againſt Oran: but he was ſcarcely got four leagues from Algiers, when the plague, which at that time raged violently in the city, broke out in his groin, and carried him off in 24 hours.

23
Haſſan Corſo choſen baſhaw by by the janiſſaries.

Immediately after his death the Algerine ſoldiery choſe a Corſican renegado, Haſſan Corſo, in his room, till they ſhould receive further orders from the Porte. He did not accept of the baſhawſhip without a good deal of difficulty; but immediately proſecuted the intended expedition againſt Oran, diſpatching a meſſenger to acquaint the Porte with what had happened. They had hardly begun their hoſtilities againſt the place, when orders came from the Porte, expreſsly forbidding Haſſan Corſo to begin the ſiege, or, if he had begun it, enjoining him to raiſe it immediately. This news was received with great grief by the whole fleet and army, as they thought themſelves ſure of ſucceſs, the garriſon being at that time very weak. Neverthele ſs, as they dared not diſobey, the ſiege was immediately raiſed.

24
Superſeded by Tekelli, who puts him to a cruel death.

Corſo had hardly enjoyed his dignity four months, before news came, that eight galleys were bringing a new baſhaw to ſucceed him; one *Tekelli*, a principal Turk of the Grand Signior's court: upon which the Algerines unanimouſly reſolved not to admit him. By the treachery of the Levantine ſoldiers, however, he was admitted at laſt, and the unfortunate Corſo thrown over a wall in which a number of iron hooks were fixed; one of which catching the ribs of his right ſide, he hung three days in the moſt exquiſite torture, before he expired.

Tekelli was no ſooner entered upon his new government, than he behaved with ſuch cruelty and rapacioufneſs, that he was aſſaſſinated, even under the dome of a ſaint, by Yuſef Calabres, the favourite renegado of Haſſan Corſo; who for this ſervice was unanimouſly choſen baſhaw, but died of the plague ſix days after his election.

25
Haſſan reinſtated.

Yuſef was ſucceeded by Haſſan the ſon of Hayradin, who had been formerly recalled from his baſhawſhip, when he was ſucceeded by Selha-Rais; and now had the good fortune to get himſelf reinſtated in his employment. Immediately on his arrival, he engaged in a war with the Arabs, by whom he was defeated with great loſs.

26
Spaniards defeated with great ſlaughter.

The next year, the Spaniards undertook an expedition againſt Moſtagan, under the command of the count d' Alcandela; but were utterly defeated, the commander himſelf killed, and 12,000 taken priſoners. This diſaſter was owing to the inconſiderate raſhneſs, or rather madneſs, of the commander; which was ſo great, that, after finding it impoſſible to rally his ſcattered forces, he ruſhed, ſword in hand, into the thickeſt of the enemy's ranks, at the head of a ſmall number of men, crying out, St Jago! St Jago! the victory is ours, the enemy is defeated;" ſoon after which he was thrown from his horſe, and trampled to death.

27
Haſſan ſe
in irons
Conſtanti
nople.

Haſſan having had the misfortune to diſoblige his ſubjects by allowing the mountaineers of Cuco to buy ammunition at Algiers, was ſent in irons to Conſtantinople, while the aga of the Janiſaries, and general of the land forces, ſupplied his place.—Haſſan eaſily found means to clear himſelf; but a new baſhaw was appointed, called Achmet; who was no ſooner arrived, than he ſent the two deputy-baſhaws to Conſtantinople, where their heads were ſtruck off.—Achmet was a man of ſuch inſatiable avarice, that, upon his arrival at Algiers, all ranks of people came in ſhoals to make him preſents; which he the more greedily accepted, as he had bought his dignity by the money he had amaſſed while head-gardener to the ſultan. He enjoyed it, however, only four months; and after his death, the ſtate was governed other four months by his lieutenant; when Haſſan was a third time ſent viceroy to Algiers, where he was received with the greateſt demonſtrations of joy.

28
Reinſtate

29
Siege of
Marſalqu
ver.

The firſt enterpriſe in which Haſſan engaged, was the ſiege of Marſalquiver, ſituated near the city Oran, which he deſigned to inveſt immediately after. The army employed in this ſiege conſiſted of 26,000 foot and 10,000 horſe, beſides which he had a fleet conſiſting of 32 galleys and galliots, together with three French veſſels laden with biſcuit, oil, and other proviſions. The city was defended by Don Martin de Cordova, brother of the Count d'Alcandela, who had been taken priſoner in the battle where that nobleman was killed, but had obtained his liberty from the Algerines with immenſe ſums, and now made a moſt gallant defence againſt the Turks. The city was attacked with the utmoſt fury by ſea and land, ſo that ſeveral breaches were made in the walls. The Turkiſh ſtandards were ſeveral times planted on the walls, and as often diſlodged; but the place muſt have in the end ſubmitted, had not Haſſan been obliged to raiſe the ſiege in haſte, on the news that the famed Genoeſe admiral Doria was approaching with conſiderable ſuccours from Italy. The fleet accordingly arrived ſoon after; but miſſing the Algerine gallies, bore away for Pennon de Velez, where they were ſhamefully repulſed by an handful of Turks who garriſoned that place; which, however, was taken the following year.

30
Haſſana
recalled.

In 1567, Haſſan was again recalled to Conſtantinople, where he died three years after. He was ſucceeded by Mahomet, who gained the love of the Algerines by ſeveral public-ſpirited actions. He incorporated the Janiſaries and Levantine Turks together, and by that means put an end to their diſſentions, which laid the foundation of the Algerine independency on the Porte. He likewiſe added ſome conſiderable fortifications to the city and caſtle, which he deſigned to render impregnable.

31
John G
con's bo
attempt
fire the
gerine

But while he was thus ſtudying the intereſt of Algiers, one John Gaſcon, a bold Spaniſh adventurer, formed a deſign of ſurpriſing the whole piratic navy in the bay, and ſetting them on fire in the night-time, when they lay defenceleſs, and in their firſt ſleep. For this he had not only the permiſſion of king Philip II. but was furniſhed by him with proper veſſels, mariners, and fireworks, for the execution of his plot. With theſe he ſet ſail for Algiers in the moſt proper ſeaſon, *viz.* the beginning of October, when moſt, if not all the ſhips lay at anchor there; and eaſily ſailed near enough, unſuſpected, to view their manner of riding, in order to catch them napping, at a time when the greater part of their crew were diſperſed in their quarters. He came accordingly, unperceived by any, to the very mole-gate, and diſperſed his men with their fire-works; but to their great ſurpriſe, they found them ſo ill mixed, that they could not with all their art make them take fire. In the mean time, Gaſcon took it into his head, by way of bravado, to go to the mole-gate, and give three loud knocks at it with the pommel of his dagger, and to leave it fixed in the gate by its point, that the Algerines might have cauſe to remember him. This he had the good fortune to do without meeting with any diſturbance or oppoſition: but it was not ſo with his men; for no ſooner did they find their endeavours unſucceſsful, than they made ſuch a buſtle as quickly alarmed the guard poſted on the adjacent baſtion, from which the uproar quickly ſpread itſelf thro' the whole garriſon. Gaſcon, now finding himſelf in the utmoſt danger, ſailed away with all poſſible haſte: but he was purſued, overtaken, and brought back a priſoner to Mahomet; who no ſooner got him into his power, than he immediately cauſed a gibbet of conſiderable height to be erected on the ſpot where Gaſcon had landed, ordering him to be hoiſted up, and hung by the feet to a hook, that he might die in exquiſite torture; and to ſhew his reſentment and contempt of the king his maſter, he ordered his commiſſion to be tied to his toes. He had not, however, hung long in that ſtate, when the captain who took him, accompanied by a number of other corſairs, interceded ſo ſtrongly in his behalf, that he was taken down, and put under the care of ſome Chriſtian ſurgeons; but two days after, ſome Moors reporting that it was the common talk and belief in Spain, that the Algerines durſt not hurt a hair of Gaſcon's head, &c. the unfortunate Spaniard was hoiſted up by a pulley to the top of the execution-wall, and let down again upon the hook, which in his fall catched him by the belly, and gave him ſuch a wound, that he expired without a groan.——Thus ended the expedition of John Gaſcon, which has procured him a place among the Spaniſh martyrs; while, on the other hand, the Algerines look upon his diſappointment to have been miraculous, and owing to the efficacious protection of the powerful ſaint *Sidi Outededda*, whoſe prayers had before raiſed ſuch a terrible ſtorm againſt the Spaniſh fleet.

32
s bravado
the city
c.

33
aken and
to death.

Mahomet, being ſoon after recalled, was ſucceeded by the famous renegado Ochali, who reduced the kingdom of Tunis; which, however, remained ſubject to the viceroy of Algiers only till the year 1586, when a baſhaw of Tunis was appointed by the Porte.

The kingdom of Algiers continued to be governed, till the beginning of the ſeventeenth century, by viceroys or baſhaws appointed by the Porte; concerning whom we find nothing very remarkable, further than that their avarice and tyranny was intolerable both to the Algerines and the Turks themſelves. At laſt the Turkiſh Janiſaries and militia becoming powerful enough to ſuppreſs the tyrannic ſway of theſe baſhaws, and the people being almoſt exhauſted by the heavy taxes laid upon them, the former reſolved to depoſe theſe petty tyrants, and ſet up ſome officers of their own at the head of the realm. The better to ſucceed in this attempt, the militia ſent a deputation of ſome of their chief members to the Porte, to complain of the avarice and oppreſſion of theſe baſhaws, who ſunk both the revenue of the ſtate, and the money remitted to it from Conſtantinople, into their own coffers, which ſhould have been employed in keeping up and paying the ſoldiery; by which means they were in continual danger of being overpowered by the Arabians and Moors, who, if ever ſo little aſſiſted by any Chriſtian power, would hardly fail of driving all the Turks out of the kingdom. They repreſented to the Grand Vizir how much more honourable, as well as eaſier and cheaper, it would be for the Grand Signior to permit them to chuſe their own dey, or governor, from among themſelves, whoſe intereſt it would then be to ſee that the revenue of the kingdom was rightly applied in keeping up its forces complete, and in ſupplying all other exigencies of the ſtate, without any farther charge or trouble to the Porte than that of allowing them its protection. On their part, they engaged always to acknowledge the Grand Signiors as their ſovereigns, and to pay them their uſual allegiance and tribute, to reſpect their baſhaws, and even to lodge and maintain them and their retinue, in a manner ſuitable to their dignity, at their own charge. The baſhaws, however, were, for the future, to be excluded from aſſiſting at any but general douwans, unleſs invited to it; and from having the liberty of voting in them, unleſs when their advice was aſked, or the intereſt of the Porte was likely to ſuffer by their ſilence. All other concerns, which related to the government of Algiers, were to be wholly left under the direction of the dey and his douwan.

34
Algerines allowed to chuſe their own deys.

Theſe propoſals having been accepted by the Porte, the deputies returned highly ſatisfied; and having notified their new privileges, the great *douwan* immediately proceeded to the election of a dey from among themſelves. They compiled a new ſet of laws, and made ſeveral regulations for the better ſupport and maintenance of this new form of government, to the obſervation of which they obliged all their ſubjects to ſwear; and the militia, navy, commerce, &c. were all ſettled pretty nearly on the footing upon which they now are, and which ſhall be aſterwards deſcribed; tho' the ſubſequent altercations that frequently happened between the baſhaws and deys, the one endeavouring to recover their former power, and the other to curtail it, cauſed ſuch frequent complaints and diſcontents at the Ottoman court, as made them frequently repeat their compliance.

35
They grow formidable to the Europeans.

In the year 1601, the Spaniards, under the command of Doria the Genoeſe admiral, made another attempt upon Algiers, in which they were more fortunate than uſual, their fleet being only driven back by contrary winds, ſo that they came off without loſs. In 1609, the Moors being expelled from Spain, flocked in great numbers to Algiers; and as many of them were very able ſailors, they undoubtedly contributed to make the Algerine fleet ſo formidable as it became ſoon after; tho' it is probable the frequent attempts made on their city would alſo induce them to increaſe their fleet. In 1616, their fleet conſiſted of 40 ſail of ſhips between 200 and 400 tons, their admiral 500 tons. It was divided into two ſquadrons, one of 18 ſail, before the port of Malaga; and the other at the Cape of Santa Maria, between Liſbon and Seville; both of which fell foul on all Chriſtian ſhips, both Engliſh and French, with whom they pretended to be in friendſhip, as well as Spaniards and Portugueſe, with whom they were at war.

The Algerines were now become very formidable to the European powers. The Spaniards, who were moſt in danger, and leaſt able to cope with them, ſolicited the aſſiſtance of England, the pope, and other ſtates. The French, however, were the firſt who dared to ſhew their reſentment of the perfidious behaviour of theſe miſcreants; and in 1617, M. Beaulieu was ſent againſt them with a fleet of 50 men of war, who defeated their fleet, took two of their veſſels, while their admiral ſunk his own ſhip and crew, rather than fall into his enemies hands.

36
An Engliſh ſquadron ſent againſt the Algerines.

In 1620, a ſquadron of Engliſh men of war was ſent againſt Algiers, under the conduct of Sir Robert Manſel: but of this expedition we have no other account, than that it returned without doing any thing; and the Algerines, becoming more and more inſolent, openly defied all the European powers, the Dutch only excepted, to whom, in 1625, they ſent a propoſal, directed to the prince of Orange, that in caſe they would fit out 20 ſail of ſhips the following year, upon any good ſervice againſt the Spaniards, they would join them with 60 ſail of their own.

The next year, the *Coulolies*, or *Cologlies*, (the children of ſuch Turks as had been permitted to marry at Algiers), who were enrolled in the militia, having ſeized on the citadel, had well nigh made themſelves maſters of the city; but were attacked by the Turks and renegadoes, who defeated them with terrible ſlaughter. Many ſcores of them were executed; and their heads thrown in heaps upon the city-walls, without the eaſtern gate. Part of the citadel was blown up; and the remaining Coulolies were diſmiſſed from the militia, to which they were not again admitted till long after.

37
States of Barbary throw off their dependence on the Porte.

In 1623, the Algerines and other ſtates of Barbary threw off their dependence on the Porte altogether, and ſet up for themſelves. What gave occaſion to this was the 25 years truce which Sultan Amurath IV. was obliged to make with the emperor Ferdinand II. to prevent his being overmatched by carrying on a war againſt him and the ſophi of Perſia at the ſame time. As this put a ſtop to the piratical trade of the Algerines, they proceeded as above-mentioned; and reſolved, that whoever deſired to be at peace with them, muſt, diſtinctly and ſeparately, apply to their government.—No ſooner was this reſolution taken, than the Algerines began to make prizes of ſeveral merchant ſhips belonging to powers at peace with the Porte. Nay, having ſeized a Dutch ſhip and poleacre at Scanderoon, they ventured on ſhore; and finding the town abandoned by the Turkiſh aga and inhabitants, they plundered all the magazines and warehouſes, and ſet them on fire.—About this time Lewis XIII. undertook to build a fort on their coaſts, inſtead of one formerly built by the Marſilians, and which they had demoliſhed. This, after ſome difficulty, he accompliſhed; and it was called the *Baſtion of France*: but the ſituation being afterwards found inconvenient, the French purchaſed the port of La Calle, and obtained liberty to trade with the Arabians and Moors. The Ottoman court, in the mean time, was ſo much embarraſſed with the Perſian war, that there was no leiſure to check the Algerine piracies. This gave an opportunity to the vizir and other courtiers to compound matters with the Algerines, and to get a ſhare of their prizes, which were very conſiderable. However, for form's ſake, a ſevere reprimand, accompanied with threats, was ſent them; to which they replied, that "theſe depredations deſerved to be indulged to them, ſeeing they were the only bulwark againſt the Chriſtian powers, eſpecially againſt the Spaniards, the ſworn enemies of the Moſlem name:" adding, that "if they ſhould pay a punctilious regard to all that could purchaſe peace, or liberty to trade with the Ottoman empire, they would have nothing to do but ſet fire to all their ſhipping, and turn camel-drivers for a livelihood."

38
Deſperate undertaking of four younger brothers.

In the year 1635, four younger brothers of a good family in France, entered into an undertaking ſo deſperate, that perhaps the annals of knight-errantry can ſcarce furniſh its equal.—This was no leſs than to retort the piracies of the Algerines, upon themſelves; and as they indiſcriminately took the ſhips of all nations, ſo were theſe heroes indiſcriminately to take the ſhips belonging to Algiers; and this with a ſmall frigate of ten guns!—In this ridiculous undertaking, 100 volunteers embarked; a Malteſe commiſſion was procured, together with an able maſter, and 36 mariners.—They had the good fortune, on their firſt ſetting out, to take a ſhip laden with wine, on the Spaniſh coaſt: with which they were ſo much elated, that three days after they madly encountered two large Algerine corſairs, one of 20 and the other of 24 guns, both well manned, and commanded by able officers. Theſe two large veſſels having got the ſmall frigate between them, plied her furiouſly with great ſhot, which ſoon took off her main maſt: notwithſtanding which, the French made ſo deſperate a reſiſtance, that the pirates were not able to take them, till the noiſe of their fire brought up five more Algerines; when the French veſſel, being almoſt torn to pieces, was boarded and taken. The young knights-errant were puniſhed for their temerity by a dreadful captivity, from which they redeemed themſelves in 1642 at the price of 6000 dollars.

39
A French
admiral ca
ries off th
Turkiſh b
ſhaw.

The Algerines proſecuted their piracies with impunity, to the terror and diſgrace of the Europeans, till the year 1652; when a French fleet being accidentally driven to Algiers, the admiral took it into his head to demand a releaſe of all the captives of his nation, without exception. This being refuſed, the Frenchman without ceremony carried off the Turkiſh viceroy, and his cadi or judge, who were juſt arrived from the Porte, with all their equipage and retinue. The Algerines, by way of repriſal, ſurpriſed the Baſtion of of France already mentioned, and carried off the inhabitants to the number of 600, with all their effects; which ſo provoked the admiral, that he ſent them word that he would pay them another viſit the next year with his whole fleet.

40
The Alg
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fleet.

The Algerines, undiſmayed by the threats of the French admiral, fitted out a fleet of 16 galleys and galliots, excellently manned and equipped, under the command of Admiral Hali Pinchinin.—The chief deſign of this armament was againſt the treaſure of Loretto; which, however, they were prevented by contrary winds from obtaining. Upon this they made a deſcent on Puglia in the kingdom of Naples; where they ravaged the whole territory of Necotra, carrying off a vaſt number of captives, and among them ſome nuns. From thence ſteering towards Dalmatia, they ſcoured the

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Adriatic; and loading themſelves with immenſe plunder, left thoſe coaſts in the utmoſt conſternation and reſentment.

41 hich is to-lly de-royed by e Veneti-ns.

At laſt the Venetians, alarmed at ſuch terrible depredations, equipped a fleet of 28 ſail, under the command of admiral Capello, with expreſs orders to burn, ſink, or take, all the Barbary corſairs he met with, either on the open ſeas, or even in the Grand Signior's harbours, purſuant to a late treaty of peace with the Porte. On the other hand, the captain baſhaw, who had been ſent out with the Turkiſh fleet to chaſe the Florentine and Malteſe cruiſers out of the Archipelago, underſtanding that the Algerine ſquadron was ſo near, ſent expreſs orders to the admiral to come to his aſſiſtance. Pinchinin readily agreed; but having firſt reſolved on a deſcent upon the iſland of Liſſa, or Liſina, belonging to the Venetians, he was overtaken by Capello, from whom he retired to Valona, a ſea-port belonging to the Grand Signior, whither the Venetian admiral purſued him; but the Turkiſh governor refuſing to eject the pirates according to the articles of the peace between the Ottoman court and Venice, Capello was obliged to content himſelf with watching them for ſome time. Pinchinin was ſoon weary of reſtraint, and ventured out; when an engagement immediately enſued, in which the Algerines were defeated, and five of their veſſels diſabled; with the loſs of 1500 men, Turks, and Chriſtian ſlaves; beſides 1600 galley-ſlaves who regained their liberty. Pinchinin, after this defeat, returned to Valona, where he was again watched by Capello; but the latter had not lain long at his old anchorage before he received a letter from the ſenate, deſiring him to make no farther attempt on the pirates at that time, for fear of a rupture with the Porte. This was followed by a letter from the governor of Valona, deſiring him to take care leſt he incurred the Sultan's diſpleaſure by ſuch inſults. The brave Venetian was forced to comply; but, reſolving to take ſuch a leave of the Algerines as he thought they deſerved, obſerved how they had reared their tents, and drawn their booty and equipage along the ſhore. He then kept firing among their tents, while ſome well-manned galliots and brigatines were ordered among their ſhipping, who attacked them with ſuch bravery, that, without any great loſs, they towed out their 16 galleys, with all their cannon, ſtores, &c.—In this laſt engagement, a ball from one of the Venetian galleys happening to ſtrike a Turkiſh moſque, the whole action was conſidered as an inſult upon the Grand Signior. To conceal this, Capello was ordered to ſink all the Algerine ſhips he had taken, except the admiral; which was to be conducted to Venice, and laid up as a trophy. Capello came off with a ſevere reprimand; but the Venetians were obliged to buy, with 500,000 ducats, a peace from the Porte. The Grand Signior, offered to repair the loſs of the Algerines by building ten galleys for them, upon condition that they ſhould continue in his ſervice till the end of the enſuing ſummer; but Pinchinin, who knew how little the Algerines choſe to lie under obligations to him, civilly declined the offer.

42 iers in utmoſt fuſion at news.

In the mean time, the news of this defeat and loſs filled Algiers with the utmoſt grief and confuſion. The whole city was on the point of a general inſurrection, when the baſhaw and douwan iſſued out a proclamation, forbidding, not only complaints and outcries, under the ſevereſt penalties; but all perſons whatever to *take their thumbs from within their girdles*, while they were deliberating on this important point. In the mean time, they applied to the Porte for an order, that the Venetians ſettled in the Levant ſhould make up their loſs. But with this the Grand Signior refuſed to comply, and left them to repair their loſſes, as well as build new ſhips, in the beſt manner they could. It was not long, however, before they had the ſatisfaction to ſee one of their corſairs land, with a freſh ſupply of 600 ſlaves, whom he had brought from the coaſt of Iceland, whither he had been directed by a miſcreant native taken on board a Daniſh ſhip.

43 They ſet out a new fleet.

44 Five of their galleys defeated by a Dutch merchantman.

Our pirates did not long continue in their weak and defenceleſs ſtate; being able, at the end of two years, to appear at ſea with a fleet of 65 ſail. The admiral Pinchinin equipped four galliots at his own expence; with which, in conjunction with the Chiayah, or ſecretary of the baſhaw of Tripoli, he made a ſecond excurſion. This ſmall ſquadron, conſiſting of five galleys and two brigantines, fell in with an Engliſh ſhip of 40 guns; which, however, Pinchinin's captains refuſed to engage; but being afterwards reproached by him for their cowardice, they ſwore to attack the next Chriſtian ſhip which came in their way. This happened to be a Dutch merchantman, of 28 guns and 40 men, deeply laden, and unable to uſe her ſails by reaſon of a calm. Pinchinin immediately ſummoned her to ſurrender; but, receiving an ironical anſwer, drew up his ſquadron in form of an half-moon, that they might pour their ſhot all at once into their adverſary. This, however, the Dutchman avoided, by means of a breeze of wind which fortunately ſprung up and enabled him to turn his ſhip; upon which the galleys ran foul of each other.—Upon this, Pinchinin ran his own galley along ſide of the merchantman, the upper deck of which ſeventy Algerines immediately took poſſeſſion of, ſome of them cutting the rigging, and others plying the hatches with hand-grenadoes: but the Dutchmen having ſecured themſelves in their cloſe quarters, began to fire at the Algerines on board, from two pieces of cannon loaded with ſmall ſhot; by which they were all ſoon killed, or forced to ſubmit. Pinchinin, in the mean time, made ſeveral unſucceſsful attempts to relieve his men, as well as to ſurround the Dutchman with his other galleys: but that ſhip lay ſo deep in the water that every ſhot did terrible execution among the pirates; ſo that they were obliged to remove farther off. At laſt the Dutch captain, having ordered his guns to be loaded with cartouches, gave them ſuch a parting volley as killed 200 of them, and ſent the reſt back to Algiers in a moſt diſmal plight.

45 Preparations againſt Algiers by Lewis XIV.

But though Pinchinin thus returned in diſgrace, the reſt of the fleet quickly came back with vaſt numbers of ſlaves, and an immenſe quantity of rich ſpoils; inſomuch that the Engliſh, French, and Dutch, were obliged to cringe to the mighty Algerines, who ſometimes vouchſafed to be at peace with them, but ſwore eternal war againſt Spain, Portugal, and Italy, whom they looked upon as the greateſt enemies to the Mahometan name. At laſt, Lewis XIV. provoked by the grievous outrages committed by the Algerines on the coaſts of Provence and Languedoc, ordered, in 1681, a conſiderable fleet to be fitted out againſt them, under the marquis du Queſne, vice-admiral of France. His firſt expedition was againſt a number of Tripolitan corſairs; who had the good fortune to outrow him, and ſhelter themſelves in the Iſland of Scio belonging to the Turks. This did not, however, prevent him from purſuing them thither, and making ſuch terrible fire upon them as quickly deſtroyed 14 of their veſſels, beſides battering the walls of the caſtle.

46
Algiers bombarded and ſet on fire by the French.

This ſeverity ſeemed only to be deſigned as a check to the piracies of the Algerines; but, finding they ſtill continued their outrages on the French coaſt, he ſailed to Algiers in Auguſt 1682, cannonading and bombarding it ſo furiouſly, that the whole town was in flames in a very little time. The great moſque was battered down, and moſt of the houſes laid in ruins, inſomuch that the inhabitants were on the point of abandoning the place; when on a ſudden, the wind turned about, and obliged Du Queſne to return to Toulon. The Algerines immediately made repriſals, by ſending a number of galleys and galliots to the coaſts of Provence, where they committed the moſt dreadful ravages, and brought away a vaſt number of captives: upon which a new armament was ordered to be got ready at Toulon and Marſeilles, againſt the next year; and the Algerines, having received timely notice, put themſelves into as good a ſtate of defence as the time would allow.

47
Algerines commit dreadful ravages in France.

48
The city again bombarded.

In May 1683, Du Queſne with his ſquadron caſt anchor before Algiers; where, being joined by the Marquis D'Affranville, at the head of five ſtout veſſels, it was reſolved to bombard the town next day. Accordingly 100 bombs were thrown into it the firſt day; which did terrible execution, while the beſieged made ſome hundred diſcharges of their cannon againſt them, without doing any conſiderable damage. The following night the bombs were again thrown into the city in ſuch numbers, that the dey's palace and other great edifices were almoſt deſtroyed; ſome of their batteries were diſmounted, and ſeveral veſſels ſunk in the port. The dey, and Turkiſh baſhaw, as well as the whole ſoldiery, alarmed at this dreadful havock, immediately ſued for peace. As a preliminary, the immediate ſurrender was inſiſted on of all Chriſtian captives who had been taken fighting under the French flag; which being granted, 142 of them were immediately delivered up, with a promiſe of ſending him the remainder as ſoon as they could be got from the different parts of the country. Accordingly Du Queſne ſent his commiſſary-general and one of his engineers into the town; but with expreſs orders to inſiſt upon the delivery of all the French captives without exception, together with the effects they had taken from the French; and that Mezomorto their then admiral, and Hali Rais one of their captains, ſhould be given as hoſtages.

This laſt demand having embarraſſed the dey, he aſſembled the douwan, and acquainted them with it: upon which Mezomorto fell into a violent paſſion, and told the aſſembly, that the cowardice of thoſe who ſat at the helm had occaſioned the ruin of Algiers; but that, for his part, he would never conſent to deliver up any thing that had been taken from the French. He immediately acquainted the ſoldiery with what had paſſed; which ſo exaſperated them, that they murdered the dey that very night, and on the morrow choſe Mezomorto in his place. This was no ſooner done, than he cancelled all the articles of peace which had been made, and hoſtilities were renewed with greater fury than ever.

49
Set on fire and almoſt deſtroyed.

The French admiral now kept pouring in ſuch volleys of bombs, that, in leſs than three days, the greateſt part of the city was reduced to aſhes, and the fire burnt with ſuch vehemence, that the ſea was enlightened with it for more than two leagues round. Mezomorto, unmoved at all theſe diſaſters, and the vaſt number of the ſlain, whoſe blood ran in rivulets along the ſtreets; or rather, grown furious and deſperate, ſought only how to wreak his revenge on the enemy; and, not content with cauſing all the French in the city to be cruelly murdered, ordered their conſul to be tied hand and foot, and faſtened alive to the mouth of a mortar, from whence he was ſhot away againſt their navy.—By this piece of inhumanity Du Queſne was ſo exaſperated, that he did not leave Algiers till he had utterly deſtroyed all their fortifications, ſhipping, almoſt all the lower part, and above two thirds of the upper part, of the city; by which means it became little elſe than an heap of ruins.

50
Algerines ſue for peace.

The haughty Algerines were now thoroughly convinced that they were not invincible; and, therefore, immediately ſent an embaſſy into France, begging in the moſt abject terms for peace; which Lewis immediately granted, to their inexpreſſible joy. They now began to pay ſome regard to other nations, and to be a little cautious how they wantonly incurred their diſpleaſure. The firſt bombardment by the French had ſo far humbled the Algerines, that they condeſcended to enter into a treaty with England; which was renewed, upon terms very advantageous to the latter, in 1686. It is not to be ſuppoſed, however, that the natural perfidy of the Algerines would diſappear on a ſudden: notwithſtanding this treaty, therefore, they loſt no opportunity of making prizes of the Engliſh ſhips, when they could conveniently come at them. Upon ſome infringement of this kind, captain *Beach* drove aſhore and burnt ſeven of their frigates in 1695; which produced a renewal of the treaty five years after: but it was not till the taking of Gibraltar and Port Mahon, that Britain could have a ſufficient chek upon them to enforce the obſervation of treaties; and theſe have ſince proved ſuch reſtraints upon Algiers, that they ſtill continue to pay a greater deference to the Engliſh, than to any other European power.

51
Seven of their ſhips burnt by capt. Beach.

52
Expulſion of the Turkiſh baſhaw.

The preſent century furniſhes no very remarkable events with regard to Algiers; except the taking of the famed city of Oran from the Spaniards in 1708, (which however they regained in 1737,) and the expulſion of the Turkiſh baſhaw, and uniting his office to that of dey in 1710. This introduced the form of government which ſtill continues in Algiers.

53
Revenues, &c. of the Dey.

The dey is now abſolute monarch; and pays no other revenue to the Porte, than that of a certain number of fine boys or youths, and ſome other preſents which are ſent thither yearly. His own income, probably, riſes and falls according to the opportunities he hath of fleecing both natives and foreigners; whence it is variouſly computed by different authors. Dr Shaw computes the taxes of the whole kingdom to bring into the treaſury no more than 300,000 dollars; but ſuppoſes that the eighth part of the prizes, the effects of thoſe perſons who die without children, joined to the yearly contributions raiſed by the government, preſents from foreigners, fines and oppreſſions, may bring in about as much more. Both the dey, and officers under him, enrich themſelves by the ſame laudable methods of rapine and fraud; which it is no wonder to find the common people practiſing upon one another, and eſpecially upon ſtrangers, ſeeing they themſelves are impoveriſhed by heavy taxes and the injuſtice of thoſe who are in authority.

We have already hinted, that the firſt deys were elected by the militia, who were then called the *douwan*, or common-council. This elective body was at firſt compoſed of 800 militia-officers, without whoſe conſent the dey could do nothing; and upon ſome urgent occaſions, all the officers reſiding in Algiers, amounting to above 1500, were ſummoned to aſſiſt. But ſince the deys, who may be compared to the Dutch Stadtholders, have become more powerful, the douwan is principally compoſed of 30 chiak-baſhaws, or colonels, with now and then the mufti and cadi upon ſome emergencies; and, on the election of a dey, the whole ſoldiery are allowed to come and give their votes. All the regulations of ſtate ought to be determined by that aſſembly, before they paſs into a law, or the dey hath power to put them in execution: but, for many years back, the douwan is of ſo little account, that it is only convened out of formality, and to give aſſent to what the dey and his chief favourites have concerted beforehand. The method of gathering the votes in this auguſt aſſembly, is perfectly agreeable to the character of thoſe who compoſe it. The aga, or general of the janiſſaries, or the preſident *pro tempore*, firſt propoſes the queſtion, which is immediately repeated with a loud voice by the chiah-baſhaws, and from them echoed again by four officers called *baſhaldalas*, from theſe the queſtion is repeated from one member of the douwan to another, with ſtrange contortions, and the moſt hideous growlings, if it is not to their liking. From the loudneſs of this growling noiſe, the aga is left to gueſs as well as he can whether the majority of the aſſembly are pleaſed or diſpleaſed with the queſtion; and from ſuch a prepoſterous method, it is not ſurpriſing that theſe aſſemblies ſhould ſeldom end without ſome tumult or diſorder. As the whole body of the militia is concerned in the election of a new dey, it is ſeldom carried on without blows and bloodſhed: but when once the choice is made, the perſon elected is ſaluted with the words ALLA BARICK, "God bleſs you, or proſper you;" and the new dey uſually cauſes all the officers of the douwan, who had oppoſed his election, to be ſtrangled, filling up their places with thoſe who had been moſt zealous in promoting it. From this account of the election of the deys, it cannot be expected that their government ſhould be at all ſecure; and as they arrive at the throne by tumult, diſorder, and bloodſhed, they are generally deprived of it by the ſame means, ſcarcely one in ten of them having the good fortune to die a natural death.

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In this country it is not to be expected that juſtice will be adminiſtered with any degree of impartiality. The Mahometan ſoldiery, in particular, are ſo much favoured, that they are ſeldom put to death for any crime, except rebellion; in which caſe, they are either ſtrangled with a bow-ſtring, or hanged to an iron hook. In leſſer offences, they are fined, or their pay ſtopped; and if officers, they are reduced to the ſtation of common ſoldiers, from whence they may gradually raiſe themſelves to their former dignity. Women guilty of adultery, have a halter tied about their necks, with the other end faſtened to a pole, by which they are held under water till they are ſuffocated. The baſtinado is likewiſe inflicted for ſmall offences; and is given either upon the belly, back, or ſoles of the feet, according to the pleaſure of the cadi; who alſo the appoints the number of ſtrokes. Theſe ſometimes amount to 200 or 300, according to the indulgence the offender can obtain either by bribery or friends; and hence he often dies under this puniſhment, for want of powerful enough advocates. But the moſt terrible puniſhments, are theſe inflicted upon the Jews, or Chriſtians, who ſpeak againſt Mahomet or his religion; in which caſe, they muſt either turn Mahometans, or be impaled alive. If they afterwards apoſtatize, they are burned or roaſted alive; or elſe thrown down from the top of the city-walls, upon iron hooks, where they are caught by different parts of their body, according as they happen to fall, and ſometimes expire in the greateſt torments; though by accident they may be put out of pain at once, as we have already related of the Spaniſh adventurer John Gaſcon. This terrible puniſhment, however, begins now to be diſuſed.

56
Aga of the janiſſaries and other military officers.

The officer next in power to the dey is the aga of the janiſſaries, who is one of the oldeſt officers in the army, and holds his poſt only for two months. He is then ſucceeded by the chiah, or next ſenior officer.—During the two months in which the aga enjoys his dignity, the keys of the metropolis are in his hands; all military orders are iſſued out in his name; and the ſentence of the dey upon any offending ſoldier, whether capital or not, can only be executed in the court of his palace.—As ſoon as he is gone through this ſhort office, he is conſidered as *mazoul*, or ſuperannuated; receives his pay regularly, like the reſt of the militia, every two moons; is exempt from all further duties, except when called by the dey to aſſiſt at the grand council, to which he hath, however, a right to come at all times, but hath no longer a vote in it.—Next to the aga in dignity, is the ſecretary of ſtate, who regiſters all the public acts; and after him are the 30 chiahs, or colonels, who ſit next to the aga in the douwan, and in the ſame gallery with him. Out of this claſs are generally choſen thoſe who go embaſſadors to foreign courts, or who diſperſe the dey's orders throughout the realm.—Next to them are 800 bolluck-baſhaws, or eldeſt captains, who are promoted to that of chiah-baſhaws, according to their ſeniority. The oldack-baſhaws, or lieutenants, are next; who amount to 400, and are regularly raiſed to the rank of captains in their turn, and to other employments in the ſtate, according to their abilities. Theſe, by way of diſtinction, wear a leather ſtrap, hanging down to the middle of their back. One rule is ſtrictly obſerved in the rotation of theſe troops from one deputy to a higher; viz. the right of ſeniority; one ſingle infringement of which would cauſe an inſurrection, and probably coſt the dey his life. Other military officers of note are the vekelards, or purveyors of the army; the peys, who are the four oldeſt ſoldiers, and conſequently the neareſt to preferment; the ſoulacks, who are the next in ſeniority to them, and are part of the dey's body-guard, always marching before him when he takes the field, and diſtinguiſhed by their carbines and gilt ſcymiters, with a braſs gun on their caps; the kayts, or Turkiſh ſoldiers, each band of whom have the government of one or more adowars, or itinerant villages, and collect their taxes for the dey; and the ſagiards, or Turkiſh lancemen, 100 of whom always attend the army, and watch over the water appointed for it. To theſe we may add the beys, or governors of the three great provinces of the realm. All the above-mentioned officers ought to compoſe the great douwan or council above-mentioned; but only the 30 chiah-baſhaws have a right to ſit in the gallery next after the dey: The reſt are obliged to ſtand on the floor of the hall, or council-chamber, with their arms acroſs, and, as much as poſſible, without motion; neither are they permitted to enter with their ſwords on, for fear of a tumult. As for thoſe who have any matters to tranſact with the douwan, they muſt ſtand without, let the weather be ever ſo bad; and there they are commonly preſented with coffee by ſome of the inferior officers, till they are diſmiſſed.

57
Diviſion of the kingdom.

The kingdom of Algiers is at preſent divided into three provinces or diſtricts, viz. the eaſtern, weſtern, and ſouthern. The eaſtern or Levantine government, which is by far the moſt conſiderable of the three, and is alſo called *Beylick*, contains the towns of Bona, Conſtantina, Gigeri, Bujeyah, Steſſa, Tebef, Zamoura, Biſcara, and Necanz, in all which the Turks have their garriſons: beſides which, it includes the two ancient kingdoms of Cuco and Labez, though independent of the Algerine government, to whoſe forces their country is inacceſſible; ſo that they ſtill live under their own cheyks, choſen by each of their adowars or hords. To theſe we may add a French factory at Callo, under the direction of the company of the French Baſtion.—The weſtern government hath the towns of Oran, Tremecen, Moſtagan, Tenez, and Secrelly with its caſtle and garriſon.—The ſouthern government hath neither town, village, nor even a houſe, all the inhabitants living in tents, which obliges the bey and his forces to be always encamped.

58
Rivers.

The moſt conſiderable rivers of Algiers are the Zha, or Ziz, which runs acroſs the province of Tremecen, and the deſert of Anguid, falling into the Mediterranean, near the town of Tabecrita, where it has the name of *Sirut*. (2.) The Haregol, ſuppoſed the *Sign* of Ptolemy, comes down from the great Atlas, croſſes the deſert of Anguid, and falls into the ſea, about five leagues from Oran. (3.) The Mina, ſuppoſed the *Chylematis* of Ptolemy, a large river, which runs through the plains of Bathala, and falls into the ſea near the town of Arzew. This river hath lately received the name of *Cena*, who rebuilt the town of Bathalah, after it had been deſtroyed. (4.) The Shelliff, Zilef, or Zilif, deſcending from the mount Gnanexeris, runs through ſome great deſerts, the lake Titteri, the frontiers of Tremecen and Tenez, falling into the ſea a little above the city of Moſtagan. (5.) The Celef, ſuppoſed to be the *Carthena* of the ancients, falls into the ſea, about three leagues weſt of Algiers, after a ſhort courſe of 18 or 20 leagues. (6.) The Hued-al-quivir, ſuppoſed to be the *Nalabata*, or *Naſaba*, of the ancients, and called by the Europeans *Zinganir*, runs down, with a ſwift courſe, through ſome high mountains of Cuco, and falls into the ſea near Bujeyah.

59
Harbour
Burjeyah
cleared b
accident.

Whilſt the city of Bujeyah was in the hands of the Chriſtians, the mouth of this river was ſo choaked up with ſand, that no veſſel could come up into it: but in 1555, very ſoon after it was taken by the Moors, the great rains ſwelled it to ſuch a degree, that all the ſand and mud was carried off; ſo that galleys, and other veſſels, have ever ſince entered it with eaſe, where they lie ſafe from ſtorms, and all winds, but that which blows from the north. (7.) Suf-Gemar, or Suf-Gimmar al Rumniel, ſuppoſed to be the *Ampſaga* of Ptolemy, hath its ſource on mount Auras, on the confines of Atlas; thence runs through ſome barren plains, and the fruitful ones of Conſtantina, where its ſtream is greatly increaſed by ſome other rivers it receives; from thence running northward, along the ridges of ſome high mountains, it falls into the ſea a little eaſt of Gigeri. (8.) The Ladag, or Ludeg, runs down from mount Atlas through part of Conſtantina, and falls into the ſea a little eaſtward of Bona. (9.) Guadi, or Guadel Barbar, ſprings from the head of Orbus, or Urbs, in Tripoli, runs through Bujeyah, and falls into the ſea near Tabarea.

60
Account
the corſ
commerc
&c.

Beſides theſe there are many others of leſs note; of which, however, we do not find that the Algerines avail themſelves as they might do, their genius leading them too much to the piratical trade to mind any real advantage that might be derived from their own country. The corſairs, or pirates, form each a ſmall republic, of which the rais or captain is the ſupreme baſhaw; who, with the officers under him, form a kind of douwan, in which every matter relating to the veſſel is decided in an arbitrary way. Theſe corſairs are chiefly inſtrumental in importing whatever commodities are brought into the kingdom either by way of merchandiſe or prizes. Theſe conſiſt chiefly of gold and ſilver ſtuffs, damaſks, cloths, ſpices, tin, iron, plated braſs, lead, quickſilver, cordage, ſail-cloth, bullets, cochineal, linen, tartar, alum, rice, ſugar, ſoap, cotton raw and ſpun, copperas, aloes, brazil and logwood, vermilion, &c. Very few commodities, however, are exported from this part of the world; the oil, wax, hides, pulſe and corn produced, being but barely ſufficient to ſupply the country; though, before the loſs of Oran, the merchants have been known to ſhip off from one or other of the ports of Barbary ſeveral thouſand tons of corn. The conſumption of oil, though here in great abundance, is likewiſe ſo conſiderable in this kingdom, that it is ſeldom permitted to be ſhipped off for Europe. The other exports conſiſt chiefly in oſtriches feathers, copper, ruggs, ſilk ſaſhes, embroidered handkerchiefs, dates, and Chriſtian ſlaves. Some manufactures in ſilk, cotton, wool, leather, &c. are carried on in this country, but moſtly by the Spaniards ſettled here, eſpecially about the metropolis. Carpets are alſo a manufacture of the country, which, though much inferior to thoſe of Turkey, both in beauty and fineneſs, are preferred by the people to lie upon, on account of their being both cheaper and ſofter. There are alſo, at Algiers, looms for velvet, taffaties, and other wrought ſilks; and a coarſe ſort of linen is likewiſe made in moſt parts of the kingdom.

61
Inhabit

The inhabitants along the ſea-coaſts are a mixture of different nations; but chiefly Moors and Moreſcos driven out of Catalonia, Arragon, and other parts of Spain. Here are alſo great numbers of Turks, who come from the Levant to ſeek their fortune; as well as multitudes of Jews and Chriſtians taken at ſea, who are brought hither to be ſold for ſlaves. The Berebers are ſome of the moſt ancient inhabitants of the country; and are ſuppoſed to be deſcended from the ancient Sabeans, who came hither from Arabia Felix, under the conduct of one of their princes. Others believe them to be ſome of the Canaanites driven out of Paleſtine by Joſhua. Theſe are diſperſed all over Barbary, and divided into a multitude of tribes under their reſpective chiefs: moſt of them inhabit the mountainous parts; ſome range from place to place, and live in tents, or portable huts; others in ſcattered villages: they have, nevertheleſs, kept themſelves for the moſt part from intermixing with other nations. The Berebers are reckoned the richeſt of all, go better cloathed, and carry on a much larger traffic of cattle, hides, wax, honey, iron, and other commodities. They have alſo ſome artificers in iron, and ſome manufacturers in the weaving branch.—The name of *Bereber* is ſuppoſed to have been originally given them on account of their being firſt ſettled in ſome deſert place. Upon their increaſing in proceſs of time, they divided themſelves into five tribes, probably on account of religious differences, called the *Zinhagians*, *Muſamedins*, *Zeneti*, *Hoares*, and *Gomeres*; and theſe having produced 600 families, ſubdivided themſelves into a great number of petty tribes.—To theſe we may add the *Zwowahs*, by European authors called *Azuagues*, or *Aſſagues*, who are likewiſe diſperſed over moſt parts of Barbary and Numidia. Great numbers of theſe inhabit the mountainous parts of Cuco, Labez, *&c.* leading a wandering paſtoral life.—But the moſt numerous inhabitants are the Moors and Arabians. The former are very ſtout and warlike, and ſkilful horſemen; but ſo addicted to robbing, that one cannot ſafely travel along the country at a diſtance from the towns without a guard, or at leaſt a marabout or ſaint for a ſafeguard. For as they look upon themſelves to be the original proprietors of the country, and not only as diſpoſſeſſed by the reſt of the inhabitants, but reduced by them to the loweſt ſtate of poverty, they make no ſcruple to plunder all they meet by way of repriſal. See Moors.

Algiers, a city, the capital of the above kingdom, is probably the ancient *Icoſium*: by the Arabians called *Algezair*, or rather *Al-Jezier*, or *Al-Jezerah*, i. e. *the iſland*, becauſe there was an iſland before the city, to which it hath been ſince joined by a mole. It is built on the declivity of a hill by the ſea-ſide, in the form of an amphitheatre: at ſea, it looks like the topſail of a ſhip. The tops of the houſes are quite flat and white; inſomuch, that when it is firſt diſcovered, one would take it to be a place where they bleach linen. One houſe riſes above another in ſuch a manner that they do not hinder each other's proſpect. The ſtreets are ſo narrow, that they will ſcarce admit two perſons to walk a-breaſt, and the middle part is lower than the ſides. When any loaded beaſts, ſuch as camels, horſes, mules, or aſſes, paſs along, you are forced to ſtand up cloſe to the wall to let them paſs by. There is but one broad ſtreet, which runs through the city from eaſt to weſt, in which are the ſhops of the principal merchants, and the market for corn and other commodities. The lower part of the walls of the city are of hewn ſtone, and the upper part of brick; they are 30 feet high on the land ſide, and 40 towards the ſea; the foſſes or ditches are twenty feet broad, and ſeven deep. There is no ſweet water in the city; and tho' there is a tank or ciſtern in every houſe, yet they often want water, becauſe it rains but ſeldom: the chief ſupply is from a ſpring on a hill, the water of which is conveyed by pipes to above a hundred fountains, at which a bowl is faſtend for the uſe of paſſengers. The common reſervoir is at the end of the mole, where the ſhips take in their water. Every one takes his turn at theſe places, except the Turks, who are firſt, and the Jews laſt. There are five gates, which are open from ſun-riſing till ſun-ſetting; and ſeven forts, or caſtles, without the walls, the greateſt of which is on the mole without the gate, all of which are well ſupplied with great guns. There are ten large moſques, and fifty ſmall ones; three great colleges or public ſchools, and a great number of petty ones for children. The houſes are ſquare, and built of ſtone and brick, with a ſquare court in the middle, and galleries all round. There are ſaid to be about 100,000 inhabitants in the city, comprehending 5000 Jewiſh families, beſides Chriſtians. There are four fundics, or public inns, ſuch as are in Turky; and ſix cazernes, or barracks, for the unmarried Turkiſh ſoldiers, which will hold ſix hundred each. There are no inns for Chriſtians to lodge in; but only a few tippling-huts kept by ſlaves, for the accommodation of Greeks and the poorer ſort of travellers, where any thing may be had for money. Here are bagnios, or public baths, in the ſame manner as in Turky, at a very moderate rate. The women have baths of their own, where the men dare not come. Without the city there are a great number of ſepulchres, as alſo cells or chapels, dedicated to marabouts, or reputed ſaints, which the women go to viſit every Friday. The Turkiſh ſoldiers are great tyrants; for they not only turn others out of the way in the ſtreets, but will go to the farm-houſes in the country for twenty days together, living on free quarters, and making uſe of every thing, not excepting the women. The Algerines eat, as in Turky, ſitting croſs-legged round a table about four inches high, and uſe neither knives nor forks; before they begin, every one ſays, *Be iſme Allah*, "In the name of God." When they have done, a ſlave pours water on all their hands as they ſit, and then they waſh their mouths. Their drink is water, ſherbet, and coffee. Wine is not allowed, though drank immoderately by ſome. E. Long. 3. 30. N. Lat. 36. 40.

ALGOL, a fixed ſtar of the third magnitude, called *Meduſa's Head*, in the conſtellation Perſeus; its longitude is 21°, 50', 42'', of Taurus, and its latitude 23°, 23', 47'', north; according to Flamſtead's catalogue.

ALGONQUINS, a nation in North America, who formerly poſſeſſed great tracts of land along the north ſhore of the river St Lawrence. For a long time they had no rivals as hunters and warriors, and were long in alliance with the Iroquois; whom they agreed to protect from all invaders, and to let them have a ſhare of their veniſon. The Iroquois, on the other hand, were to pay a tribute to their allies, out of the culture of the earth; and to perform for them all the menial duties, ſuch as flaying the game, curing the fleſh, and dreſſing the ſkins. By degrees, however, the Iroquois aſſociated in the hunting matches and warlike expeditions of the

Algonquins; ſo that they ſoon began to fancy themſelves as well qualified, either for war or hunting, as their neighbours. One winter, a large detachment of both nations having gone out a-hunting, and ſecured, as they thought, a vaſt quantity of game, ſix young Algonquins and as many Iroquois were ſent out to begin the ſlaughter. The Algonquins, probably become a little jealous of their aſſociates, upon ſeeing a few elks, deſired the Iroquois to return, on pretence that they would have ſufficient employment in flaying the game they ſhould kill; but after three days hunting, having killed none, the Iroquois exulted, and in a day or two privately ſet out to hunt for themſelves. The Algonquins were ſo exaſperated at ſeeing their rivals return laden with game, that they murdered all the hunters in the night-time. The Iroquois diſſembled their reſentment; but in order to be revenged, applied themſelves to ſtudy the art of war as practiſed among thoſe ſavage nations. Being afraid of engaging with the Algonquins at firſt, they tried their proweſs on other inferior nations, and, when they thought themſelves ſufficiently expert, attacked the Algonquins with ſuch diabolical fury, as ſhewed they could be ſatisfied with nothing leſs than the extermination of the whole race; which, had it not been for the interpoſition of the French, they would have accompliſhed.—The few Algonquin nations that are now to be ſeen, ſeem entirely ignorant of agriculture, and ſubſiſt by fiſhing and hunting. They allow themſelves a plurality of wives; notwithſtanding which, they daily decreaſe in populouſneſs, few or none of their nations containing above 6000 ſouls, and many of them not 2000. Their language is one of the three radical ones in North America, being underſtood from the river St Lawrence to the Miſſiſſippi.

ALGOR, with phyſicians, an unuſual coldneſs in any part of the body.

ALGORITHM, an Arabic word expreſſive of numerical computation.

ALGUAZIL, in the Spaniſh polity, an officer whoſe buſineſs it is to ſee the decrees of a judge executed.

ALHAGI, in botany, the trivial name of a ſpecies of hedyſarum. See HEDYSARUM.

ALHAMA, a very pleaſant town of the kingdom of Granada, in Spain, ſituated in the midſt of ſome craggy mountains, about 25 miles S. W. of Granada, on the banks of the Rio Frio, in W. Long. 1. 10. N. Lat. 36. 59. and having the fineſt warm baths in all Spain. It was taken from the Moors in 1481. The inhabitants, though ſurpriſed, and the town without a garriſon, made a gallant defence: but being at length forced to ſubmit, the place was abandoned to the pillage of the *Chriſtian* ſoldiers; who, not ſatisfied with an immenſe quantity of gold and jewels, made ſlaves of upwards of 3000 of the inhabitants.

ALI, gives the denomination to a ſect, or diviſion, among the Mahometans, who adhere to the right of ſucceſſion of Ali, the fourth caliph, or ſucceſſor of Mahomet, and the reform of Muſſulmaniſm introduced by him. The ſectaries of Ali are more particularly called *Schiites*; and ſtand oppoſed to the *Sunnites*, or ſect of Omar, who adhere to the law, as left by Mahomet, Abubeker, and Omar. Ali was couſin of Mahomet, and ſon-in-law of that prophet, having married his daughter Fatimah. After Mahomet's death, great diſputes aroſe about the ſucceſſion: many ſtood for Ali; but Abubeker was preferred, and elected the firſt kalif. Ali took his turn, after the death of Othman.—The Perſians are the chief adherents to the ſect of Ali, whom they hold to have been the legitimate ſucceſſor of Mahomet, and Abubeker an uſurper. On the contrary, the Turks are of the ſect of Omar; and hold Ali in execration, having raiſed a furious civil war among the Muſſulmans. The diſtinguiſhing badge of the followers of Ali is a red turban, which is worn by the Perſians, who are hence called in deriſion, by the Turks, *Kiſilbachi*, q. d. *red-heads*. Ali is reputed the author of ſeveral works, particularly a Centiloquium, in great repute among the Arabs and Perſians, part of which has been publiſhed in Engliſh by Mr Ockley.

ALIBI, in law: When a perſon purſued for the commiſſion of a crime, libelled to have been perpetrated at a certain place, and upon a certain day, proves in his defence, that he was elſewhere at the time libelled, he is ſaid to have proved *alibi*.

ALICANT, a large ſea-port town, in the province of Valencia and territory of Segura. It is ſeated between the mountains and the ſea, and has a caſtle deemed impregnable. The port is defended by three baſtions furniſhed with artillery. To prevent the viſits of the Algerine pirates, watch-towers were built to give notice of the approach of an enemy's ſhip. It was taken from the Moors in 1264. The caſtle was taken by the Engliſh in 1706, and held out a ſiege of two years before it was retaken by the French and Spaniards, and at laſt ſurrendered upon honourable terms, after part of the rock was blown up on which the caſtle ſtood, and the governor killed. The houſes are high, and well built; and a very great trade is carried on here, particularly in wine and fruit. It is ſeated in the Mediterranean, on a bay of the ſame name, 37 miles north-eaſt of Murcia, and 75 ſouth of Valencia. W. Long. 0. 36. N. Lat. 38. 24.

ALICATA, a mountain of Sicily, near the valleys Mazara and Noto, upon which was ſituated (as is generally thought) the famous Dædalion, where the tyrant Phalaris kept his brazen bull.

ALICATA, a town of Sicily, remarkable for corn and good wine. It was plundered by the Turks in 1543; and is ſeated on a ſort of peninſula near the ſea, twenty-two miles S. E. of Girgenti. E. Long. 15. 20. N. Lat. 37. 11.

ALIEN, in law, implies a perſon born in a ſtrange country, not within the king's allegiance; in contradiſtinction to a denizon, or natural ſubject. The word is formed from the Latin *alius*, another; *q. d.* one born in another country. An alien is incapable of inheriting lands in Britain, till naturalized by an act of parliament. No alien is entitled to vote at the election of members of parliament; nor can he enjoy any office, or be returned on any jury, unleſs where an alien is party in a cauſe, when the inqueſt is compoſed of an equal number of denizens and aliens. The reaſons for eſtabliſhing theſe laws were, that every man is preſumed to bear faith and love to that prince and country where he received protection during his infancy; and that one prince might not ſettle ſpies in another's country; but chiefly, that the rents and revenues of the country might not be drawn to the ſubjects of another. Some have thought that the laws againſt aliens

liens were introduced in the time of Henry II. when a law was made at the parliament of Wallingford, for the expulſion of ſtrangers, in order to drive away the Flemings and Picards introduced into the kingdom by the wars of king Stephen. Others have thought that the origin of this law was more ancient; and that it is an original branch of the feudal law: for by that law no man can purchaſe any lands but he muſt be obliged to do fealty to the lords of whom the lands are holden; ſo that an alien who owed a previous faith to another prince, could not take an oath of fidelity in another ſovereign's dominions. Among the Romans, only the *Cives Romani* were eſteemed freemen; but, when their territories increaſed, all the Italians were made free, under the name of *Latins*, tho' they had not the privilege of wearing gold rings till the time of Juſtinian. Afterwards all born within the pale of the empire were conſidered as citizens.

Alien-*Duty*, an impoſt laid on all goods imported by aliens, over and above the cuſtoms paid for ſuch goods imported by Britiſh, and on Britiſh bottoms.

Alien-*Priories*, a kind of inferior monaſteries, formerly very numerous in England, and ſo called from their belonging to foreign abbeys.

ALIENATION, in law, denotes the act of making over a man's property in land, tenements, &c. to another perſon.

Alienation in mortmain, is making over lands, tenements, &c. to a body-politic, or to a religious houſe, for which the king's licence muſt firſt be obtained, otherwiſe the lands, &c. alienated will be forfeited *.

* See Mortmain.

ALIMENT, (from *alo* to nouriſh,) implies food both ſolid and liquid: from which, by the proceſs of digeſtion, is prepared a very mild, ſweet, and whitiſh liquor, reſembling milk, and diſtinguiſhed by the name of *chyle;* which being abſorbed by the lacteal veins, by them conveyed into the circulation, and there aſſimilated into the nature of blood, affords that ſupply of nutrition which the continual waſte of the body is found to require.—Next to air, food is the moſt neceſſary thing for the preſervation of our bodies: and as on the choice thereof our health greatly depends, it is of great importance to underſtand, in general, what is the propereſt for our nouriſhment; and, in particular deviations from health, what is the beſt adapted to reſtore us. Our blood and juices naturally incline to become putrid and acrimonious: freſh chyle, duly received, prevents this deſtructive tendency, and preſerves in them that mild ſtate which alone conſiſts with health. An animal diet affords the moſt of this bland nutritious mucilage; watery fluids dilute the too groſs parts, and carry off what is become unfit for uſe. It is only the ſmall portion of jelly which is ſeparated from the farinaceous parts of vegetables, that, after being much elaborated, is converted into the animal nature; yet the uſe of vegetables prevents both repletion, and a too great tendency to a putreſcent acrimony of the blood. In hot climates, as well as againſt the conſtitutional heat of particular perſons, vegetables are demanded in the largeſt portion; animal ſubſtances afford the higheſt reliſh while our appetite continues, but will ſate the appetite before the ſtomach is duly filled. Vegetables may be eaten after either fleſh or fiſh: few herbs or fruits ſatiate ſo much as that the ſtomach may not be filled with them, when it is already ſatisfied with fleſh or fiſh; whence it may be obſerved, that no diet which is very nouriſhing can be eat to fulneſs, becauſe its nutritious parts are oily and ſatiating.—Health depends almoſt wholly on a proper craſis of the blood; and to preſerve this a mixture of vegetables in ſome degree is always required, for a loathing is ſoon the conſequence of animal food alone: hot acrid habits, too, receive from milk and vegetables the needful for correcting their exceſſes; but in cold, pituitous, and nervous habits, who want moſt nouriſhment from leaſt digeſtion, and from the ſmalleſt quantity of food, animal diet is to be uſed more freely.

Thus much being offered as general principles with reſpect to the matter and quality of our aliment, the valetudinarian may eaſily regulate his diet with ſome advantage to himſelf by an attention to the few enſuing particulars. In winter, eat freely, but drink ſparingly: roaſt meat is to be preferred, and what is drank ſhould be ſtronger than at other ſeaſons. In ſummer, let thirſt determine the quantity to be drank; cold ſtomachs never require much: boiled meats and vegetables, if not otherwiſe contradicted, may now be more freely uſed. Lax habits require the winter's diet to be continued all the year, and rigid ones ſhould be confined to that of ſummer. Fat people ſhould faſt at times, but the lean ſhould never do ſo. Thoſe who are troubled with eructations occaſioned by their food, ſhould drink but little, and uſe ſome unaccuſtomed exerciſe. The thirſty ſhould drink freely, but eat ſparingly. In general, let moderation he obſerved; and tho' no dinner hath been had, a light ſupper is at all times to be preferred. After very high-ſeaſoned meats, a glaſs of water acidulated with the acid elixir of vitriol *, or in very weak ſtomachs the ſweet elixir of vitriol †, is far more aſſiſtant to the work of digeſtion than the common method of taking brandy.

* See *Pharmacy*, nº 438, a.
† *Ib.* —, b.

Obligation of Aliment, in Scots law, the natural obligation on parents to provide their children with the neceſſaries of life, &c. See Law, Part III. Nº clxxiii. 4

ALIMONY, in law, implies that allowance which a married woman ſues for, and is entitled to, upon any occaſional ſeparation from her huſband *.

* See *Law*, Part III. Nº clx. 13.

ALIPILARIUS, or Alipilus, in Roman antiquity, a ſervant belonging to the baths, whoſe buſineſs it was, by means of waxen plaſters, and an inſtrument called *volſella*, to take off the hairs from the arm-pits, and even arms, legs, &c. this being deemed a point of cleanlineſs.

ALIPTERIUM, αλειπτηριον, in antiquity, a place in the ancient *paleſtræ*, where the *athletæ* were anointed before their exerciſes.

ALIQUANT part, in arithmetic, is that number which cannot meaſure any other exactly without ſome remainder. Thus 7 is an aliquant part of 16; for twice 7 wants two of 16, and three times 7 exceeds 16 by 5.

ALIQUOT part, is that part of a number or quantity, which will exactly meaſure it without any remainder. Thus 2 is an aliquot part of 4; 3 of 9; 4 of 16; &c.

ALISMA, or Thrumwort, a genus of the polyginia order, belonging to the hexandria claſs of plants. Of this genus, Linnæus enumerates ſeven ſpecies, *viz.* the plantago, or great water-plantain, which grows in all the marſhy parts of this country; the ranunculoides, or leſſer water-plantain; the natans, or creeping water-plantain; the damaſonium, or ſtar-headed water-plantain; all which are natives of Britain. The others, *viz.* the flava, cordifolia, and ſubulata, are natives of America, where they are generally found in ſtagnating waters, and other ſwampy places; ſo that it would be difficult to preſerve them in Britain, for they will not live in the open air, and require a bog to make them thrive: but as they are plants of no great beauty or uſe, it is not worth while to cultivate them in this country.

ALITES, in Roman antiquity, a deſignation given to ſuch birds as afforded matter of auguries by their flight.

ALKAHEST, or ALCAHEST, in chemiſtry, an univerſal menſtruum capable of reſolving all bodies into their firſt principles. Van Helmont pretended he was poſſeſſed of ſuch a menſtruum; but, however credulous people might be impoſed on in his days, the notion is now become as ridiculous as the philoſopher's ſtone, the perpetuum mobile, &c.—It is likewiſe uſed by ſome authors for all fixed ſalts volatilized.

ALKALI, in chemiſtry. See ALCALI.

ALKANET, in botany. See ANCHUSA.

ALKEKENGI, in botany, the trivial name of a ſpecies of phyſalis. See PHYSALIS.

ALKERMES, in pharmacy, a compound cordial medicine made in the form of a confection, deriving its name from the kermes-berries uſed in its compoſition*.

* See *Kermes*, and *Quercus*.

ALL-HALLOWS. See the next article.

ALL-SAINTS, in the calendar, denotes a feſtival celebrated on the firſt of November, in commemoration of all the ſaints in general; which is otherwiſe called *All-hallows*. The number of ſaints being ſo exceſſively multiplied, it was found too burdenſome to dedicate a feaſt-day to each. In reality, there are not days enough, ſcarce hours enough, in the year, for this purpoſe. Hence an expedient was had recourſe to, by commemorating ſuch in the lump as had not their own days. Boniface IV. in the ninth century, introduced the feaſt of *All-Saints* in Italy, which was ſoon after adopted into the other churches.

ALL-SAINTS *Bay*, a ſpacious harbour near St Salvador in Brazil, in S. America, on the Atlantic Ocean. W. long. 40°, S. lat. 12°.

ALL-SOULS, a feſtival kept in commemoration of all the faithful deceaſed, on the ſecond of November.

ALLA, or ALLAH, the name by which the profeſſors of Mahometaniſm call the Supreme Being.

The term *alla* is Arabic, derived from the verb *alah*, to adore. It is the ſame with the Hebrew *Eloah*, which ſignifies the *Adorable Being*.

ALLANTOIS, or ALLANTOIDES, a gut-ſhaped veſicle inveſting the fœtus of cows, goats, ſheep, &c. filled with an urinous liquor conveyed to it from the urachus.—Anatomiſts are not agreed whether the allantois has any exiſtence in the human ſpecies or not*.

* See *Fœtus*; and *Comparative* Anatomy, n° 79.

ALLATIUS (Leo), keeper of the Vatican library, a native of Scio, and a celebrated writer of the 17th century. He was of great ſervice to the gentlemen of Port Royal in the controverſy they had with M. Claude touching the belief of the Greeks with regard to the euchariſt. No Latin was ever more devoted to the ſee of Rome, or more inveterate againſt the Greek ſchiſmatics, than Allatius. He never engaged in matrimony, nor was he ever in orders; and Pope Alexander VII. having aſked him one day, why he did not enter into orders, he anſwered, "Becauſe I would be free to marry." The pope rejoined, "If ſo, why do you not marry?" "Becauſe," replied Allatius, "I would be at liberty to take orders." Thus, as Mr Bayle obſerves, he paſſed his whole life, wavering betwixt a pariſh and a wife; ſorry, perhaps, at his death, for having choſen neither of them; when, if he had fixed upon one, he might have repented his choice for 30 or 40 years.—If we believe John Patricius, Allatius had a very extraordinary pen, with which, and no other, he wrote Greek for 40 years; and we need not be ſurpriſed, that, when he loſt it, he was ſo grieved, that he could ſcarce forbear crying. He publiſhed ſeveral manuſcripts, ſeveral tranſlations of Greek authors, and ſeveral pieces of his own compoſing. In his compoſitions he is thought to ſhew more erudition than judgment: he uſed alſo to make frequent digreſſions from one ſubject to another. He died at Rome in 1669, aged 83.

ALLAY. See ALLOY.

ALLEGATA, a word anciently ſubſcribed at the bottom of reſcripts and conſtitutions of the emperors; as *ſignata*, or *teſtata*, was under other inſtruments.

ALLEGIANCE, in law, is the tie, or *ligamen*, which binds the ſubject to the king, in return for that protection which the king affords the ſubject. The thing itſelf, or ſubſtantial part of it, is founded in reaſon and the nature of government; the name and the form are derived to us from our Gothic anceſtors. Under the feodal ſyſtem, every owner of lands held them in ſubjection to ſome ſuperior or lord, from whom or from whoſe anceſtors the tenant or vaſſal had received them: and there was a mutual truſt or confidence ſubſiſting between the lord and vaſſal, that the lord ſhould protect the vaſſal in the enjoyment of the territory he had granted him; and, on the other hand, that the vaſſal ſhould be faithful to the lord, and defend him againſt all his enemies. This obligation on the part of the vaſſal was called his *fidelitas* or fealty; and an oath of fealty was required by the feodal law to be taken by all tenants to their landlord, which is couched in almoſt the ſame terms as our ancient oath of allegiance: except, that in the uſual oath of fealty, there was frequently a ſaving or exception of the faith due to a ſuperior lord by name, under whom the landlord himſelf was perhaps only a tenant or vaſſal. But when the acknowledgement was made to the abſolute ſuperior himſelf, who was vaſſal to no man, it was no longer called the oath of fealty, but the oath of allegiance; and therein the tenant ſwore to bear faith to his ſovereign lord, in oppoſition to all men, without any ſaving or exception: "*contra omnes homines fidelitatem fecit.*" Land held by this exalted ſpecies of fealty, was called *feudum ligium*, a liege fee; the vaſſals *homines ligii*, or liege men; and the ſovereign, their *dominus ligius*, or liege lord. And when ſovereign princes did homage to each other for lands held under their reſpective ſovereignties, a diſtinction was always made between *ſimple* homage, which was only an acknowledgement of tenure; and *liege* homage, which included the fealty before-mentioned, and the ſervices conſequent upon it. Thus, when Edward III. of England in 1329, did homage to Philip VI. of France, for his ducal dominions on that continent; it was warmly diſputed of what ſpecies the homage was to be, whether *liege* or *ſimple* homage. But with us in Britain, it becoming a ſettled principle of tenure, that all lands in the kingdom are holden of the king as their ſovereign and lord paramount, no oath but that of fealty could ever be taken to inferior lords; and the oath of allegiance was neceſſarily confined to the perſon of the king alone. By an eaſy analogy, the term of *allegiance* was ſoon brought to ſignify all other engagements which are due from ſubjects to their prince, as well as thoſe duties which were ſimply and merely territorial. And the oath of allegiance, as adminiſtered in England for upwards of 600 years, contained a promiſe "to be true and faithful to the king and his heirs, and truth and faith to bear of life and limb and terrene honour, and not to know or hear of any ill or damage intended him, without defending him therefrom." But, at the revolution, the terms of this oath being thought perhaps to favour too much the notion of non-reſiſtance, the preſent form was introduced by the convention parliament, which is more general and indeterminate than the former; the ſubject only promiſing "that he will be faithful and bear *true* allegiance to the king," without mentioning "his heirs," or ſpecifying in the leaſt wherein that allegiance conſiſts. The oath of ſupremacy is principally calculated as a renunciation of the pope's pretended authority: and the oath of abjuration, introduced in the reign of King William, very amply ſupplies the looſe and general texture of the oath of allegiance; it recognizing the right of his majeſty, derived under the act of ſettlement; engaging to ſupport him to the utmoſt of the juror's power; promiſing to diſcloſe all traiterous conſpiracies againſt him; and expreſsly renouncing any claim of the deſcendants of the late pretender, in as clear and explicit terms as the Engliſh language can furniſh. This oath muſt be taken by all perſons in any office, truſt, or employment; and may be tendered by two juſtices of the peace to any perſon whom they ſhall ſuſpect of diſaffection. And the oath of allegiance may be tendered to all perſons above the age of twelve years, whether natives, denizens, or aliens.

But, beſides theſe *expreſs* engagements, the law alſo holds that there is an *implied*, *original*, and *virtual* allegiance, owing from every ſubject to his ſovereign, antecedently to any expreſs promiſe, and although the ſubject never ſwore any faith or allegiance in form. For as the king, by the very deſcent of the crown, is fully inveſted with all the rights and bound to all the duties of ſovereignty, before his coronation; ſo the ſubject is bound to his prince by an intrinſic allegiance, before the ſuper-induction of thoſe outward bonds of oath, homage, and fealty, which were only inſtituted to remind the ſubject of this his previous duty, and for the better ſecuring its performance. The formal profeſſion, therefore, or oath of ſubjection, is nothing more than a declaration in words of what was before implied in law. Which occaſions Sir Edward Coke very juſtly to obſerve, that "all ſubjects are equally bounden to their allegiance, as if they had taken the oath; becauſe it is written by the finger of the law in their hearts, and the taking of the corporal oath is but an outward declaration of the ſame." The ſanction of an oath, it is true, in caſe of violation of duty, makes the guilt ſtill more accumulated, by ſuperadding perjury to treaſon: but it does not increaſe the civil obligation to loyalty; it only ſtrengthens the *ſocial* tie, by uniting it with that of *religion*.

Allegiance, both expreſs and implied, is however diſtinguiſhed by the law into two ſorts or ſpecies, the one *natural*, the other *local*; the former being alſo perpetual, the latter temporary.

Natural allegiance is ſuch as is due from all men born within the king's dominions immediately upon their birth. For, immediately upon their birth, they are under the king's protection; at a time too, when (during their infancy) they are incapable of protecting themſelves. Natural allegiance is, therefore, a debt of gratitude; which cannot be forfeited, cancelled, or altered, by any change of time, place, or circumſtance, nor by any thing but the united concurrence of the legiſlature. A Briton who removes to France, or to China, owes the ſame allegiance to the king of Britain there, as at home, and twenty years hence as well as now. For it is a principle of univerſal law, That the natural-born ſubject of one prince cannot by any act of his own, no, not by ſwearing allegiance to another, put off or diſcharge his natural allegiance to the former: for this natural allegiance was intrinſic, and primitive, and antecedent to the other; and cannot be diveſted without the concurrent act of that prince to whom it was firſt due. Indeed the natural-born ſubject of one prince, to whom he owes allegiance, may be entangled by ſubjecting himſelf abſolutely to another: but it is his own act that brings him into thoſe ſtraits and difficulties, of owing ſervice to two maſters; and it is unreaſonable, that, by ſuch voluntary act of his own, he ſhould be able at pleaſure to unlooſe thoſe bands by which he is connected to his natural prince.

Local allegiance is ſuch as is due from an alien, or ſtranger born, for ſo long time as he continues within the king's dominion and protection; and it ceaſes, the inſtant ſuch ſtranger transfers himſelf from this kingdom to another. Natural allegiance is therefore *perpetual*, and local *temporary* only; and that for this reaſon, evidently founded upon the nature of government, That allegiance is a debt due from the ſubject, upon an implied contract with the prince, that ſo long as the one affords protection, ſo long the other will demean himſelf faithfully. As, therefore, the prince is always under a conſtant tie to protect his natural-born ſubjects at all times and in all countries, for this reaſon their allegiance due to him is equally univerſal and permanent. But, on the other hand, as the prince affords his protection to an alien, only during his reſidence in this realm, the allegiance of an alien is confined (in point of time) to the duration of ſuch his reſidence, and (in point of locality) to the dominions of the Britiſh empire. From which conſiderations, Sir Matthew Hale deduces this conſequence, That, though there be an uſurper of the crown, yet it is treaſon for any ſubject, while the uſurper is in full poſſeſſion of the ſovereignty, to practice any thing againſt his crown and dignity: wherefore, altho' the true prince regain his ſovereignty yet ſuch attempts againſt the uſurper (unleſs in defence or aid of the rightful king) have been afterwards puniſhed with death; becauſe of the breach of that temporary allegiance, which was due to him as king *de facto*. And upon this footing, after Edward IV. recovered the crown, which had been long detained from his houſe by the line of Lancaſter, treaſons committed againſt Henry VI. were capitally puniſhed, tho' Henry had been declared an uſurper by parliament.

The *oath* of allegiance, or rather the *allegiance* itſelf, is held to be applicable not only to the political capacity of the king, or regal office; but to his natural perſon, and blood-royal: and for the miſapplication of their allegiance, *viz.* to the regal capacity or crown, excluſive of the perſon of the king, were the Spencers baniſhed in the reign of Edward II. And from hence aroſe that principle of perſonal attachment, and affectionate loyalty, which induced our forefathers (and, if occaſion required, would doubtleſs induce their ſons) to hazard all that was dear to them, life, fortune, and family, in defence and ſupport of their liege lord and ſovereign.

ALLEGORY, in compoſition, conſiſts in chuſing a ſecondary ſubject, having all its properties and circumſtances reſembling thoſe of the principal ſubject, and deſcribing the former in ſuch a manner as to repreſent the latter. The principal ſubject is thus kept out of view, and we are left to diſcover it by reflection. In other words, an allegory is, in every reſpect, ſimilar to an hieroglyphical painting, excepting only that words are uſed inſtead of colours. Their effects are preciſely the ſame: An hieroglyphic raiſes two images in the mind; one ſeen, that repreſents one that is not ſeen: An allegory does the ſame; the repreſentive ſubject is deſcribed, and the reſemblance leads us to apply the deſcription to the ſubject repreſented.

There cannot be a finer or more correct allegory than the following, in which a vineyard is made to repreſent God's own people the Jews:

> “ Thou haſt brought a vine out of Egypt; thou haſt caſt out the heathen, and planted it. Thou didſt cauſe it to take deep root, and it filled the land. The hills were covered with its ſhadow, and the boughs thereof were like the goodly cedars. Why haſt thou then broken down her hedges, ſo that all that paſs do pluck her? The boar out of the wood doth waſte it, and the wild beaſt doth devour it. Return, we beſeech thee, O God of hoſts: look down from heaven, and behold, and viſit this vine and the vineyard thy right-hand hath planted, and the branch thou madeſt ſtrong for thyſelf.” Pſal. lxxx.

Nothing gives greater pleaſure than an allegory, when the repreſentative ſubject bears a ſtrong analogy, in all its circumſtances, to that which is repreſented. But moſt writers are unlucky in their choice, the analogy being generally ſo faint and obſcure, as rather to puzzle than to pleaſe. Allegories, as well as metaphors and ſimiles, are unnatural in expreſſing any ſevere paſſion which totally occupies the mind. For this reaſon, the following ſpeech of Macbeth is juſtly condemned by the learned author of the Elements of Criticiſm:

Methought I heard a voice cry, Sleep no more!
Macbeth doth murder Sleep; the innocent ſleep;
Sleep that knits up the ravell'd ſleeve of Care,
The birth of each day's life, ſore Labour's bath,
Balm of hurt minds, great Nature's ſecond courſe,
Chief nouriſher in life's feaſt. Act. ii. Sc. 3.

But ſee this ſubject more fully treated under the article METAPHOR *and Allegory*.

ALLEGRO, in muſic, an Italian word, denoting that the part is to be played in a ſprightly, briſk, lively, and gay manner.

Piu ALLEGRO, ſignifies, that the part it is joined to ſhould be ſung or played quicker; as

Poco piu ALLEGRO intimates, that the part to which it refers ought to be played or ſung only a little more briſkly than allegro alone requires.

ALLEIN (Joſeph), the ſon of Tobias Allein, was born in the Devizes, in Wiltſhire, in 1633, and educated at Oxford. In 1655, he became aſſiſtant to Mr Newton, in Taunton-Magdalen, in Somerſetſhire; but was deprived for non-conformity. He died in 1668, aged 35. He was a man of great learning, and greater charity; preſerving, though a nonconformiſt and a ſevere ſufferer on that account, great reſpect for the church, and loyalty to his ſovereign. He wrote ſeveral books of piety, which are highly eſteemed; but his *Alarm to unconverted ſinners* is more famous than the reſt. There have been many editions of this little pious work, the ſale of which has been very great; of the edition 1672, there were 20,000 ſold; of that 1675, with this title, *A ſure guide to heaven*, 50,000. There was alſo a large impreſſion of it with its firſt title, in 1720.

ALLEMAND, a ſort of grave ſolemn muſic, with good meaſure, and a ſlow movement.—It is alſo a briſk kind of dance, very common in Germany and Switzerland.

ALLEMANNIC, in a general ſenſe, denotes any thing belonging to the ancient Germans. Thus, we meet with Allemannic hiſtory, Allemannic language, Allemannic law, &c.

ALLEN (Thomas), a famous mathematician of the ſixteenth century, born at Utoxeter in Staffordſhire, the 21st of December 1542. He was admitted ſcholar of Trinity-college, Oxford, the 4th of June 1561; and in 1567, took his degree of maſter of arts. In 1570, he quitted his college and fellowſhip, and retired to Glouceſter-hall; where he ſtudied very cloſely, and became famous for his knowledge in antiquity, philoſophy, and mathematics. Having received an Invitation from Henry earl of Northumberland, a great friend and patron of the mathematicians, he ſpent ſome time at the earl's houſe, where he became acquainted with thoſe celebrated mathematicians Thomas Harriot, John Dee, Walter Warner, and Nathaniel Torporley. Robert earl of Leiceſter had a particular eſteem for Mr Allen, and would have conferred a biſhopric upon him, but his love of ſolitude and retirement made him decline the offer. His great ſkill in the mathematics, made the ignorant and vulgar look upon him as a magician or conjurer: the author of a book intitled *Leiceſter's Commonwealth*, has accordingly accuſed him with uſing the art of figuring, to procure the earl of Leiceſter's unlawful deſigns, and endeavouring by the black art to bring about a match betwixt him and Queen Elizabeth. But without pretending to point out the abſurdity of the charge, it is certain that the earl placed ſuch confidence in Allen, that nothing material in the ſtate was tranſacted without his knowledge; and the earl had conſtant information, by letter, from Mr Allen, of what paſſed in the univerſity. Mr Allen was very curious and indefatigable in collecting ſcattered manuſcripts relating to hiſtory, antiquity, aſtronomy, philoſophy, and mathematics: theſe collections have been quoted by ſeveral learned authors, *&c.* and mentioned to have been in the Bibliotheca Alleniana. He publiſhed in Latin the ſecond and third books of Claudius Ptolemy of Peluſium, *Concerning the Judgment of the Stars*, or, as it is commonly called, of the *Quadripartite Conſtruction*, with an expoſition. He wrote alſo notes on many of Lilly's books, and ſome on John Bale's work *De Scriptoribus Maj. Britanniæ*. Having lived to a great age, he died at Glouceſter-hall, on the 30th of September 1632.

ALLENDORF, a ſmall town in the circle of the Upper Rhine, and in the landgravate of Heſſe-Caſſel, remarkable for its ſalt works, and three ſtone-bridges. It is ſeated on the river Weſer, 15 miles eaſt of Caſſel; E. Long. 10. 5. N. Lat. 51. 26.

ALLER, a river which runs thro' the duchy of Lunenburg, and falls into the Weſer, a little below Verden.

ALLERION, or **Alerion**, in heraldry, a ſort of eagle without beak or feet, having nothing perfect but the wings. They differ from martlets by having their wings expanded, whereas thoſe of the martlet are cloſe; and denote imperialiſts vanquiſhed and diſarmed, for which reaſon they are more common in French than in German coats of arms.

ALLESTRY (Richard) D. D. an eminent divine, born at Uppington in Shropſhire, in March 1619, was educated in the grammar ſchool at Coventry, and afterwards at Chriſt-church in Oxford. His parts, which were extraordinary, were improved by a no leſs extraordinary induſtry. He took up arms for King Charles I. and was ſometimes ſeen with his muſket in one hand and his book in the other. He was very active in the ſervice of King Charles II. before his reſtoration, and was employed by the royaliſts in tranſacting buſineſs with that prince during his exile; but was at laſt ſeized at Dover by a party of ſoldiers, and committed priſoner to Lambeth-houſe, where he was confined ſix or eight weeks: but ſoon after the reſtoration he was made canon of Chriſt-church, created doctor of divinity, and appointed chaplain in ordinary to the king, and regius profeſſor of divinity. In 1665, he was appointed provoſt of Eton college, where he raiſed the ſchool, which he found in a low condition, to an uncommon pitch of reputation. The weſt ſide of the outward quadrangle of that college was built from the ground at his expence. The excellent Dr Hammond, who was his intimate friend, left him his valuable library, which he himſelf afterwards bequeathed to his ſucceſſors in the divinity-chair. He was eminent for his piety, benevolence, and integrity; for the ſincerity of his friendſhip, and his diſintereſted temper. He wrote ſeveral books; and a collection of his ſermons were printed after his deceaſe, by Dr Fell, biſhop of Oxford. He died Auguſt 28th 1680.

ALLEVEURE, a ſmall braſs Swediſh coin, worth about ½*d.* Engliſh money.

ALLEY (William), biſhop of Exeter in the reign of Queen Elizabeth, was born at Great Wycomb in Buckinghamſhire. From Eton ſchool, in the year 1528, he removed to king's college, Cambridge, where he took the degree of bachelor of arts. He alſo ſtudied ſome time at Oxford; afterwards he married, was preſented to a living, and became a zealous reformer. Upon Queen Mary's acceſſion, he left his cure, and retired into the north of England; where he maintained his wife and himſelf by teaching a ſchool, and practiſing phyſic. Queen Elizabeth aſcending the throne, he went to London, where he acquired great reputation by reading the divinity-lecture at St Paul's, and in July 1560 was conſecrated biſhop of Exeter. He was created doctor of divinity at Oxford in Nov. 1561. He died on the 15th of April 1570; and was buried at Exeter, in the cathedral. He wrote, 1. *The poor man's library*, 2 vol. fol. Lond. 1571. Theſe volumes contain twelve lectures on the firſt epiſtle of St Peter, read at St Paul's. 2. *A Hebrew grammar.* Whether it was ever publiſhed, is uncertain. He tranſlated the Pentateuch, in the verſion of the Bible which was undertaken by queen Elizabeth's command.

ALLEY, in gardening, a ſtraight parallel walk, bounded on both ſides with trees, ſhrubs, *&c.* and uſually covered with gravel or turf.

Alley, among builders, denotes a narrow paſſage leading from one place to another.

Alley, in perſpective, that which, in order to have a greater appearance of length, is made wider at the entrance than at the termination.

ALLIA, a river of Italy, which running down a very ſteep channel from the mountains of Cruſtuminum, mixes with the Tiber at 40 miles from Rome; famous for the great ſlaughter of the Romans by the Gauls, under Brennus: hence *Allienſis dies*, an unlucky day, (Virgil, Ovid, Lucan.) Our anceſtors, ſays Cicero, deemed the day of the fight of *Allia*, more fatal than that of taking the city.

ALLIANCE, in the civil and canon law, the relation contracted between two perſons or two families by marriage.

Alliance is alſo uſed for a treaty entered into by ſovereign princes and ſtates, for their mutual ſafety and defence.—In this ſenſe, alliances may be diſtinguiſhed into ſuch as are offenſive, whereby the contracting parties oblige themſelves jointly to attack ſome other power; and into defenſive ones, whereby they bind themſelves to ſtand by and defend each other in caſe they are attacked by others.

Alliance, in a figurative ſenſe, is applied to any kind of union or connection; thus we ſay, there is an alliance between the church and ſtate.

ALLIGATI, in Roman antiquity, the baſeſt kind of ſlaves, who were uſually kept fettered. The Romans had three degrees, or orders, of ſlaves or ſervants; the firſt employed in the management of their eſtates; the ſecond in the menial or lower functions of the family; the third called *alligati*, abovementioned.

ALLIGATION, the name of a method of ſolving all queſtions that relate to the mixture of one ingredient with another. Though writers on arithmetic generally make alligation a branch of that ſcience; yet, as it is plainly nothing more than an application of the common properties of numbers, in order to ſolve a few queſtions that occur in particular branches of buſineſs, we chuſe rather to keep it diſtinct from the ſcience of arithmetic.

Alligation is generally divided into *medial* or *alternate*.

Alligation *Medial*, from the rates and quantities of the ſimples given, diſcovers the rate of the mixture.

Rule. As the total quantity of the ſimples,
To their price or value;
So any quantity of the mixture,
To the rate.

Examp. A grocer mixeth 30 lb. of currants, at

Alligation. 4 d. *per* ℔. with 10 ℔. of other currants, at 6 d. *per* ℔ : What is the value of 1 ℔. of the mixture. *Anſ.* 4½ d.

lb. *d.* *d.*
30, at 4 amounts to 120
10, at 6 ——— 60
—
40 180
lb. *d.* *lb.* *d.*
If 40 : 180 : : 1 : 4½

Note 1. When the quantity of each ſimple is the ſame, the rate of the mixture is readily found by adding the rates of the ſimples, and dividing their ſum by the number of ſimples, thus.

Suppoſe a grocer mixes ſeveral ſorts of ſugar, and of each an equal quantity, *viz.* at 50 s. at 54 s. and at 60 s. *per* C^{wt}. the rate of the mixture will be 54 s. 8 d. *per* C^{wt}.; for

s. *s.* *d.*
50+54+60=164, and 3)164)54 8

Note 2. If it be required to increaſe or diminiſh the quantity of the mixture, ſay, As the ſum of the given quantities of the ſimples, to the ſeveral quantities given; ſo the quantity of the mixture propoſed, to the quantities of the ſimples ſought.

Note 3. If it be required to know how much of each ſimple is in an aſſigned portion of the mixture, ſay, As the quantity of the mixture, to the ſeveral quantities of the ſimples given; ſo the quantity of the aſſigned portion, to the quantities of the ſimples ſought. Thus,

Suppoſe a grocer mixes 10 ℔. of raiſins, with 30 ℔. of almonds, and 40 ℔ of currants, and it be demanded, how many ounces of each ſort are found in every pound or in every ſixteen ounces of the mixture, ſay,

Oz.
80 : 10 : : 16 : 2 raiſins.
80 : 30 : : 16 : 6 almonds.
80 : 40 : : 16 : 8 currants.
—
Proof 16

Note 4. If the rates of two ſimples, with the total value and total quantity of the mixture, be given, the quantity of each ſimple may be found as follows, *viz.* Multiply the leſſer rate into the total quantity, ſubtract the product from the total value, and the remainder will be equal to the product of the exceſs of the higher rate above the lower, multiplied into the quantity of the higher-priced ſimple; and conſequently the ſaid remainder, divided by the difference of the rates, will quote the ſaid quantity. Thus,

Suppoſe a grocer has a mixture of 400 ℔ weight, that coſt him 7 l. 10 s. conſiſting of raiſins at 4 d. *per* ℔. and almonds at 6 d. how many pounds of almonds were in the mixture?

lb. *Rates.*
400 6 d.
L. *s.* *d.* 4 4 d.
7 10=1800 ——— ———
1600 1600 d. 2 d.
——— *L.* *s.*
2)200(100 ℔. of almonds at 6 d. is 2 10
And 300 ℔. of raiſins at 4 d. is, 5 0
——— ———
Total 400 Proof 7 10

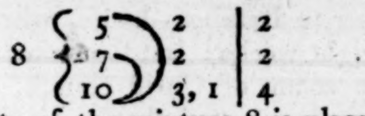
Alligation *Alternate*, being the converſe of alligation medial, from the rates of the ſimples, and rate of the mixture given, finds the quantities of the ſimples.

Rules. I. Place the rate of the mixture on the left ſide of a brace, as the root; and on the right ſide of the brace ſet the rates of the ſeveral ſimples, under one another, as the branches. II. Link or alligate the branches, ſo as one greater and another leſs than the root may be linked or yoked together. III. Set the difference betwixt the root and the ſeveral branches, right againſt their reſpective yoke-fellows. Theſe alternate differences are the quantities required. Note, 1. If any branch happen to have two or more yoke-fellows, the difference betwixt the root and theſe yoke-fellows muſt be placed right againſt the ſaid branch, one after another, and added into one ſum. 2. In ſome queſtions, the branches may be alligated more ways than one; and a queſtion will always admit of ſo many anſwers, as there are different ways of linking the branches.

Alligation alternate admits of three varieties, *viz.* 1. The queſtion may be unlimited, with reſpect both to the quantity of the ſimples, and that of the mixture. 2. The queſtion may be limited to a certain quantity of one or more of the ſimples. 3. The queſtion may be limited to a certain quantity of the mixture.

Variety I. When the queſtion is unlimited, with reſpect both to the quantity of the ſimples, and that of the mixture, this is called *Alligation Simple.*

Examp. A grocer would mix ſugars, at 5 d. 7 d. and 10 d. *per* ℔. ſo as to ſell the mixture or compound at 8 d. *per* ℔ : What quantity of each muſt he take?



Here the rate of the mixture 8 is placed on the left ſide of the brace, as the root; and on the right ſide of the ſame brace are ſet the rates of the ſeveral ſimples, *viz.* 5, 7, 10, under one another, as the branches; according to Rule I.

The branch 10 being greater than the root, is alligated or linked with 7 and 5, both theſe being leſs than the root; as directed in Rule II.

The difference between the root 8 and the branch 5, *viz.* 3, is ſet right againſt this branch's yoke-fellow 10. The difference between 8 and 7 is likewiſe ſet right againſt the yoke-fellow 10. And the difference betwixt 8 and 10, *viz.* 2, is ſet right againſt the two yoke-fellows 7 and 5; as preſcribed by Rule III.

As the branch 10 has two differences on the right, *viz.* 3 and 1, they are added; and the anſwer to the queſtion is, that 2 ℔ at 5 d. 2 ℔ at 7 d. and 4 ℔ at 10 d. will make the mixture required.

The truth and reaſon of the rules will appear by conſidering, that whatever is loſt upon any one branch is gained upon its yoke-fellow. Thus, in the above example, by ſelling 4 ℔ of 10 d. ſugar at 8 d. *per* ℔ there is 8 d. loſt: but the like ſum is gained upon its two yoke-fellows; for by ſelling two 2 ℔ of 5 d. ſugar at 8 d. *per* ℔. there is 6 d. gained; and by ſelling 2 ℔ of 7 d. ſugar at 8 d. there is 2 d. gained; and 6 d. and 2 d. make 8 d.

Hence it follows, that the rate of the mixture muſt always be mean or middle with reſpect to the rates of the ſimples; that is, it muſt be leſs than the greateſt, and greater than the leaſt; otherwiſe a ſolution would be impoſſible. And the price of the total quantity mixed, computed at the rate of the mixture, will always be equal to the ſum of the prices of the ſeveral quantities caſt up at the reſpective rates of the ſimples.

Variety II. When the queſtion is limited to a certain quantity of one or more of the ſimples, this is called *Alligation Partial.*

If the quantity of one of the ſimples only be limited, alligate the branches, and take their differences, as if there had been no ſuch limitation; and then work by the following proportion:

As the difference right againſt the rate of the ſimple whoſe quantity is given,
To the other differences reſpectively;
So the quantity given,
To the ſeveral quantities ſought.

Examp. A diſtiller would, with 40 gallons of brandy at 12 s. *per* gallon, mix rum at 7 s. *per* gallon, and gin at 4 s. *per* gallon: How much of the rum and gin muſt he take, to ſell the mixture at 8 s. *per* gallon?

$$\begin{array}{l} \qquad\qquad\qquad\qquad\qquad\textit{Gal.} \\ 8\left\{\begin{array}{l}12\\7\\4\end{array}\right. \begin{array}{l}1\ 4,\\4\\4\end{array}\left|\begin{array}{c}5\\4\\4\end{array}\right|\left.\begin{array}{l}\text{40 of brandy.}\\\text{32 of rum.}\\\text{32 of gin.}\end{array}\right\}\textit{Anſ.}\end{array}$$

The operation gives for anſwer, 5 gallons of brandy, 4 of rum, and 4 of gin. But the queſtion limits the quantity of brandy to 40 gallons; therefore ſay,

If 5 : 4 : : 40 : 32

The quantity of gin, by the operation, being alſo 4, the proportion needs not be repeated.

Variety III. When the queſtion is limited to a certain quantity of the mixture, this is called *Alligation Total.*

After linking the branches, and taking the differences, work by the proportion following:

As the ſum of the differences,
To each particular difference;
So the given total of the mixture,
To the reſpective quantities required.

Examp. A vintner hath wine at 3 s. *per* gallon, and would mix it with water, ſo as to make a compoſition of 144 gallons, worth 2 s. 6 d. *per* gallon: How much wine, and how much water, muſt he take?

$$\begin{array}{l} \qquad\qquad\quad\textit{Gal.} \\ 30\left\{\begin{array}{r}36\\0\end{array}\right.\begin{array}{r}30\\6\end{array}\left|\left.\begin{array}{r}\text{120 of wine.}\\\text{24 of water.}\end{array}\right\}\textit{Anſw.}\right. \\ \qquad\overline{36}\ \ \Big|\ \overline{\text{144 total.}} \end{array}$$

$$\begin{array}{r} 120 \times 36 = 4320 \\ 24 \times 0 = 0 \\ \hline \end{array}$$

Proof 144)4320(30

As 36 : 30 : : 144 : 120
As 36 : 6 : : 144 : 24.

There being here only two ſimples, and the total of the mixture limited, the queſtion admits but of one anſwer.

ALLIGATOR, in zoology, a ſynonime of the lacerta crocodilus. See Lacerta.

ALLIOTH, a ſtar in the tail of the greater bear, much uſed for finding the latitude at ſea.

ALLIUM, (from ʼαλεω, to avoid or ſhun, becauſe many ſhun the ſmell of it), Garlic; a genus of the monogynia order belonging to the hexandria claſs of plants. Of this genus no fewer than 33 different ſpecies are enumerated by Linnæus, among which he includes the cepa and porrum; but as theſe are ſo generally known by the names of *onions* and *leeks*, we have given the deſcription of them under theſe words Cepa and Porrum.

The roots of garlic are of the bulbous kind, of an irregularly roundiſh ſhape, with ſeveral fibres at the bottom; each root is compoſed of a number of leſſer bulbs, called *cloves* of garlic, incloſed in one common membranous coat, and eaſily ſeparable from one another. All the parts of this plant, but more eſpecially the roots, have an acrimonious, and almoſt cauſtic taſte, with a ſtrong offenſive ſmell, which laſt has induced thoſe who preſerved ſome of the ſpecies in gardens on account of their yellow flowers, to eradicate them.

Culture. All the ſpecies of Garlick are very hardy, and will thrive in almoſt any ſoil or ſituation. They are eaſily propagated either by the roots or ſeeds. If from the roots, they ought to be planted in autumn, that they may take good root in the ground before the ſpring, which is neceſſary to make them flower ſtrong the following ſummer. If they are propagated by ſeeds, they may be ſown on a border of common earth, either in autumn, ſoon after the ſeeds are ripe, or in the ſpring following; and will require no farther care than to keep them clear from weeds. In the following autumn, they may be tranſplanted into the borders where they are to remain.

Medicinal Uſes. This pungent root warms and ſtimulates the ſolids, and attenuates tenacious juices; for which it is well adapted, on account of its being very penetrating; inſomuch, that, when applied to the feet, its ſcent is ſoon diſcovered in the breath; and, when taken internally, its ſmell is communicated to the urine, or the matter of an iſſue, and perſpires through the pores of the ſkin. Hence, in cold leucophlegmatic habits, it proves a powerful expectorant, diuretic, and emmenagogue; and, if the patient is kept warm, ſudorific. It is alſo of great ſervice in humoral aſthmas and cattarhous diſorders of the breaſt, and in other diſorders proceeding from a laxity of the ſolids, and cold ſluggiſh indiſpoſition of the fluids. It is alſo frequently of ſervice in the dropſy; in the beginning of which it is particularly recommended by Sydenham, as a warm ſtrengthening medicine. By him it is alſo recommended as a moſt powerful revellent; for which purpoſe he was led to make uſe of it in the confluent ſmall-pox. His method was to cut the root in pieces, and apply it, tied in a linnen cloth, to the ſoles of the feet, about the eighth day of the diſeaſe, after the face began to ſwell; renewing it once a-day till the danger was over.—— When made into an unguent with oils, and applied externally, garlic is ſaid to reſolve and diſcuſs cold tumours, and has been by ſome greatly celebrated in cutaneous diſorders.

The acrimonious qualities of this root, however, render it manifeſtly improper on many occaſions.—Its liberal uſe is apt to occaſion headachs, flatulencies, thirſt, febrile heats, inflammatory diſtempers, and ſometimes diſcharges of blood from the hæmorrhoidal veſſels. In hot bilious conſtitutions, where there is already a degree of irritation, where the juices are too thin and acrimonious, or the viſcera unſound, it never fails to aggravate the diſtemper. See Materia Medica, n° 85.

ALLIX (Dr Peter), a learned French proteſtant divine, born at Alencon, in 1641. He became miniſter of the reformed church at Rouen, where he publiſhed many learned and curious pieces; the credit of which induced the reformed to call him to Charenton, about a league from Paris, being the principal church they had in France. On the revocation of the edict of Nantz, he retired to England; where he ſtudied the language with ſo much ſucceſs, as to publiſh a work, intitled *Reflections on the books in the Holy Scriptures, to eſtabliſh the truth of the Chriſtian Religion*, 2 vols; which he dedicated to James II. acknowledging his obligations to that prince, and his kind behaviour to the diſtreſſed refugees in general. He wrote ſeveral other treatiſes relating to eccleſiaſtical hiſtory; which rendered him as famous in England as in France, for his ingenious and ſolid defences of the reformed religion. He was complimented with the degree of D. D. and in 1690 was made treaſurer of the church of Saliſbury. He died in 1717.

ALLOA, or Alloway, a ſea-port town of Mentieth, in Scotland, ſeated on the river Forth, five miles eaſt of Stirling; and remarkable for its fine caſtle, the ſeat of the earl of Mar, and for the coal-mines near it. W. Long. 3. 45. N. Lat. 56. 10.

ALLOBROGES, (Inſcriptions, Livy, Velleius, Florus); from *Allobrox*, (Horace): a people of Gallia Narbonenſis, ſituated between the rivers Iſara and Rhodanus, and the Lacus Lemanus; commended by Cicero for their fidelity, diſcommended by Horace on account of their fondneſs for novelty.

ALLOCATION denotes the admitting or allowing of an article of an account, eſpecially in the exchequer. Hence,

Allocatione *Facienda*, is a writ directed to the lord treaſurer, or barons of the exchequer, commanding them to allow an accountant ſuch ſums as he has lawfully expended in the execution of his office.

ALLODIUM, or Alleud, denotes lands which are the abſolute property of their owner, without being obliged to pay any ſervice or acknowledgment whatever to a ſuperior lord.

ALLOY, or Allay, properly ſignifies a proportion of a baſer metal mixed with a finer one. The alloy of gold is eſtimated by carats, that of ſilver by penny-weights. See Gold, *&c.* In different nations, different proportions of alloy are uſed; whence their moneys are ſaid to be of different degrees of fineneſs or baſeneſs, and are valued accordingly in foreign exchanges.

In a more general ſenſe, the word is employed in chemiſtry to ſignify the union of different metallic matters.—As an infinity of different combinations may be made according to the nature, the number, and the proportions of the metallic matters capable of being alloyed, we ſhall not here enter into the detail of the particular alloys, all which are not yet nearly known. Thoſe which are uſed, as *Bronze*, *Tombac*, *Braſs*, *White Copper*, &c. may be found under their particular names; and what is known concerning other allays may be found under the names of the different metals and ſemi-metals.

ALLUMINOR, a perſon who colours or paints upon paper or parchment.—The word is derived from the French *allumer*, to lighten.

ALLUSION, in rhetoric, a figure by which ſomething is applied to, or underſtood of, another, on account ſome ſimilitude between them.

ALLUVION, in law, denotes the gradual increaſe of land along the ſea-ſhore, or on banks of rivers *.

ALLY, in matters of polity, a ſovereign prince or ſtate that has entered into alliance with others †.

ALMACANTARS. See Almucantars.

ALMACARRON, a ſea-port town of Spain, in the province of Murcia, at the mouth of the river Guadalantin. It is about twenty miles weſt of Carthagena, and is remarkable for the prodigious quantity of alum found in its territory. W. Long. 1. 15. N. Lat. 37. 40.

ALMADE, a town of Spain, in the province of La Mancha, in the kingdom of Caſtile, ſituated upon the top of a mountain, where are the moſt ancient as well as the richeſt ſilver mines in Europe.

ALMADIE, a kind of canoe, or ſmall veſſel, about four fathoms long, commonly made of bark, and uſed by the negroes of Africa.

Almadie is alſo the name of a kind of long-boats, fitted out at Calicut, which are eighty feet in length, and ſix or ſeven in breadth. They are exceedingly ſwift, and are otherwiſe called *cathuri*.

ALMAGEST, in matters of literature, is particularly uſed for a collection or book compoſed by Ptolemy, containing various problems of the ancients both in geometry and aſtronomy.

Almagest is alſo the title of other collections of this kind. Thus, Riccioli has publiſhed a book of aſtronomy, which he calls the *New Almageſt*; and Pluckenet, a book which he calls *Almageſtrum Botanicum*.

ALMAGRA, a fine deep red ochre, with ſome admixture of purple, very heavy, and of a denſe yet friable ſtructure, and rough duſty ſurface. It adheres very firmly to the tongue, melts freely and eaſily in the mouth, is of an auſtere and ſtrongly aſtringent taſte, and ſtains the ſkin in touching. It is the *Sil Atticum* of the ancients: it ferments very violently with acid menſtruums; by which ſingle quality, it is ſufficiently diſtinguiſhed from the *Sil Syricum*, to which it has in many reſpects a great affinity. It is found in immenſe quantities, in many parts of Spain; and in Andaluſia there are in a manner whole mountains of it. It is uſed in painting, and in medicine as an aſtringent.

ALMAGRO, a fortreſs of Spain, the capital of one of the diſtricts of La Mancha. It was built by the archbiſhop Roderic of Toledo, who finiſhed it in 1214, and put a conſiderable garriſon into it to reſtrain the incurſions of the Moors. This was hardly done, when the fortreſs was beſieged by an army of 5000 horſe and foot, under the command of a Mooriſh officer of great reputation; but the prelate, its founder, took care to ſupply thoſe within with ſuch plenty of neceſſaries, that at length the enemy found themſelves obliged to raiſe the ſiege and retire with great loſs.

ALMANACK, a book, or table, containing a calendar of days and months, the riſing and ſetting of the ſun, the age of the moon, the eclipſes of both luminaries, &c.—Authors are divided with regard to the etymology of the word; ſome deriving it from the Arabic particle *al*, and *manach*, to count; ſome from *almanah*, new-years gifts, becauſe the Arabian aſtrologers uſed at the beginning of the year to make preſents of their ephemerides; and others, from the Teutonic *almaen-achte*, obſervations on all the months. Mr Johnſon derives it from the Arabic particle *al*, and the Greek μην, a month. But the moſt ſimple etymology appears from the common ſpelling; the word being compoſed of two Arabic ones, *Al Manack*, which ſignify *the Diary*. All the claſſes of Arabs are commonly much given to the ſtudy of aſtronomy and aſtrology; to both which a paſtoral life, and a ſort of huſbandry, not only incline them, but give them time and leiſure to apply themſelves to them. They neither ſow, reap, plant, travel, buy or ſell, or undertake any expedition or matter, without previouſly conſulting the ſtars, or, in other words, their almanacks, or ſome of the makers of them. From theſe people, by their vicinity to Europe, this art, no leſs uſeful in one ſenſe than ſtupid and ridiculous in another, hath paſſed over hither: and thoſe aſtronomical compoſitions have ſtill every where not only retained their old Arabic name; but were, like theirs, for a long while, and ſtill are among many European nations, interſperſed with a great number of aſtrological rules for planting, ſowing, bleeding, purging, &c. down to the cutting of the hair and paring of the nails.—Regiomontanus appears to have been the firſt in Europe, however, who reduced almanacks into their preſent form and method, gave the characters of each year and month, foretold the eclipſes and other phaſes, calculated the motions of the planets, &c. His firſt almanack was publiſhed in 1474.

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* See Law, Part III. N° clxii. 6.

† See *Alliance*.

Almanacks differ from one another, chiefly, in containing ſome more, others fewer, particulars.

The eſſential part is the calendar of months and days, with the riſings and ſettings of the ſun, age of the moon, &c. To theſe are added various parerga, aſtronomical, meteorological, chronological, political, rural, &c. as calculations and accounts of eclipſes, ſolar ingreſſes, prognoſtics of the weather, tables of the tides, terms, &c. liſts of poſts, offices, dignities, public inſtitutions, with many other articles political as well as local, and differing in different countries.—A great variety are annually publiſhed in Britain; ſome for binding, which may be denominated *book-almanacks*; others in looſe papers, called *ſheet-almanacks*.

The modern almanack anſwers to the *Faſti* of the ancient Romans. See FASTI.

Conſtruction of ALMANACKS. The firſt thing to be done is, to compute the ſun's and moon's place for each day of the year, or it may be taken from ſome ephemerides and entered into the almanack; next, find the dominical letter, and, by means thereof, diſtribute the calendar into weeks; then, having computed the time of eaſter, by it fix the other moveable feaſts; adding the immoveable ones, with the names of the martyrs, the riſing and ſetting of each luminary, the length of day and night, the aſpects of the planets, the phaſes of the moon, and the ſun's entrance into the cardinal points of the ecliptic, *i. e.* the two equinoxes and ſolſtices *. By the help of good aſtronomical tables or ephemerides, the conſtruction of almanacks is extremely eaſy.

ALMANACK, among antiquaries, is alſo the name given to a kind of inſtrument, uſually of wood, inſcribed with various figures and Runic characters, and repreſenting the order of the feaſts, dominical letters, days of the week, and golden number, with other matters neceſſary to be known throughout the year; uſed by the ancient northern nations, in their computations of time, both civil and eccleſiaſtical. Almanacks of this kind are known by various names, among the different nations wherein they have been uſed; as rimſtocks, primſtaries, runſtocks, runſtaffs, *Scipiones Runici*, *Bacculi Annales*, clogs, &c. They appear to have been uſed only by the Swedes, Danes, and Norwegians. From the ſecond of theſe people, their uſe was introduced into England, whence divers remains of them in the counties. Dr Plot has given the deſcription and figure of one of theſe clogs, found in Staffordſhire, under the title of *The perpetual Staffordſhire Almanack*. The external figure and matter of theſe calendars appear to have been various. Sometimes they were cut on one or more wooden leaves, bound together after the manner of books; ſometimes on the ſcabbards of ſwords, or even on daggers; ſometimes on tools and implements, as portable ſteelyards, hammers, the helves of hatchets, flails, &c. Sometimes they were made of braſs or horn; ſometimes of the ſkins of eels, which, being drawn over a ſtick properly inſcribed, retained the impreſſions of it. But the moſt uſual form was that of walking-ſtaves, or ſticks, which they carried about with them to church, market, &c. Each of theſe ſtaves is divided into three regions, whereof the firſt indicates the ſigns, the ſecond the days of the week and year, and the third the golden number. The characters engraven on them are, in ſome, the ancient Runic; in others, the later Gothic characters of Ulfilus. The ſaints days are expreſſed in hieroglyphics, ſignificative either of ſome endowment of the ſaint, the manner of his martyrdom, or the like. Thus, againſt the notch for the firſt of March, or St David's day, is repreſented a harp; againſt the 25th of October, or Criſpin's day, a pair of ſhoes; againſt the 10th of Auguſt, or St Lawrence's day, a gridiron; and, laſtly, againſt New-year's day, a horn, the mark of good drinking, which our anceſtors gave a looſe to at that ſeaſon.

ALMANZA, a little town of New-Caſtile, on the frontiers of the kingdom of Valencia in Spain, ſituated in W. Long. 1. 19. N. Lat. 38. 54. It is remarkable for the defeat of the allies in 1707, under the Marquis de las Minas and the Earl of Galway. In the beginning of this action, the Engliſh troops penetrated thro' the centre of the Spaniſh army; but the Portugueſe cavalry being broken by the Spaniſh, and the French infantry making a dreadful fire on their flanks, the allied army was at laſt broken, and began their retreat when it was almoſt dark. Colonel Hill carried off the remains of thirteen battalions towards the river Xucar, which, if they could have paſſed, they might have been ſafe: but being very much fatigued, they were obliged to halt; by which means they were ſurrounded, and forced to ſurrender priſoners of war. In this battle, the allies loſt 120 ſtandards, together with all their artillery and baggage; a great number were killed, and ſeveral thouſands taken priſoners. The Marquis de las Minas was dangerouſly wounded; and his miſtreſs, in the garb of an amazon, killed by his ſide. The earl of Galway had two cuts croſs the face, which, though not dangerous, had prevented him from ſeeing, or giving orders properly.

HERESY OF ALMARIC, a tenet broached in

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* See TRO- MY, *paſ-*

France by one Almaric, in the year 1209. It conſiſted in affirming, that every Chriſtian was actually a member of Chriſt; and that without this faith no one could be ſaved. His followers went farther, and affirmed, that the power of the Father laſted only during the continuance of the Moſaic law; that the coming of Chriſt introduced a new law; that at the end of this began the reign of the Holy Ghoſt; and that now confeſſion and the ſacraments were at an end, and that every one is to be ſaved by the internal operations of the Holy Spirit alone, without any external act of religion.

ALMEDIA, a frontier-town of Portugal, in the province of Tralos Montes, on the confines of Leon, where there was a very briſk action between the French and Portugueſe in 1663; 17 miles N. W. of Cividad Rodrigo. W. Long. 7. 10. N. Lat. 40. 41.

ALMEHRAB, in the Mahometan cuſtoms, a nich in their moſques, pointing towards the kebla or temple of Mecca, to which they are obliged to bow in praying. See KEBLA.

ALMENE, in commerce, a weight of two pounds uſed to weigh ſaffron in ſeveral parts of the continent of the E. Indies.

ALMERIA, a ſea-port town in the kingdom of Granada in Spain, pleaſantly ſituated in a fine bay at the mouth of the river Almeria, on the Mediterranean: W. Long. 3. 20. N. Lat. 36. 51. This town is by ſome thought to have riſen upon the ruins of the ancient Abdera, and was formerly a place of great conſequence. It was taken from the Moors in 1147, by the emperor Conrad III. in conjunction with the French, Genoeſe, and Piſans.—It was at that time the ſtrongeſt place in Spain, held by the infidels; from which their privateers, which were exceedingly numerous, not only troubled the ſea-coaſts inhabited by the Chriſtians, but gave equal diſturbance to the maritime provinces of France, Italy, and the adjacent iſlands. The city being well fortified, having a ſtrong caſtle, a numerous garriſon, and being excellently provided with every thing neceſſary, made a vigorous reſiſtance; but was at laſt taken by ſtorm, when the victor put to the ſword all the inhabitants who were found in arms, diſtributing the beſt part of the plunder among his allies, whom he ſent away thoroughly ſatisfied. The Genoeſe, particularly, acquired here that emerald veſſel which ſtills remains in their treaſury, and is deemed invaluable.

Upon its reduction by the Chriſtians, Almeria became a biſhopric; but is, at preſent, very little better than a village, indifferently inhabited, and has nothing to teſtify ſo much as the probability of its former greatneſs, except certain circumſtances which cannot be effaced even by the indolence of the Spaniards themſelves. What theſe are, Udal ap Rhys, a Welſhman, thus deſcribes, in his tour through Spain and Portugal. "Its climate," ſays he, "is ſo peculiarly bleſſed, that one really wants words to expreſs its charms and excellence. Its fields and meads are covered with flowers all the year round; they are adorned alſo with palms, myrtles, plane-trees, oranges, and olives; and the mountains and promontories near it are as noted for their producing a great variety of precious ſtones, inſomuch that the next promontory to it is called the *Cape of Gates*, which is a corruption from the word *agates*, the hills thereabouts abounding in that ſort of precious ſtones, as well as in emeralds and amethyſts, granites or coarſe rubies, and extreme curious alabaſter in the mountains of Filaures."

ALMIGGIM-WOOD, (Scripture), is thought to be that of the Indian pine-tree; which being light and white, was greatly eſteemed for making muſical inſtruments.

ALMISSA, a ſmall but ſtrong town at the mouth of the Cetina, in Dalmatia, famous for its piracies; ten miles Eaſt of Spalatro. E. Long. 39. 33. N. Lat. 43. 56.

ALMOND, the fruit of the almond-tree*.

ALMOND, in commerce, a meaſure by which the Portugueſe ſell their oil; 26 almonds make a pipe.

ALMONDS, in anatomy, a name ſometimes given to two glands, generally called the *tonſils*.

ALMOND-*Furnace*, among refiners, that in which the ſlags of litharge, left in refining ſilver, are reduced to lead again, by the help of charcoal.

ALMONDS, among lapidaries, ſignify pieces of rock-cryſtal, uſed in adorning branch-candleſticks, &c. on account of the reſemblance they bear to the fruit of that name.

ALMONDBURY, a village in England, in the weſt-riding of Yorkſhire, ſix miles from Halifax.

ALMONER, in its primitive ſenſe, denotes an officer in religious houſes, to whom belonged the management and diſtribution of the alms of the houſe. By the ancient canons, all monaſteries were to ſpend at leaſt a tenth part of their income in alms to the poor. The almoner of St Paul's is to diſpoſe of the monies left for charity, according to the appointment of the donors, to bury the poor who die in the neighbourhood, and to breed up eight boys to ſinging, for the uſe of the choir. By an ancient canon, all biſhops are required to keep almoners.

Lord ALMONER, or *Lord High* ALMONER, *of England*, is an eccleſiaſtical officer, generally a biſhop, who has the forfeiture of all deodands, and the goods of *ſelos de ſe*, which he is to diſtribute among the poor. He has alſo, by virtue of an ancient cuſtom, the power of giving the firſt diſh from the king's table to whatever poor perſon he pleaſes, or, inſtead of it, an alms in money.

Great ALMONER, *Grand* AUMONIER, in France, is the higheſt dignity in that kingdom. To him belongs the ſuperintendency of all hoſpitals and houſes of lepers. The king receives the ſacrament from his hand; and he ſays maſs before the king, in all grand ceremonies and ſolemnities.

ALMONRY, AUMBRY, AMBRY. See AMBRY.

ALMS, a general term for what is given out of charity to the poor.

In the early ages of Chriſtianity, the alms of the charitable were divided into four parts; one of which was allotted to the biſhop, another to the prieſts, and a third to the deacons and ſub-deacons, which made their whole ſubſiſtence; the fourth part was employed in relieving the poor, and in repairing the churches.

No religious ſyſtem is more frequent or warm in its exhortations to alms-giving, than the Mahometan. The Alcoran repreſents alms as a neceſſary means to make prayer be heard. Hence that ſaying of one of their kalifs: "Prayer carries us half-way to God, faſting brings us to the door of his palace, and alms introduces us into the preſence-chamber." Hence many illuſtrious examples of this virtue among the Mahometans. Haſan, the ſon of Ali, and grandſon of Mohammed, in particular, is related to have thrice in his life divided his ſubſtance equally between himſelf and the poor, and twice to have given away all he had. And the generality are ſo addicted to the doing of good, that they extend their charity even to brutes.

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* See *Amygdalus*.

Alms, alſo denotes lands or other effects left to churches or religious houſes, on condition of praying for the ſoul of the donor. Hence,

Free Alms was that which is liable to no rent or ſervice.

Reaſonable Alms was a certain portion of the eſtates of inteſtate perſons, allotted to the poor.

Alms *Box*, or *Cheſt*, a ſmall cheſt, or coffer, called by the Greeks Κιβατιον, wherein anciently the alms were collected, both at church and at private houſes.

The alms-cheſt, in Engliſh churches, is a ſtrong box, with a hole in the upper part, having three keys, one to be kept by the parſon or curate, the other two by the church-wardens. The erecting of ſuch alms-cheſt in every church is enjoined by the book of canons, as alſo the manner of diſtributing what is thus collected among the poor of the pariſh.

Alms-*Houſe*, a petty kind of hoſpital, for the maintenance of a certain number of poor, aged, or diſabled people.

ALMUCANTARS, in aſtronomy, an Arabic word denoting circles of the ſphere paſſing through the center of the ſun, or a ſtar, parallel to the horizon, being the ſame as Parallels *of Altitude*.

Almucantars-*Staff*, is an inſtrument uſually made of pear-tree or box, having an arch of fifteen degrees; uſed to take obſervations of the ſun, about the time of its riſing and ſetting; in order to find the amplitude, and conſequently the variation of the compaſs.

ALMUCIUM, denotes a kind of cover for the head, worn chiefly by monks and eccleſiaſtics: It was of a ſquare form, and ſeems to have given riſe to the bonnets of the ſame ſhape ſtill retained in univerſities and cathedrals.

ALMUG-TREE, mentioned in Scripture, is ſuppoſed to be the ſame with that which produces the gum arabic.

ALMUNECAR, a ſea-port town in the kingdom of Granada, ſeated on the Mediterranean, with a good harbour, defended by a ſtrong caſtle, twenty miles ſouth of Alhama. W. Long. 3. 45. N. Lat. 36. 50.

ALNAGE, or Aulnage, the meaſuring of woollen manufactures with an ell. It was at firſt intended as a proof of the goodneſs of that commodity, and accordingly a ſeal was invented as a mark that the commodity was made according to the ſtatute; but, it being now poſſible to purchaſe theſe ſeals, they are affixed, whenever the vender pleaſes, to all cloaths indiſcriminately, to the great prejudice of our woollen manufactures.

ALNAGER, a public officer, whoſe duty it is to examine into the aſſize of all woollen cloth, fix ſeals upon the various pieces, and collect the alnage-duty for the king.

ALNUS; a ſpecies of the alder tree. See Betula.

Alnus, in the ancient theatres, that part which was moſt diſtant from the ſtage.

ALNWICK, a thoroughfare town in Northumberland, on the road to Scotland. Here Malcom, king of Scotland, making an inroad into Northumberland, was killed, with Edward his ſon, and his army defeated by Robert Mowbray, earl of this county, *anno* 1092. Likewiſe William, king of Scotland, in 1174, invading England with an army of 80,000 men, was here encountered, his army routed, and himſelf made priſoner. The town is populous, and in general well built; it has a large town-houſe, where the quarter-ſeſſions and county-courts are held, and members of parliament elected. It has a ſpacious ſquare, in which a market is held every Saturday. Alnwick appears to have been formerly fortified, by the veſtiges of a wall ſtill viſible in many parts, and three gates which remain almoſt entire. It is governed by four chamberlains, who are choſen once in two years out of a common council, conſiſting of 24 members. It is ornamented by a ſtately old Gothic caſtle, which has been the ſeat of the noble family of Piercy, earls of Northumberland. As the audits for receipt of rents have ever been in this caſtle, it has always been kept in tolerable repair; and not many years ago, it was repaired and beautified by the earl of Northumberland, who made very conſiderable alterations, upon a moſt elegant plan, with a view to reſide in it ſome part of the ſummer-ſeaſon. The manner of making freemen is peculiar to this place, and indeed is as ridiculous as ſingular. The perſons who are to be made free, or, as the phraſe is, leap the well, aſſemble in the market-place, very early in the morning, on the 25th of April, being St Mark's day. They appear on horſe-back, with every man his ſword by his ſide, dreſſed in white, and with white night-caps, attended by the four chamberlains and the caſtle-bailiff, mounted and armed in the ſame manner; from hence they proceed, with muſic playing before them, to a large dirty pool, called *Freeman's-well*, where they diſmount, and draw up in a body, at ſome diſtance from the water; and then ruſh into it all at once, and ſcramble through the mud as faſt as they can. As the water is generally very foul, they come out in a dirty condition; but taking a dram, they put on dry cloaths, remount their horſes, and ride full gallop round the confines of the diſtrict; then re-enter the town, ſword in hand, and are met by women dreſſed in ribbons with bells and garlands, dancing and ſinging. Theſe are called *timber-waſts*. The houſes of the new freemen are on this day diſtinguiſhed by a great holly-buſh, as a ſignal for their friends to aſſemble and make merry with them after their return. This ceremony is owing to King John, who was mired in this well; and who, as a puniſhment for not mending the road, made this a part of their charter. Alnwick is 310 miles north by weſt from London, 33 north of Newcaſtle, and 29 ſouth of Berwick. Long. 1. 10. Lat. 55. 24.

ALOA, in Grecian antiquity, a feſtival kept in honour of Ceres by the huſbandmen, and ſuppoſed to reſemble our harveſt-home.

ALOE, in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants. Of this genus, botanical writers enumerate 23

Species. 1. The mitriformis, or mitre-ſhaped aloe. The leaves of this cloſely embrace the ſtalks; they are thick, ſucculent, broad at their baſe, growing narrower, and ending in a point; they draw together towards the top, where they ſomewhat reſemble a mitre, from whence the ſpecies takes its name. The flower-ſtem riſes about three feet high; on the top of which the flowers come out in a ſort of globular ſpike, which afterwards becomes cylindrical. They have long footſtalks, which come out horizontally, ſo that the flowers hang downward. They are tubulous, and cut into ſix unequal ſegments to the bottom, three being alternately broader than the others. The tube of the flower is of a fine red colour, and the brim of it a pale green, ſo that they make a fine appearance when the ſpikes of flowers are large. 2. The barbadenſis, common, or Barbadoes aloe. The leaves of this ſort are about four inches broad at their baſe, where they are near two inches thick, and diminiſh gradually to a point, having a few indentures on their edges, and when young are ſpotted with white. The flower-ſtem riſes near three feet high. The flowers ſtand in a ſlender looſe ſpike with very ſhort footſtalks, hanging downwards. They are tubulous, cut into ſix parts, and of a bright yellow colour. 3. The arboreſcens, or ſword-aloe. This grows to the height of 10 or 12 feet, with a ſtrong naked ſtem, the leaves growing at the top, which cloſely embrace the ſtalk; they are about two inches broad at their baſe, growing narrower to a point, and are indented on their edges, each being armed with a ſtrong crooked ſpine. The flowers grow in a pyramidal ſpike, of a bright red colour; and are in beauty in November and December. 4. The africana, or African aloe. This ſpecies reſembles the former; but the leaves are broader, and have ſeveral ſpines on the back ſide towards the extremities, and the flowers grow in a looſer ſpike. 5. The diſticha, by ſome called the *ſoap-aloe*, by others *Carolina-aloe*. This ſeldom riſes above two feet high. The leaves are very broad at the baſe, where they cloſely embrace the ſtalk, and gradually decreaſe to a point. The edges are ſet with ſharp ſpines, and the under leaves ſpread open horizontally every way. Theſe are of a dark green colour ſpotted with white, ſomewhat reſembling the colour of ſoft ſoap, from whence the plant got the name of *ſoap-aloe*. The flowers grow in umbels on the tops of the ſtalks, are of a beautiful red colour, and appear in Auguſt and September. 6. The obſcura, with very broad ſpotted leaves embracing the ſtalk, whoſe edges are ſet with ſpines, and flowers growing in an umbel. This very much reſembles the former; only the leaves are broader, and of a lighter green. The edges and alſo the ſpines are of a copper colour, and the flowers grow in looſe ſpikes. They appear in September. 7. The plicatilis, with ſword-ſhaped ſmooth leaves, grows to the height of ſix or ſeven feet. It has a ſtrong ſtem, towards the upper part of which are produced two, three, or four heads, compoſed of long, compreſſed, pliable leaves, placed two ways, lying over one another, with their edges the ſame way. The flowers are produced in ſhort looſe ſpikes of a red colour, and appear at different times of the year. 8. The brevioribus, with leaves embracing the ſtalks, which are prickly on every ſide. This is an humble plant, ſeldom riſing more than a foot high. The leaves grow near the ground, are broad at the baſe, where they embrace the ſtalk, and gradually diminiſh to a point. Their edges, and alſo their upper parts, are beſet with pretty ſharp ſpines. The flowers grow in looſe ſpikes, the tubulous part being red, and the brim of a light green colour. 9. The variegata, or partridge-breaſt aloe, is a low plant, ſeldom riſing above eight inches high. The leaves of this are triangular, and curiouſly veined and ſpotted, ſomewhat like the feathers of a patridge's breaſt. The flowers grow in very looſe ſpikes, and are of a fine red colour tipped with green. 10. The hedge-hog aloe is a very low plant, never riſing to have ſtalks. The leaves are beſet on their edges and both ſurfaces, with ſoft ſpines, very cloſely; from whence its name. The flowers grow on a looſe head; and are of a fine red colour below, but of a pale green above. 11. The viſcoſa, with funnel-ſhaped flowers, grows near a foot high, with triangular leaves of a dark green colour. The flowers grow thinly upon very ſlender footſtalks, are of an herbaceous colour, and their upper part turns backward. 12. The ſpiralis, with oval crenated flowers, grows ſomewhat like the former; only the flowers grow upon taller ſtalks, which branch out and grow in very long cloſe ſpikes. 13. The linguiforme, or tongue-aloe, has its leaves about ſix inches in length, and ſhaped like a tongue. The flowers grow in ſlender looſe ſpikes, each hanging downward, of a red colour below, and green at the top. 14. The margaritifera, or large pearl aloe, is a very beautiful plant. It is ſmaller than moſt of the aloe kind. The leaves are ſhort, very thick, ſharp pointed, and turning down, with a large thick end, appear there triangular. The colour of the leaves is a fine green, ſtripped in an elegant manner with white, and frequently tipped with red at the point. The flower-ſtalk, which riſes in the midſt of the leaves, is round, ſmooth, of a purple colour, and generally about eight inches high. When the plant has been properly cultivated, the flowers are ſtripped with green and white; and ſometimes they are entirely white. This aloe is ſingular in not having the bitter reſinous juice with which the leaves of moſt others abound; when a leaf of this ſpecies is cut, what runs from it is watery, colourleſs, and perfectly inſipid *. 15. The vera, or ſocotorine aloe, hath long, narrow, ſucculent leaves, which come out without any order, and form large heads. The ſtalks grow three or four feet high; and have two, three, and ſometimes four, of theſe heads branching out from it. The flowers grow in long ſpikes, each ſtanding on a pretty long footſtalk; they are of a bright red colour tipped with green, and generally appear in the winter ſeaſon. 16. The glauca, with a ſhort ſtalk, and flowers growing in a head. This reſembles the eighth in ſome particulars; but the leaves are much broader, and ſpread wide on every ſide, whereas thoſe of the eighth are ranged only two ways, and are narrow. The brevioribus alſo flowers but ſeldom, whereas the glauca flowers annually in the ſpring. 17. The arachnoidea, or cobweb-aloe, never riſes from the ground, but the leaves ſpread flat on the ſurface. The flower-ſtalk riſes about a foot high, is very ſlender, and hath three or four ſmall herbaceous flowers ſtanding at a diſtance from each other. Theſe are tubulous, and, at the brim, cut into ſix parts which turn backward. 18. The herbacea, with oval leaves, is alſo a ſmall plant growing near the ground. The leaves are almoſt cylin-

* Plate X. fig. 1.

drical toward their baſe, but angular near their ends, and are ſet with ſhort ſoft ſpines at the angles. Theſe leaves are ſhorter, and of a darker green colour, than thoſe of the former ſort. 19. The retuſa, or cuſhion-aloe, hath very ſhort, thick, ſucculent leaves, compreſſed on the upper ſide like a cuſhion. This grows very cloſe to the ground; the flowers grow on ſlender ſtalks, and are of an herbaceous colour. 20. The verrucoſa, or pearl-tongue-aloe, hath long, narrow, tongue-ſhaped leaves, which are hollowed on their upper ſide, but keel-ſhaped below. They are cloſely ſtudded on every ſide, with ſmall white protuberances; from whence the plant hath had the name of *pearl-tongue-aloe*. The flowers grow on pretty tall ſtalks, and form looſe ſpikes, each hanging downward. They are of a beautiful red colour, tipped with green. 21. The carinata, or low aloe, with fleſhy, keel-ſhaped, ſpotted leaves. This hath ſome reſemblance to the laſt, but the leaves are much broader and thicker; the flowers alſo are of a paler colour, and the ſpikes ſhorter. 22. The ferox, with dark green leaves, beſet with ſpines on every ſide. This ſpecies grows to the height of eight or ten feet, with a ſtrong ſtem. The leaves grow on the top, and cloſely embrace the ſtalk. They come out irregularly, and ſpread every way. They are near four inches broad at the baſe; and diminiſh gradually to the top, where they end in a ſpine. This ſort hath not as yet flowered in Britain. 23. The uvaria, with reflexed flowers, lying over each other like tiles on a houſe. This ſpecies hath very long, narrow, triangular leaves, ſhaped like thoſe of the bulruſh. The flowers are produced in cloſe thick ſpikes, upon ſtalks near three feet high. They are of an orange colour, having ſix yellow ſtamina, which come out beyond the tube of the flower; ſo that when the plants are ſtrong, and produce large ſpikes, they make a fine appearance. The flowers appear in Auguſt and September. There is a variety of this ſpecies with narrower leaves, and longer ſpikes of flowers.

Culture. The proper earth for planting theſe vegetables in, is, one half freſh light earth from a common, and the reſt an equal mixture of white ſea-ſand and ſifted lime-rubbiſh. This mixture ſhould be always made ſix or eight months before the plants are to be ſet in it. The common aloe will live in a dry green-houſe in winter; and may be placed in the open air in ſummer, in a ſheltered ſituation, but muſt have very little water. Moſt of the other aloes are beſt preſerved in an airy glaſs-caſe, in which there is a ſtove, to make a little fire in very bad weather. The tendereſt kinds require a greater ſhare of heat to preſerve them in winter, and ſhould be kept in a good ſtove, in a degree of heat ten degrees above temperate. Many other kinds may alſo be kept in this heat; but the greater the heat, the more water they always require. About the beginning of June, it is uſual in England to ſet the pots of aloes out of the houſe: but they ſhould be ſet under the ſhelter of hedges, or trees, to keep them from the violence of the ſun; the rains alſo, which uſually fall in this and the following month, are apt to rot them. It is therefore beſt to keep them under cover the greateſt part of the year. The beſt time to ſhift theſe plants is the middle of July. They are, on this occaſion, to be taken out of the pots, the looſe earth to be picked from about their roots, and the decayed or mouldy parts of them cut off; then a few ſtones are to be put at the bottom of the pot, and it is to be filled with the compoſition before deſcribed, and the plants carefully put in, the roots being ſo diſpoſed as not to interfere with one another. They are to be carefully watered after this, at times, for three weeks, and ſet in a ſhady place. The common kind will bear the open air from May to October, and ſhould be ſhifted every year. All the aloes are propagated by off-ſets, or by planting the leaves. The off-ſets ſhould be taken from the mother plant, at the time when it is ſhifted: they are to be planted in very ſmall pots of the proper mixed earth; and if that part of them which joined to the mother-plant be obſerved to be moiſt when taken off, it ſhould lie on the ground in a ſhady place two or three days before it is planted, otherwiſe it will rot. After planting theſe, they ſhould remain in a ſhady place a fortnight; and then be removed to a very moderate hot-bed, plunging the pots therein, which will help their ſtriking new roots. Towards the end of Auguſt they muſt be, by degrees, hardened to the open air, by taking off the glaſſes of the hot-bed; and in September they may be removed into the green-houſe.

ALOES, in medicine, the inſpiſſated juice of ſome of the abovementioned ſpecies. The ancients diſtinguiſhed two ſorts of aloes: the one was pure and of a yellowiſh colour, inclining to red, reſembling the colour of a liver, and thence named *hepatic*; the other was full of impurities, and hence ſuppoſed to be only the droſs of the better kind. At preſent, various ſorts are met with in the ſhops; which are diſtinguiſhed either from the places, from the ſpecies of the plants, or from ſome differences in the juices themſelves. Theſe may be all ranged in three claſſes:

1. ALOE *Socotorina*, ſocotorine aloes, brought from the iſland Socotora in the Indian ocean, wrapt in ſkins; it is obtained from the 15th ſpecies abovementioned.—This ſort is the pureſt of the three: it is of a gloſſy ſurface, clear, and in ſome degree pellucid; in the lump, of a yellowiſh red colour, with a purple caſt; when reduced to powder, of a bright golden colour. It is hard and friable in the winter, ſomewhat pliable in ſummer, and grows ſoft betwixt the fingers. Its taſte is bitter, accompanied with an aromatic flavour, but inſufficient to prevent its being diſagreeable: the ſmell is not very unpleaſant, and ſomewhat reſembles that of myrrh.

2. ALOE *Hepatica*, hepatic, Barbadoes, or common aloes, (the juice of the ſecond ſpecies), is not ſo clear and bright as the foregoing ſort; it is alſo of a darker colour, more compact texture, and for the moſt part drier. Its ſmell is much ſtronger and more diſagreeable; the taſte intenſely bitter and nauſeous, with little or nothing of the fine aromatic flavour of the Socotorine.—The beſt hepatic aloes come from Barbadoes in large gourd ſhells; an inferior ſort of it (which is generally ſoft and clammy) is brought over in caſks.

3. ALOE *Caballina*, fetid, caballine, or horſe aloes, (the produce of an African aloe,) is eaſily diſtinguiſhed from both the foregoing, by its ſtrong rank ſmell; although, in other reſpects, it agrees pretty much with the hepatic, and is not unfrequently ſold in its ſtead. Sometimes the caballine aloes is prepared ſo pure and bright, as not to be diſtinguiſhable by the eye even

from the Socotorine; but its offenſive ſmell, which it cannot be diveſted of, readily betrays it.

Aloes is a ſtimulating cathartic bitter: if given in ſo large a doſe as to purge effectually, it often occaſions an irritation about the anus, and ſometimes a diſcharge of blood. Small doſes of it frequently repeated, not only cleanſe the *primæ viæ*, but likewiſe attenuate and diſſolve viſcid juices in the remoter parts, warm the habit, quicken the circulation, and promote the uterine and hæmorrhoidal fluxes. This medicine is particularly ſerviceable to perſons of a phlegmatic temperament and ſedentary life, and where the ſtomach is oppreſſed and weakened: in dry bilious habits, aloes prove injurious, immoderately heating the blood, and inflaming the bowels.

This juice is likewiſe, on account of its bitterneſs, ſuppoſed to kill worms, either taken internally, or applied in plaſters to the umbilical region. It is alſo celebrated for reſtraining external hæmorrhages, and cleanſing and healing wounds and ulcers.

Socotorine aloes contains more gummy matter than the hepatic; and hence it is likewiſe found to purge more, and with greater irritation. The firſt ſort therefore is moſt proper where a ſtimulus is required, as for promoting or exciting the menſtrual flux; whilſt the latter is better calculated to act as a common purge.

ALOGIANS, in church-hiſtory, a ſect of ancient heretics, who denied that Jeſus Chriſt was the Logos, and conſequently rejected the goſpel of St John.

ALOGOTROPHIA, among phyſicians, a term ſignifying the unequal growth or nouriſhment of any part of the body, as in the rickets.

ALOOF, has frequently been mentioned as a ſea-term; but whether juſtly or not, we ſhall not preſume to determine. It is known in common diſcourſe to imply *at a diſtance;* and the reſemblance of the phraſes *keep a loof*, and *keep a luff*, or *keep the luff*, in all probability gave riſe to this conjecture. If it was really a ſea-phraſe originally, it ſeems to have referred to the dangers of a lee-ſhore, in which ſituation the pilot might naturally apply it in the ſenſe commonly underſtood, *viz.* keep *all of*, or quite off: it is, however, never expreſſed in that manner by ſeamen now*. It may not be improper to obſerve, that beſides uſing this phraſe in the ſame ſenſe with us, the French alſo call the weather-ſide of a ſhip, and the weather-clue of a courſe, *le lof*.

ALOPECIA, in medicine, ſignifies a falling off of the hair, occaſioned either by want of nouriſhment, or by a bad ſtate of the humours. It is alſo uſed by Galen for a change in the colour of the hair.—See MEDICINE, nº 853.

ALOPECURUS, or FOX-TAIL GRASS, in botany, a genus of the triandria digynia claſs. There are ſeven ſpecies, *viz.* the pratenſis, or meadow fox-tail graſs; the bulboſus, or bulbous fox-tail graſs; the geniculatus, or flote fox-tail graſs; and the myoſuroides, or field fox-tail graſs; theſe four grow wild in Britain: the agreſtis, the monſpelienſis, the paniceus, and the hordeiformis, are all natives of France and the ſouthern parts of Europe, except the laſt, which is a native of India*.

ALOSA, the ſhad, or mother of herrings, a ſpecies of the clupea. See CLUPEA.

ALOST, a town in Flanders, belonging to the houſe of Auſtria, ſeated on the river Dender, in the midway between Bruſſels and Ghent. It has but one pariſh; but the church is collegiate, and has a provoſt, a dean, and twelve canons. Here is a convent of Carmelites, another of capuchins, another of bare-footed Carmelites, three nunneries, an hoſpital, and a convent of Guillemins, in which is the tomb of Theodore Martin, who brought the art of printing out of Germany into the Low Countries. He was a friend of Eraſmus, who wrote his epitaph. E. Long. 4. 10. N. Lat. 49. 55.

ALPHA, the name of the firſt letter of the Greek alphabet, anſwering to our A.—As a numeral, it ſtands for one, or the firſt of any thing. It is particularly uſed, among ancient writers, to denote the chief or firſt man of his claſs or rank. In this ſenſe, the word ſtands contradiſtinguiſhed from *beta*, which denotes the ſecond perſon. Plato was called the *Alpha* of the wits: Eratoſthenes, keeper of the Alexandrian library, whom ſome called a Second Plato, is frequently named *Beta*.

ALPHA is alſo uſed to denote the beginning of any thing. In which ſenſe it ſtands oppoſed to *omega*, which denotes the end. And theſe two letters were made the ſymbol of Chriſtianity; and accordingly were engraven on the tombs of the ancient Chriſtians, to diſtinguiſh them from thoſe of idolaters. Moralez, a Spaniſh writer, imagined that this cuſtom only commenced ſince the riſe of Arianiſm; and that it was peculiar to the orthodox, who hereby made confeſſion of the eternity of Chriſt: but there are tombs prior to the age of Conſtantine whereon the two letters were found, beſides that the emperor juſt mentioned bore them on his labarum before Arius appeared.

ALPHABET, the natural or cuſtomary ſeries of the ſeveral letters of a language*. The word is formed from *alpha* and *beta*, the firſt and ſecond letters of Greek alphabet. The number of letters is different in the alphabets of different languages. The Engliſh alphabet contains 24 letters; to which if we add *j* and *v* conſonant, the ſum will be 26: the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic 28; the Perſian 31; the Turkiſh 33; the Georgian 36; the Coptic 32; the Muſcovite 43; the Greek 24; the Latin 22; the Sclavonic 27; the Dutch 26; the Spaniſh 27; the Italian 20; the Ethiopic and Tartarian, each 202; the Indians of Bengal 21; the Barameſe 19. The Chineſe have, properly ſpeaking, no alphabet, except we call their whole language by that name; their letters are words, or rather hieroglyphics, amounting to about 80,000.

ALPHEUS, (Strabo); ALPHEIUS, (Ptolemy); a noted and large river of the Peleponneſus; which, riſing in, and after ſeveral windings running through, Arcadia, and by Olympia in Elis, with a ſouth-weſt courſe, pours into the Sinus Chelonites, about ten miles to the ſouth of Olympia. It has a common ſpring with the Eurotas, at the foot of mount Parthenius, near the village Aſea, (Strabo.) The Alpheus and Eurotas mix and run together for 20 ſtadia; after which, they enter a ſubterraneous paſſage at Mantinea; then again emerge, the Eurotas in Laconica, and the Alpheus in the territory of Megalopolis, (Pauſanias.) The poets fable ſtrange things of this river; particularly, that, out of love to the nymph *Arethuſa*, it runs under the ſea to Sicily, and burſts out at the fountain of that name in Syracuſe, (Virgil). Its waters were reckoned good in the leproſy, which is called Αλφος by the Greeks; and hence the

* See *Luff*.

* See the article *Graſs*.

* See *La- guage, an Writing.*

the name *Alpheus*.—Pauſanias adds, that the Eleans had a law, which condemned any woman to death that ſhould either appear at the Olympic games, or even croſs this river during that ſolemnity: and the Eleans add, that the only woman who tranſgreſſed it, had diſguiſed herſelf in the habit of a maſter or keeper of theſe games, and conducted her ſon thither; but when ſhe ſaw him come off victorious, her joy made her forget her diſguiſe, ſo that her ſex was diſcovered. She was pardoned, but from that time a law was made that the keepers ſhould appear there naked.

ALPHONSIN, in ſurgery, an inſtrument for extracting bullets out of gun-ſhot wounds. This inſtrument derives its name from the inventor Alphonſus Ferrier, a phyſician of Naples. It conſiſts of three branches, which are cloſed by a ring. When cloſed and introduced into the wound, the operator draws back the ring towards the handle, upon which the branches opening take hold of the ball; and then the ring is puſhed from the haft, by which means the branches graſp the ball ſo firmly, as to extract it from the wound.

ALPHONSUS X. king of Leon and Caſtile, ſurnamed the Wiſe, was author of the aſtronomical tables called *Alphonſine*. Reading of Quintus Curtius gave him ſuch delight, that it recovered him out of a dangerous illneſs. He read the Bible fourteen times, with ſeveral comments on it. He is ſaid to have found fault with the ſtructure of the mundane ſyſtem, and has been charged with impiety on that ſcore; but unjuſtly, for he only found fault with the involved ſyſtem of ſome aſtronomers. He was dethroned by his ſon Sancho; and died of grief, A. D. 1284.

ALPINI (Proſpero), a famous phyſician and botaniſt, born in the Venetian territory, in 1553. He travelled in Egypt to acquire a knowledge of exotic plants, and was the firſt who explained the fructification and generation of plants; by the ſexual ſyſtem. Upon his return to Venice, in 1586, Andrea Doria, prince of Melfi, appointed him his phyſician: and he diſtinguiſhed himſelf ſo much in this capacity, that he was eſteemed the firſt phyſician of his age. The republic of Venice began to be uneaſy, that a ſubject of theirs, of ſo great merit as Alpini, ſhould continue at Genoa, when he might be of ſo much ſervice and honour to their ſtate: they therefore recalled him in 1593, to fill the profeſſorſhip of botany at Padua; and he had a ſalary of 200 florins, which was afterwards raiſed to 750. He diſcharged this office with great reputation; but his health became very precarious, having been much broke by the voyages he had made. According to the regiſter of the univerſity of Padua, he died the 5th of February 1617, in the 64th year of his age; and was buried the day after, without any funeral pomp, in the church of St Anthony.—Alpini wrote the following works in Latin: 1. Of the phyſic of the Egyptians, in four books. Printed at Venice, 1591, in 4to. 2. A treatiſe concerning the plants of Egypt. Printed at Venice, 1592, in 4to. 3. A dialogue concerning balſams. Printed at Venice, 1592, in 4to. 4. Seven books concerning the method of forming a judgment of the life or death of patients. Printed at Venice, 1691, in 4to. 5. Thirteen Books concerning methodical Phyſic. Padua, 1611, folio; Leyden, 1719, in 4to. 6. A Diſputation held in the ſchool at Padua, concerning the Raphonticum. Padua, 1612, and 1629, 4to. 7. Of exotic plants, in two books. Venice, 1699, in 4to. He left ſeveral other works, which have never been printed; particularly, 8. The fifth book concerning the phyſic of the Egyptians. 9. Five books concerning the natural hiſtory of things obſerved in Egypt, adorned with a variety of draughts of plants, ſtones, and animals.

ALPINIA, in botany, a genus of the monogynia order, belonging to the monandria claſs of plants. Of this genus there is but one ſpecies, which is a native of the Weſt Indies, where it grows naturally in moiſt places. The leaves decay every winter, and are puſhed out from the roots in the ſpring, like the ginger and maranta; ſo muſt be managed in the ſame manner as directed for theſe two plants, and may be propagated by parting the roots when the leaves decay.

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Aloes is a ſtimulating cathartic bitter: if given in ſo large a doſe as to purge effectually, it often occaſions an irritation about the anus, and ſometimes a diſcharge of blood. Small doſes of it frequently repeated, not only cleanſe the *primæ viæ*, but likewiſe attenuate and diſſolve viſcid juices in the remoter parts, warm the habit, quicken the circulation, and promote the uterine and hæmorrhoidal fluxes. This medicine is particularly ſerviceable to perſons of a phlegmatic temperament and ſedentary life, and where the ſtomach is oppreſſed and weakened: in dry bilious habits, aloes prove injurious, immoderately heating the blood, and inflaming the bowels.

This juice is likewiſe, on account of its bitterneſs, ſuppoſed to kill worms, either taken internally, or applied in plaſters to the umbilical region. It is alſo celebrated for reſtraining external hæmorrhages, and cleanſing and healing wounds and ulcers.

Socotorine aloes contains more gummy matter than the hepatic; and hence it is likewiſe found to purge more, and with greater irritation. The firſt ſort therefore is moſt proper where a ſtimulus is required, as for promoting or exciting the menſtrual flux; whilſt the latter is better calculated to act as a common purge.

ALOGIANS, in church-hiſtory, a ſect of ancient heretics, who denied that Jeſus Chriſt was the Logos, and conſequently rejected the goſpel of St John.

ALOGOTROPHIA, among phyſicians, a term ſignifying the unequal growth or nouriſhment of any part of the body, as in the rickets.

ALOOF, has frequently been mentioned as a ſea-term; but whether juſtly or not, we ſhall not preſume to determine. It is known in common diſcourſe to imply *at a diſtance;* and the reſemblance of the phraſes *keep a loof*, and *keep a luff*, or *keep the luff*, in all probability gave riſe to this conjecture. If it was really a ſea-phraſe originally, it ſeems to have referred to the dangers of a lee-ſhore, in which ſituation the pilot might naturally apply it in the ſenſe commonly underſtood, *viz.* keep *all of*, or quite off: it is, however, never expreſſed in that manner by ſeamen now*. It may not be improper to obſerve, that beſides uſing this phraſe in the ſame ſenſe with us, the French alſo call the weather-ſide of a ſhip, and the weather-clue of a courſe, *le lof*.

* See *Luff*.

ALOPECIA, in medicine, ſignifies a falling off of the hair, occaſioned either by want of nouriſhment, or by a bad ſtate of the humours. It is alſo uſed by Galen for a change in the colour of the hair.—See MEDICINE, nº 853.

ALOPECURUS, or FOX-TAIL GRASS, in botany, a genus of the triandria digynia claſs. There are ſeven ſpecies, *viz.* the pratenſis, or meadow fox-tail graſs; the bulboſus, or bulbous fox-tail graſs; the geniculatus, or flote fox-tail graſs; and the myoſuroides, or field fox-tail graſs; theſe four grow wild in Britain: the agreſtis, the monſpelienſis, the paniceus, and the hordeiformis, are all natives of France and the ſouthern parts of Europe, except the laſt, which is a native of India*.

* See the article *Graſs*.

ALOSA, the ſhad, or mother of herrings, a ſpecies of the clupea. See CLUPEA.

ALOST, a town in Flanders, belonging to the houſe of Auſtria, ſeated on the river Dender, in the midway between Bruſſels and Ghent. It has but one pariſh; but the church is collegiate, and has a provoſt, a dean, and twelve canons. Here is a convent of Carmelites, another of capuchins, another of bare-footed Carmelites, three nunneries, an hoſpital, and a convent of Guillemins, in which is the tomb of Theodore Martin, who brought the art of printing out of Germany into the Low Countries. He was a friend of Eraſmus, who wrote his epitaph. E. Long. 4. 10. N. Lat. 49. 55.

ALPHA, the name of the firſt letter of the Greek alphabet, anſwering to our A.—As a numeral, it ſtands for one, or the firſt of any thing. It is particularly uſed, among ancient writers, to denote the chief or firſt man of his claſs or rank. In this ſenſe, the word ſtands contradiſtinguiſhed from *beta*, which denotes the ſecond perſon. Plato was called the *Alpha* of the wits: Eratoſthenes, keeper of the Alexandrian library, whom ſome called a Second Plato, is frequently named *Beta*.

ALPHA is alſo uſed to denote the beginning of any thing. In which ſenſe it ſtands oppoſed to *omega*, which denotes the end. And theſe two letters were made the ſymbol of Chriſtianity; and accordingly were engraven on the tombs of the ancient Chriſtians, to diſtinguiſh them from thoſe of idolaters. Moralez, a Spaniſh writer, imagined that this cuſtom only commenced ſince the riſe of Arianiſm; and that it was peculiar to the orthodox, who hereby made confeſſion of the eternity of Chriſt: but there are tombs prior to the age of Conſtantine whereon the two letters were found, beſides that the emperor juſt mentioned bore them on his labarum before Arius appeared.

ALPHABET, the natural or cuſtomary ſeries of the ſeveral letters of a language *. The word is formed from *alpha* and *beta*, the firſt and ſecond letters of Greek alphabet. The number of letters is different in the alphabets of different languages. The Engliſh alphabet contains 24 letters; to which if we add *j* and *v* conſonant, the ſum will be 26: the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic 28; the Perſian 31; the Turkiſh 33; the Georgian 36; the Coptic 32; the Muſcovite 43; the Greek 24; the Latin 22; the Sclavonic 27; the Dutch 26; the Spaniſh 27; the Italian 20; the Ethiopic and Tartarian, each 202; the Indians of Bengal 21; the Barameſe 19. The Chineſe have, properly ſpeaking, no alphabet, except we call their whole language by that name; their letters are words, or rather hieroglyphics, amounting to about 80,000.

* See La
guage, a
Writing.

ALPHEUS, (Strabo); ALPHEIUS, (Ptolemy); a noted and large river of the Peleponneſus; which, riſing in, and after ſeveral windings running through, Arcadia, and by Olympia in Elis, with a ſouth-weſt courſe, pours into the Sinus Chelonites, about ten miles to the ſouth of Olympia. It has a common ſpring with the Eurotas, at the foot of mount Parthenius, near the village Aſea, (Strabo.) The Alpheus and Eurotas mix and run together for 20 ſtadia; after which, they enter a ſubterraneous paſſage at Mantinea; then again emerge, the Eurotas in Laconica, and the Alpheus in the territory of Megalopolis, (Pauſanias.) The poets fable ſtrange things of this river; particularly, that, out of love to the nymph *Arethuſa*, it runs under the ſea to Sicily, and burſts out at the fountain of that name in Syracuſe, (Virgil). Its waters were reckoned good in the leproſy, which is called Αλφος by the Greeks; and hence

Alphonſin || Alpini.

the name *Alpheus*.—Pauſanias adds, that the Eleans had a law, which condemned any woman to death that ſhould either appear at the Olympic games, or even croſs this river during that ſolemnity: and the Eleans add, that the only woman who tranſgreſſed it, had diſguiſed herſelf in the habit of a maſter or keeper of theſe games, and conducted her ſon thither; but when ſhe ſaw him come off victorious, her joy made her forget her diſguiſe, ſo that her ſex was diſcovered. She was pardoned, but from that time a law was made that the keepers ſhould appear there naked.

ALPHONSIN, in ſurgery, an inſtrument for extracting bullets out of gun-ſhot wounds. This inſtrument derives its name from the inventor Alphonſus Ferrier, a phyſician of Naples. It conſiſts of three branches, which are cloſed by a ring. When cloſed and introduced into the wound, the operator draws back the ring towards the handle, upon which the branches opening take hold of the ball; and then the ring is puſhed from the haft, by which means the branches graſp the ball ſo firmly, as to extract it from the wound.

ALPHONSUS X. king of Leon and Caſtile, ſurnamed the Wiſe, was author of the aſtronomical tables called *Alphonſine*. Reading of Quintus Curtius gave him ſuch delight, that it recovered him out of a dangerous illneſs. He read the Bible fourteen times, with ſeveral comments on it. He is ſaid to have found fault with the ſtructure of the mundane ſyſtem, and has been charged with impiety on that ſcore; but unjuſtly, for he only found fault with the involved ſyſtem of ſome aſtronomers. He was dethroned by his ſon Sancho; and died of grief, A. D. 1284.

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ALPUXARRAS, or ALPAXARES, mountains of Spain, in the province of Granada, on the coaſt of the Mediterranean ſea. They are about 17 leagues in length, and 11 in breadth, reaching from the city of Velez to Almeria. They are inhabited by Moors, who are the remains of the diſperſion and ruin of their empire. They embraced the Chriſtian religion; but preſerve their own manner of living, and their language, though much corrupted. Here is a rivulet between Pitros and Portugos, which dyes linen that is dipt in it black in an inſtant. Near this rivulet is a cavern, from which proceeds ſo malignant a ſteam, that it deſtroys ſuch animals as come near it. The Moriſcos cultivate the ſoil extremely well, and plant-fruit trees; ſome of which grow to a prodigious height and thickneſs, and give the mountains a very agreeable aſpect.

ALQUIER, a liquid meaſure, uſed in Portugal to meaſure oil, two of which make an almond *.

ALQUIFOU, or ARQUIFOU, is a ſort of lead-ore, which, when broken, looks like antimony. It is uſed by the potters to give a green varniſh to their works, and thence is called potter's ore. It is met with in Cornwall, &c. The potters mix a ſmall portion of manganeze with the alquifou, and then the varniſh or glazing on their ware is of a blackiſh hue.

ALREDUS, ALURED, or ALFREDUS, of Beverley, one of the moſt ancient and beſt Engliſh hiſtorians. He wrote in the reign of Henry I. There are no circumſtances of his life known with any degree of certainty. It is generally believed that he was educated at Cambridge, and that he afterwards became one of the canons and treaſurer of St John's at Beverley. And we learn in a note of biſhop Tanner's, that, for the ſake of improvement, he travelled thro' France and Italy; and that at Rome he became domeſtic chaplain to cardinal Othoboni. He died in the year 1128, or 1129; leaving behind him the following works: 1. *The Annals of Alured of Beverley*. Oxford, 1726. Publiſhed by Mr Hearne, from a manuſcript belonging to Thomas Rawlinſon, Eſq. It contains an abridgement of our hiſtory from Brutus to Henry I. written in good Latin, and with great accuracy. 2. *Libertates eccleſiæ S. Johannis de Beverlac*, &c. a manuſcript in the Cotton Library. It is a collection of records relative to the church at Beverley, tranſlated by our author from the Saxon language. The Biographia Britannica evidently proves theſe to be all that were written by Alredus.

ALRESFORD, a town of Hampſhire, ſeated on the road from London to Southampton, cloſe by the river Itching, which feeds a great pond to the left of the town. Part of a Roman highway runs from hence to Alton. It is a rectory, with the mediety of Old Alresford, of 49*l.* 12*s.* 8*d.* in the king's books. It conſiſts of about 200 houſes; has one church; two principal ſtreets, which are large and broad; and a ſmall manufacture of linſeys.

ALSA, a river of Carniola, (Pliny;) now the *Auſa;* running by Aquileia, with a ſhort courſe from north to ſouth, into the Adriatic; where Conſtantine, the ſon of Conſtantine the Great, fighting againſt Conſtans his brother, loſt his life.

ALSACE, a province of France, bounded on the eaſt by the Rhine, on the ſouth by Swiſſerland, on the weſt by Lorrain, and on the north by the palatinate of the Rhine. It was formerly a part of Germany, but was given to France by the treaty of Munſter. It is one of the moſt fruitful and plentiful provinces of Europe, abounding in corn, wine, wood, flax, tobacco, pulſe, fruits, &c. The mountains which divide it from Lorrain are very high; and generally covered with fir, beech, oak, and horn-beam. Thoſe on the ſide of Swiſſerland are leſs high; and furniſhed with all ſorts of wood, as well for fuel as building. The country itſelf is diverſified with riſing hills and fertile vales, beſides large foreſts; but that between the rivers Ill, Hart, and the Rhine, as far as Straſburgh, is inferior to the reſt, on account of the frequent overflowing of the Rhine. In High Alſace, there are mines of ſilver, copper, and lead. They however work none but thoſe of Giromany, from which are annually drawn 1600 marks of ſilver, each mark being eight ounces; and 24000 pounds of copper: but the expence of working them is almoſt equal to the profit. There are iron-works in ſeveral parts of Alſace, and particularly at Betford. There is a mineral ſpring at Sultſbach, near Munſter, in High Alſace; which is in great reputation for the palſy, weakneſs of the nerves, and the gravel.—The original inhabitants of Alſace are honeſt and good-natured, but wedded to their own manners and cuſtoms. The fruitfulneſs of their country renders them indolent and inactive; for the Swiſs make their hay and reap their corn, as well as manage the vintage of High Alſace, which ſends a great deal of money out of the province. The common language is the German: however, the better ſort of people ſpeak French in the towns; and even in the country, they ſpeak French well enough to be underſtood.

ALSEN, an iſland of Denmark in the leſſer Belt, or entrance into the Baltic ſea, between Sleſwick and Funen. It is remarkable for nothing except two caſtles, and producing large crops of aniſeeds, a carminative much uſed in ſeaſoning the food and mixing with the bread all over the Daniſh dominions. E. Long. 10. 12. N. Lat. 55. 12.

ALSFIELD, a town of Germany, in the landgravate of Heſſe Caſſel, ten miles north-weſt of Marpurg, and thirty-five ſouth of Heſſe Caſſel. It is an ancient town, and well-built; and the inhabitants were the firſt of this country who embraced the Reformation. E. Long. 9. 5. N. Lat. 50. 40.

ALSHASH, a very beautiful city in Bukharia, ſuppoſed to be the ſame with that which is now called *Taſhcant*, the capital of the eaſtern part of Turkeſtan, poſſeſſed by the Kaſſats. It is ſituated on the river *Sihûn*, now *Sir*, and had a well watered garden for every houſe; but was ruined by Jenghiz Khan, who took the city, and cauſed a great number of its inhabitants to be maſſacred.

ALSHEDA, a pariſh of Sweden, in the province of Smaland, where a gold mine was diſcovered in 1738.

ALSINA, in botany, a ſynonime of the theligonum. See THELIGONUM.

ALSINASTRUM, in botany, the trivial name and alſo

* See Almond.

3 MA 53

Plate X.

Fig. 1.

ALOE floribus ſeſſilibus bilabiatis
or PEARL ALOE

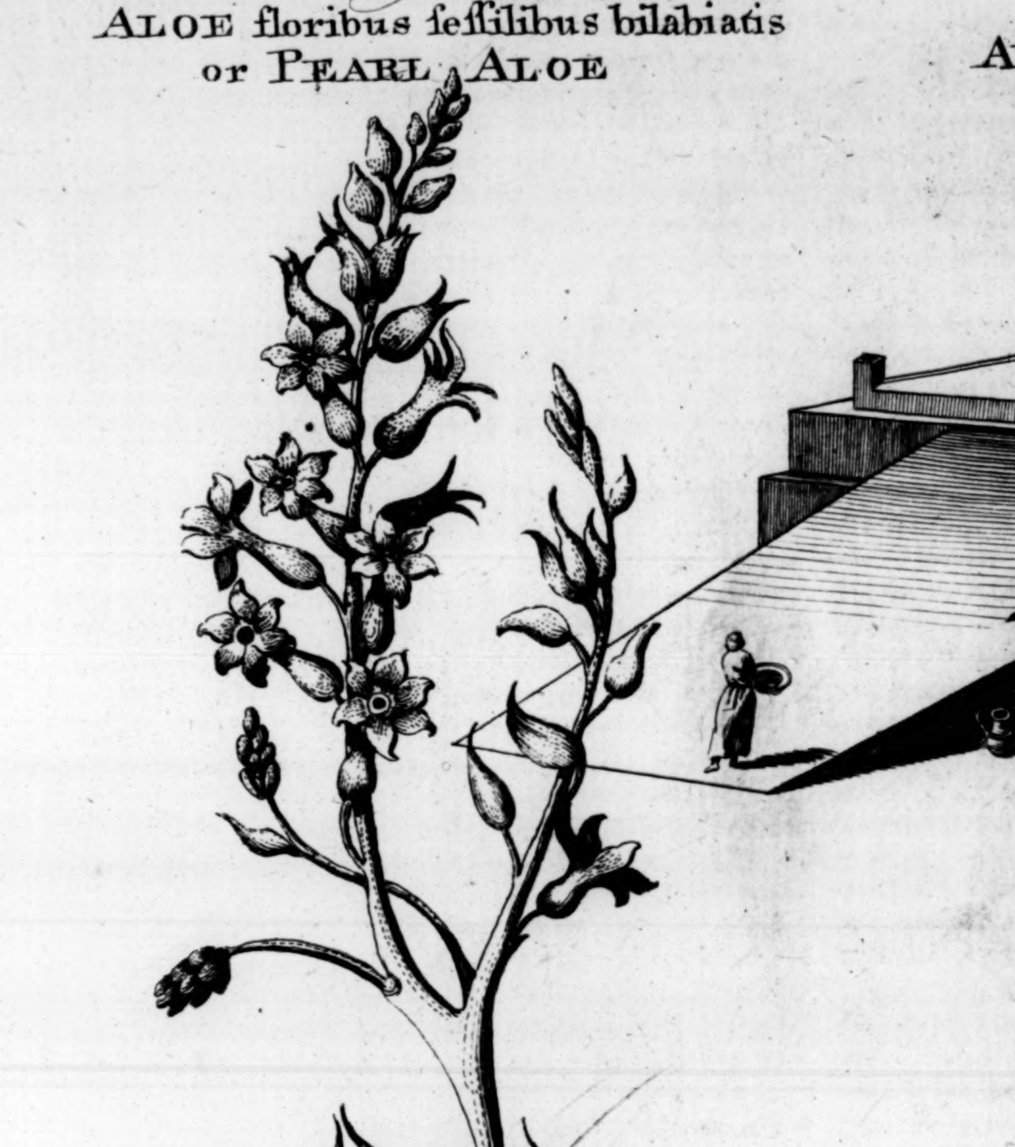


Fig. 2.

ALTAR of Burnt Offering

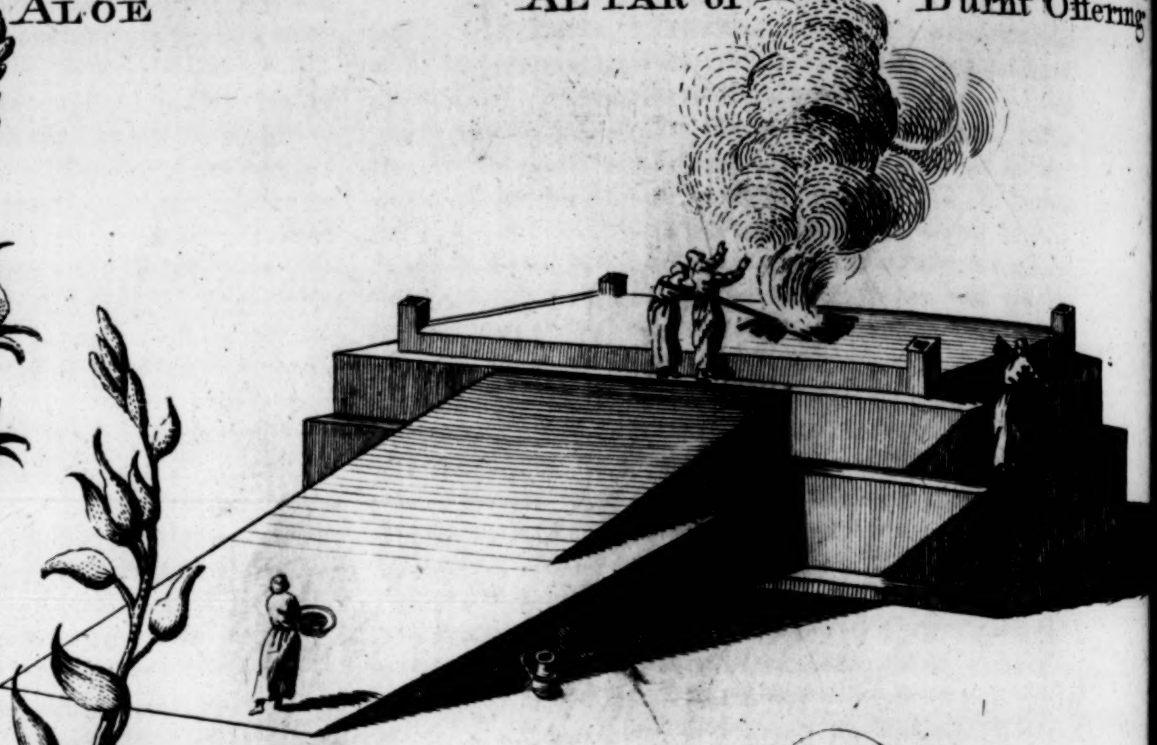
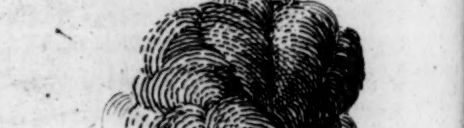


Fig. 3.

ALTAR of Incenſe



A. Bell Sculp

alſo a ſynonime of the elatine. See **Elatine.**

ALSINE, Chickweed; a genus of the trigynia order, belonging to the pentandria claſs of plants. Of this genus a great number of ſpecies are enumerated by ſome botanical writers; but none of them poſſeſs any remarkable properties, except the media, or common chickweed, with white bloſſoms, which is ſo well known as to need no particular deſcription.—This ſpecies affords a notable inſtance of what is called the *ſleep of plants*: for, every night, the leaves approach in pairs, ſo as to include within their upper ſurfaces the tender rudiments of the new ſhoots; and the uppermoſt pair but one at the end of the ſtalk are furniſhed with longer leaf-ſtalks than the others; ſo that they can cloſe upon the terminating pair, and protect the end of the branch. The young ſhoots and leaves, when boiled, can hardly be diſtinguiſhed from ſpring ſpinach, and are equally wholeſome.—Swine are extremely fond of chickweed; cows and horſes eat it; ſheep are indifferent to it; and goats refuſe it.

ALSIRAT, in the Mahometan theology, denotes a bridge laid over the middle of hell, the paſſage or path whereof is ſharper than the edge of a ſword; over which every body muſt paſs at the day of judgement, when the wicked will tumble headlong into hell, whereas the good will fly over it like the wind.

ALSIUM, a city of ancient Etruria, occupying (according to Cluverius) the ſpot on which *Pala* now ſtands. We are told by Dionyſius Halicarnaſſenſis, that Alſium was built by the Aborigines, long before the Tyrſenians invaded Italy. In this caſe it muſt have been founded not long after the diſperſion in the days of Peleg. Its founder is ſaid to have been one *Alæſus*, *Aleſus*, or *Aliſa*; whom ſome conjecture to have been Aliſah, or Eliſha, the ſon of Javan, mentioned in Scripture.

ALSTEDIUS (John-Henry), a German Proteſtant divine, and one of the moſt indefatigable writers of the 17th century. He was ſome time profeſſor of philoſophy and divinity at Herborn in the county of Naſſau: from thence he went into Tranſylvania, to be profeſſor at Alba Julia; where he continued till his death, which happened in 1638, being then 50 years of age. His Encyclopædia has been much eſteemed even by the Roman-catholics; it was printed at Lyons, and ſold very well throughout all France. His *Theſaurius Chronologicus* is by ſome eſteemed one of his beſt works, and has gone through ſeveral editions. He alſo wrote *Triumphus Biblicus*, to ſhow that the principles of all arts and ſciences are to be found in the Scriptures; but he gained very few to his opinion. He was a Millenarian; and publiſhed, in 1627, a treatiſe *De mille annis*, in which he aſſerted that the reign of the ſaints on earth was to begin in 1694.

ALSTON-MORE, a town in Cumberland, ſeated on a hill, at the bottom of which runs the river Tyne, with a ſtone bridge over it. Near this place is plenty of lead ore. W. Long. 2. 4. N. Lat. 54. 45.

ALT, in muſic, a term applied to the high notes in the ſcale.

ALTAMONT, a very handſome town of Italy, in the kingdom of Naples, and in Calabria Citerior, 15 miles north-weſt of Baſigniano. E. Long. 16. 22. N. Lat. 39. 40.

ALTAMURA, a town of Naples, in the territory of Bari, with the title of a principality, ſeated on the foot of the Apennine mountains. E. Long. 16. 54. N. Lat. 41. 0.

ALTAR, a place upon which ſacrifices were anciently offered to ſome deity.

The heathens at firſt made their altars only of turf; afterwards they were made of ſtone, of marble, of wood, and even of horn, as that of Apollo in Delos.

Altars differed in figure as well as in materials. Some were round, others ſquare, and others oval. All of them were turned towards the eaſt, and ſtood lower than the ſtatues of the gods; and were generally adorned with ſculpture, inſcriptions, and the leaves and flowers of the particular tree conſecrated to the deity. Thus, the altars of Jupiter were decked with oak, thoſe of Apollo with laurel, thoſe of Venus with myrtle, and thoſe of Minerva with olive.

The height of altars alſo differed according to the different gods to whom they ſacrificed. Thoſe of the celeſtial gods were raiſed to a great height above the ground; thoſe appointed for the terreſtrial, were almoſt on a level with the ſurface of the earth. On the contrary, they dug a hole for the altars of the infernal gods.

Before temples were in uſe, altars were erected ſometimes in groves, ſometimes in the highways, and ſometimes on the tops of mountains; and it was a cuſtom to engrave upon them the name, enſign, or character, of the deity to whom they were conſecrated.

In the great temples of ancient Rome, there were ordinarily three altars: The firſt was placed in the ſanctuary, at the foot of the ſtatue of the divinity, upon which incenſe was burnt and libations offered; the ſecond was before the gate of the temple, and upon it they ſacrificed the victims; and the third was a portable altar, upon which were placed the offering and the ſacred veſſels.

Beſides theſe uſes of altars, the ancients ſwore upon them, and ſwore by them, in making alliances, confirming treaties of peace, and other ſolemn occaſions. Altars alſo ſerved as places of refuge to all thoſe who fled to them, whatever crime they had committed.

Among the Jews, altars in the patriarchal times were very rude. The altar which Jacob ſet up at Beth-el was nothing but a ſtone, which ſerved him inſtead of a bolſter; that of Gideon, a ſtone before his houſe: and the firſt which God commanded Moſes to erect was probably of earth, or unpoliſhed ſtones, without any iron; for if any uſe was made of that metal, the altar was declared impure.

The principal altars of the Jews were, The altar of *incenſe*; that of *burnt-offering*; and the *altar*, or *table*, *for the ſhew-bread*.

The *altar of incenſe* was a ſmall table of ſhittim-wood, covered with plates of gold, of one cubit in length, another in width, and two in height. At the four corners, were four kinds of horns, and all round a little border or crown over it. This was the altar hidden by Jeremiah before the captivity; and upon it the officiating prieſt offered, every morning and evening, incenſe of a particular compoſition. See Plate X. fig. 3.

The *altar of burnt-offerings* was made of Shittim-wood, and carried upon the ſhoulders of the prieſts by ſtaves of the ſame wood overlaid with braſs. In the time of Moſes, this altar was five cubits ſquare, and three high; but in Solomon's temple it was much larger, being twenty cubits ſquare, and ten in height. It was covered with braſs; and at each corner was a horn or ſpire, wrought out of the ſame wood with the altar to which the ſacrifices were tied. Within the hollow was a grate of braſs, on which the fire was made; through it fell the aſhes, and were received in a pan below. At the four corners of the grate were four rings and four chains, which kept it up at the horns. This altar was placed in the open air, that the ſmoke of the burnt-offerings might not ſully the inſide of the tabernacle. See Plate X. fig. 2.

The *altar*, or *table*, for the *ſhew-bread*, was likewiſe of ſhittim-wood, covered with plates of gold, having a little border round it, adorned with ſculpture. It was two cubits long, one wide, and one and an half in height. Upon this table, which ſtood in the holy of holies, were put, every ſabbath-day, twelve loaves, with ſalt and incenſe.

The Jewiſh altars, after their return from the captivity, and the building of the ſecond temple, were in ſome reſpects different from thoſe deſcribed above. That of burnt-offerings was a large pile, built of unhewn ſtone, thirty-two cubits ſquare at the bottom, and twenty-four ſquare at the top. The aſcent was by a gentle riſing, thirty-two cubits in length, and ſixteen in breadth.

Altar, is alſo uſed among Chriſtians for the communion-table.

ALTAR-thane, or Altariſt, in old law-books, an appellation given to the prieſt or parſon of a pariſh, to whom the altarage belonged. See Altarage.

ALTARAGE, in law, altars erected in virtue of donations, before the Reformation, within a parochial church, for the purpoſe of ſinging of maſs for deceaſed friends.

Altarage likewiſe ſignifies the profits ariſing to the prieſt on account of the altar.

AL-TAYEF, a town of Hejaz, a diſtrict of Arabia Felix. It is ſituated about 60 miles eaſt of Mecca, behind mount Gazwan, where the cold is more intenſe than in any other part of the diſtrict, but the air very wholeſome. Its territory abounds in fountains, and produces excellent raiſins. The town is ſurrounded with a wall, but is not very large.

ALTDORF, a large handſome town in Swiſſerland, and the chief of the canton of Uri. It is ſituated below the lake of the four cantons, in a plain, at the foot of a mountain, whoſe paſſages are difficult, and ſerve inſtead of fortifications. It has four churches and two convents; St Martin's church and that of the Holy Croſs are the fineſt. The town-houſe and the arſenal are alſo worth ſeeing. E. long. 8. 30. N. lat. 46. 50.

ALTEA, a ſea-port town of Valencia, in Spain. It was taken in 1705, in favour of the archduke Charles; but loſt, after the battle of Almanza. W. long. 0. 15. N. lat. 46. 34.

ALTEMBURG, a town of Tranſylvania, 17 miles S. W. of Wiſemburg, and 35 S. of Clauſenbourg. E. long. 23. 5. N. lat. 46. 25.

ALTENA, a ſea-port town of Germany, in the duchy of Holſtein, in Lower Saxony. It is a modern town, built by the king of Denmark, and was burnt by the Swedes in 1712; but has ſince been beautifully re-built. The merchandiſe brought from Aſia, by the Daniſh Eaſt-India company, is ſold here. E. long. 10. 0. N. lat. 53. 51.

ALTENBERG, an ancient town of Germany, ſituated on the river Pleiſs, with a good caſtle placed on a rock, in Miſnia, in the circle of the Upper Saxony. It was formerly an imperial city, but at preſent belongs to the houſe of Saxony. Here is a college which has always been in a flouriſhing condition. In 1705, there was a nunnery founded for women of a high rank, who are Proteſtants. E. Long. 15. 8. N. Lat. 50. 59.

ALTENBURG, a ſmall fortified town of Hungary, in the territory of Moſon, near the Danube, about 55 miles from Vienna. E. long. 35. 30. N. lat. 48. 15.

Altenburg, or Owar, a ſmall but ſtrong town of Hungary, ſeated in a marſh, with wide ſtreets. It is near the river Danube, and is ſurrounded with deep ditches. It is 15 miles ſouth of Preſburg, 40 ſouth-eaſt of Vienna, and 65 ſouth-weſt of Buda. E. long. 17. 56. N. lat. 44. 0.

ALTERANTS, or Alterative *Medicines*, ſuch as correct the bad qualities of the blood and other humours, without occaſioning any ſenſible evacuation *.

ALTERATION, in a general ſenſe, denotes ſome variation in the qualities or circumſtances of a thing, without wholly changing its nature.

Alteration, in muſic, the diſtance of any interval increaſed or diminiſhed, which of conſequence muſt ſharpen or flatten the chords which theſe altered intervals compoſe.

ALTERN-BASE, in trigonometry, a term uſed in contradiſtinction to the true baſe. Thus in oblique triangles, the true baſe is either the ſum of the ſides, and then the *difference* of the ſides is called the altern-baſe; or the true baſe is the difference of the ſides, and then the *ſum* of the ſides is called the altern-baſe.

ALTERNATE, in a general ſenſe, a term applied to ſuch perſons or things as ſucceed each other by turns. Thus, two who command each his day, are ſaid to have an alternate command, or to command alternately.

Alternate, in heraldry, is ſaid in reſpect of the ſituation of the quarters. Thus the firſt and fourth quarters, and the ſecond and third, are uſually of the ſame nature, and are called alternate quarters.

Alternate, in botany, when the leaves or branches of plants ariſe higher on oppoſite ſides alternately.

ALTHÆA, Marshmallow; a genus of the polyandria order, belonging to the monodelphia claſs of plants. There are three

Species. 1. The vulgaris, or common marſhmallow, is a native of Britain, and hath a perennial root, and an annual ſtalk, which periſhes every autumn. The ſtalks grow erect to the height of four or five feet. Theſe are garniſhed with leaves which are hoary, ſoft to the touch, and placed alternately on the branches. The flowers come out from under the wings of the leaves, like the mallow, and are of a purpliſh white. 2. The hirſuta, or hairy marſhmallow, is a native of Spain and Portugal. It is a low plant, whoſe branches trail on the ground, unleſs they are ſupported by ſtakes. The leaves and ſtalks are beſet with ſtrong hairs, the flowers come out like thoſe of the common ſort, but are ſmaller, and have purpliſh bottoms. 3. The cannabina, or

* See *Me*- *cine*, n° 31 &c.

ſhrubby marſhmallow, is a native of Hungary and Iſtria. It has a woody ſtem, which riſes to the height of four or five feet; and puts out many ſide-branches. The flowers come out in the ſame manner as in the others, but are of a deeper red colour. This ſort ſeldom flowers the firſt year, unleſs the ſummer proves warm; but, when the plants live thro' the winter, they will flower early in the following ſummer, and produce good ſeeds.

Culture. Though the firſt ſort is found naturally in ſalt marſhes, it will thrive when tranſplanted into any ſoil, or in any ſituation; however, it will always grow larger in moiſt than in dry ſoil. It may be propagated either by parting the roots in autumn when the ſtalks decay, or by ſowing the ſeeds in the ſpring. If the ſeeds of the ſecond ſpecies are ſown in April, the plants will flower in July, and carry ripe ſeed in September. They ought to be ſown in the places where they are to remain, as the roots ſhoot deep into the ground; ſo that, unleſs the plants are removed very young, they ſeldom ſurvive it. The ſeeds of the cannabina ought alſo to be ſown where the plants are to remain, for the reaſon juſt now given. They ſhould have a ſheltered ſituation and a dry ſoil, otherwiſe they will not live through the winter. Indeed they ſeldom continue in this country above two years, with all the care that can be taken of them.

Medicinal Uſes. The firſt is the only ſpecies uſed in medicine. The whole plant, eſpecially the root, abounds with a mild mucilage. It has the general virtues of an emollient medicine; and proves ſerviceable in a thin acrimonious ſtate of the juices, and where the natural mucus of the inteſtines is abraded. It is chiefly recommended in ſharp defluxions upon the lungs, hoarſeneſs, dyſenteries; and likewiſe in nephritic and calculous complaints: not, as ſome have ſuppoſed, that this medicine has any peculiar power of diſſolving or expelling the calculus; but as, by lubricating and relaxing the veſſels, it procures a more free and eaſy paſſage. The root is ſometimes employed externally for ſoftening and maturating hard tumours; chewed, it is ſaid to give eaſe in difficult dentition of children *.

* See *Mate- Medica*, 90.

Althæa *Frutex*. See Hibiscus and Lavatera.

ALTIMETRY, the art of meaſuring altitudes or heights, whether acceſſible or inacceſſible *.

* See *Alti-*

ALTIN, a lake in Siberia, from whence iſſues the river Ob, or Oby, in N. lat. 52. 0. E. long. 85° 55'. This lake is called by the Ruſſians *Teloſkoi Oſero*, from the Teleſſi, a Tartarian nation, who inhabit the borders of it, and who give it the name of *Altin-Kul*. By the Calmucks it is called *Altinnor*. It is near ninety miles long and 50 broad, with a rocky bottom. The north part of it is ſometimes frozen ſo hard as to be paſſable on foot, but the ſouthern part is never covered with ice. The water in the Altin lake, as well as in the rivers which run through the adjacent places, only riſes in the middle of ſummer, when the ſnows on the mountains are melted by the heat of the ſun.

ALTING (Henry), profeſſor of divinity at Heidelberg and Groningen, born at Embden, Feb. 17. 1583, of a family which had been long conſpicuous in Friſeland. His father, Menſo Alting, was the firſt, who, with two others, preached the reformation in the territory of Groningen, about the year 1566, under the tyrannical government of the duke of Alva; and the firſt that preached in the great church of Groningen, after the reduction of that town by the States General in 1594. Henry was choſen, in 1605, preceptor to the three young counts of Naſſau, Solms, and Izenberg. After various difficulties, he ſettled at Groningen, where he continued till his death, Auguſt 25. 1644. He was a ſound proteſtant divine, a pious Chriſtian, a uſeful member of ſociety in many reſpects, and one who ſuffered much for the truth. Moſt of his works were never publiſhed; thoſe which have been, are the following: *Notæ in decadem problematum J. Behm*, 1618. *Loci communes explicatio catecheſeos Palatinæ*, 1646, in 3 vols. *Exegeſis Auguſtanæ confeſ.* 1647. *Methodus theologiæ*, 1650. It appears from the catalogue of his works annexed to his life, that the *Medulla hiſt. prophanæ*, publiſhed by D. Pareus, was compoſed by Alting. The moſt remarkable piece among Alting's MSS. is The eccleſiaſtical hiſtory of the Palatinate, from the reformation to the adminiſtration of John Caſimir.

Alting (James), ſon of the former, was born at Heidelberg, September 27. 1618. He travelled into England in 1640, where he was ordained by the learned Dr Prideaux, biſhop of Worceſter. He afterwards accepted of the profeſſorſhip of Groningen, vacant by the death of Gomarus; but his ſituation was rendered very diſagreeable by the continual diſputes which he had with his colleague Sam. des Marets, who favoured the ſchool-divinity. He made a pious exit, Auguſt 20, 1679, recommending the edition of his works to Menſo Alting (author of *Notitia German. Infer. Antiquæ*, fol. Amſt. 1697); but they were publiſhed in 5 vols folio, with his life, by Mr Bekker of Amſterdam. They contain various analytical, exegetical, practical, problematical, and philoſophical tracts, which ſhew his great induſtry and knowledge. Alting was a divine greatly addicted to the text of the ſcripture, to Cocceianiſm, and Rabbiniſm. He preached well in German, Dutch, and Engliſh.

ALTITUDE, acceſſible, and inacceſſible. See Geometry, Part II. chap. i.

The method of taking conſiderable terreſtrial altitudes, of which thoſe of mountains are the greateſt, by means of the barometer, is very eaſy and expeditious. It is done by obſerving, on the top of the mountain, how much the mercury has fallen below what it was at the foot of the mountain. See Barometer.

ALTKIRK, a town of Alſace in Germany, ſituated on the river Ill, in N. lat. 47. 40. and E. lon. 7. 15.

ALTMORE, a town of Ireland, in the county of Tyrone, and province of Ulſter, ſituated in N. lat. 54. 34, and W. long. 7. 2.

ALTON, a town in Hampſhire, ſeated on the river Wey; W. long. 0. 46. N. lat. 51. 5. It is governed by a conſtable; and conſiſts of about 250 houſes, indifferently built, chiefly laid out in one pretty broad ſtreet, a part of which only is paved. It has one church, a Preſbyterian, and a Quaker's meeting, a famous free-ſchool, a large manufacture of plain and figured baragons, ribbed druggets, and ſerge de Niſmes; and round the town is a large plantation of hops.

Alton, or Avelton, a village in Staffordſhire, five miles north of Utoxeter. There are the ruins of a caſtle here, which ſome would have to be built before the Norman conqueſt; but Dr Plot is pretty certain that it was erected by Theobald de Verdun, in the beginning of the reign of Edward II. A great part of the walls are ſtill ſtanding, but they are in a very ruinous condition.

ALTO-RELIEVO. See Relievo.

ALTO-RIPIENO, in muſic, the tenor of the great chorus which ſings and plays only now and then in ſome particular places.

ALTORF, a town of the circle of Franconia, in Germany. It has a phyſic-garden, with 2000 different plants; a theatre for diſſections, which has many curioſities in the anatomical way; and a handſome library. It is ſubject to the houſe of Brandenburg; and is ſeated on the confines of Bavaria, 15 miles from Nuremberg. E. lon. 9. 35. N. lat. 47. 46.

ALT-RANSTADT, a town in Saxony, famous for the treaty between Charles XII. king of Sweden, and Auguſtus elector of Saxony, in 1706, wherein the latter reſigned the kingdom of Poland.

ALTRINGHAM, a town of Cheſhire in England, upon the borders of Lancaſhire, ſeven miles from Mancheſter. W. long. 1. 30. N. lat. 53. 25.

ALTZEG, a town of Germany in the Lower Palatinate, the capital of a territory of the ſame name, with an old caſtle. W. long. 7. 25. N. lat. 49. 44.

ALVA de Tormes, a conſiderable town in Spain, in the kingdom of Leon, and territory of Salamanca, with a very handſome caſtle. It is ſeated on the north bank of the river Tormes. W. long. 6. 1. N. lat. 41. 0.

ALVARISTS, in eccleſiaſtical hiſtory, a branch of the Thomiſts, ſo called from Alvares their leader, who aſſerted the doctrine of ſufficient grace, inſtead of the efficacious grace of the ancient Thomiſts. The Alvariſts come near to the Jeſuits, the ancient Thomiſts to the Janſeniſts.

ALUDELS, in chemiſtry, are earthern pots without bottoms, inſerted into each other, and uſed in ſublimations. See Chemistry, n° 80.

ALVEOLUS, in natural hiſtory, the name of the waxen cells in bee-hives *. Alſo the name of a ſea-foſſil of a conic figure, compoſed of a number of cells, like bee-hives, joined into each other, with a pipe of communication.

* See *Apis*.

Alveolus, in anatomy, the ſockets in the jaws wherein the teeth are fixed †.—Some writers ſpeak of teeth growing without alveoli. Pliny mentions a perſon who had a tooth in his palate. Euſtachius relates, that he ſaw a man who at 60 had a tooth growing out of the middle of his fauces. Holler gives an inſtance of a perſon, whoſe teeth were of a piece with his jaws, without any inſertion into alveoli.

† See *Anatomy*, n° 19, 25.

ALUM, or Alumen, in natural hiſtory, a peculiar kind of ſalt, ſometimes found pure, but oftener ſeparated from ſeveral ſubſtances; as, a ſoft reddiſh ſtone in Italy; ſeveral kinds of earth; and, in England, from a whitiſh or bluiſh ſtone, called Iriſh ſlate *.—In medicine, it is a powerful aſtringent †. In dyeing, it fixes the colours upon the ſtuffs. See Dyeing.

* See *Chemiſtry*, n° 129.
† See *Materia Medica*, n° 91.

ALUNTIUM, Alontium, (anc. geogr.) a town in the north of Sicily, ſituated on a ſteep eminence, at the mouth of the Chydas, (Ptolemy, Pliny, Cicero;) ſaid to be as old as the war of Troy, (Dionyſ. Halicar.) Now in ruins; from which aroſe the hamlet *St Filadelfo*, in the Val di Demona. The inhabitants were called *Haluntini*, (Cicero.)

ALVUS, in anatomy, a term uſed for the belly in general, but more frequently applied to the bowels.

ALWAIDII, a ſect of Mahometans who believe all great crimes to be unpardonable.—The Alwadii ſtand in oppoſition to the Morgii. They attribute leſs efficacy to the true belief in the ſalvation of men, than the reſt of the Muſſelmans.

ALYSSUM, Allyson, or Allysoides, Madwort; (from αλυσσω, to be mad; becauſe it was believed to have the property of curing madneſs): a genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants.

Species. Of this genus, Linnæus enumerates 19 ſpecies; but none of them are remarkable either for beauty, or any other property, except the halimifolium, or madwort with whole ſpear-ſhaped leaves. This ſpreads itſelf upon the ground, and never riſes to any height. It produces, at the extremity of its branches, very pretty tufts of ſmall white flowers; of which it is ſeldom deſtitute for ſix or ſeven months ſucceſſively; for which reaſon it well deſerves a place in the gardens of the curious.

Culture. Though theſe plants are natives of the ſouthern parts of Europe; yet, if planted on a dry, lean, or rubbiſhy ſoil, they will endure our ſevereſt winters in the open air.—The halimifolium ſeldom continues above two or three years, and muſt therefore be often ſown to preſerve it; or if the ſeeds are ſuffered to fall, the plants will riſe without any trouble. It may alſo be propagated by cuttings, which ought to be planted in April or May, and are very apt to take root, if kept ſhaded in the heat of the day, and gently refreſhed with water.

This plant, as already obſerved, was thought to cure ſome kinds of madneſs; but the preſent practice has entirely rejected it for this or any other purpoſe.

ALYTARCHA, a prieſt of Antioch in Syria, who, in the games inſtituted in honour of the gods, preſided over the officers who carried rods to clear away the crowd and keep order.

In the Olympic games, the alytarches had the ſame command, and obliged every perſon to preſerve order and decency.

ALZIRA, a town of Spain, in the kingdom of Valencia, ſeated on the river Xucar, E. Long. 0. 20. N. Lat. 39. 10.

AMABYR, a barbarous cuſtom which formerly prevailed in ſeveral parts of England and Wales, being a ſum of money paid to the lord, when a maid was married within his lordſhip. The word is old Britiſh, and ſignifies "the price of virginity."

AMADABAT, a corruption from Ahmed abad, or *Ahmed's city*, (ſo called from a king of that name); a large and populous city of Indoſtan, and the capital of the province of Guzerat. It is ſituated in E. Long. 72. 12. N. Lat. 23. 0. Amadabat was formerly called *Guzerat;* and by Shah Jehân nicknamed *Gherd-abâd*, or the habitation of duſt, becauſe it was much incommoded therewith. It was the ſeat of the Guzerat kings, as it is now of the Mogul governor. The city ſtands in a beautiful plain; and is watered by the little river Sabremetti, which, though not deep, in time of rains overflows the plains prodigiouſly. The walls are built with ſtone and brick, flanked at certain diſtances with great round towers and battlements. It has twelve gates; and, including the ſuburbs, is about four miles and an half long. The ſtreets are wide. The *meydân ſhâh*, or king's ſquare, is 700 paces long, and 400 broad, planted round with trees. On the weſt ſide is the caſtle, well walled with free ſtone, and as ſpacious as a little city; but its inward appearance is not conformable to its external magnificence. The caravanſera is on the ſouth of the ſquare, and its chief ornament. Near the meydan alſo is the king's palace, whoſe apartments are richly ornamented: and in the midſt of the city is the Engliſh factory, where they purchaſe fine chints, callicoes, and other Indian merchandize. The place is ſo full of gardens ſtored with fruit-trees, that from an eminence it looks like a wood. The Hindoos have here an hoſpital for ſick beaſts, and another for ſick birds, which they take great care of. According to ſome late accounts, this city is little inferior to the beſt in Europe, and is thought to yield ten times as much revenue as Surat.

AMADAN, or HAMADAN, a town of Perſia, between Tauris and Iſpahan, E. Long. 47. 4. N. Lat. 35. 15. It is ſeated at the foot of a mountain, where there are a great many ſprings, which water the adjacent country. The extent of the city is very large; but there are a great many waſte ſpots within it, as well as cultivated land. The houſes are built of brick hardened in the ſun, and have but a very indifferent aſpect. There is but one tolerable ſtreet; and that is where ſtuffs, garments, and the like, are expoſed to ſale: it is ſtraight, long, and wide; and the ſhops are very well furniſhed. The adjacent parts are fruitful in corn and rice, inſomuch that the neighbouring provinces are ſupplied from hence. It is ſaid to enjoy a very ſalubrious air, but the cold in winter is intenſe. The Armenians have a church in this town, but it is a very ill-contrived ſtructure. The Jews have a ſynagogue near a tomb where they pretend Eſther and Mordecai lie interred. To this place they come in pilgrimage from ſeveral parts of the Levant. About a league from Amadan, there is a mountain called *Nalbana*, which abounds with all ſorts of curious herbs. In the ſpring, people flock to this mountain from all parts to recover their health, by ſucking in the ſalutary effluvia with their breath.

Amadan is a very ancient city. It is ſaid to have been deſtroyed by Nebuchadnezzar, and rebuilt by Darius, who brought hither all his riches. The kings of Perſia frequently retired to this place on account of its delightful ſituation; for which reaſon it obtained the name of the *Royal city*. It was conquered by the khalif Othman, and narrowly eſcaped being deſtroyed by Jenghiz Khan in 1220. It had then ſtrong walls and a good caſtle, which are now in ruins. Its preſent beauty conſiſts in its gardens and ſprings.

AMADANAGER, a town in the hither peninſula of India, in the province of Decan. E. Long. 74. 15. N. Lat. 18. 10.—It was taken by the Moguls in 1598, after a ſiege of ſix months; being at that time defended by a ſtrong caſtle, ſituated on an eminence, and ſurrounded with deep ditches, into which ſeveral ſprings diſcharged their waters.

AMADIA, a trading town of Aſia, in Curdiſtan, belonging to the Turks; ſeated on a high mountain. E. Long. 43. 1. N. Lat. 36. 25.

AMADMAGDA, an Abyſſinian plant, ſaid to be uſed by the inhabitants of that country for facilitating the conſolidation of fractures, and the diſcharge of bony ſplinters from wounds.

AMAIN, in the ſea-language, a term importing to lower ſomething at once. Thus, to *ſtrike amain*, is to lower, or let fall, the top-ſails; to *wave amain* is to make a ſignal, by waving a drawn ſword, or the like, as a demand that the enemy ſtrike their top-ſails.

AMAK, a ſmall iſland in the Baltic ſea, near Copenhagen, from which it is ſeparated by a canal, over which there is a draw-bridge. There is a good citadel, which they call *Chriſtian-Haven*. It is remarkable for a village of Dutch, who are deſcended from a colony that ſettled there to make butter and cheeſe for the court. They retain their own language, manner of dreſs, and other cuſtoms. E. Long. 12. 10. N. Lat. 55. 20.

AMAL, a town of Sweden, in the province of Daland, ſeated on the river Weſer. It has a good harbour; and carries on a great trade, eſpecially in timber, deals, and tar. E. Long. 12. 40. N. Lat. 58. 50.

AMALEKITES, by ſome thought to be the deſcendents of Amalek the grandſon of Eſau; by others, with more probability, to have been a Canaanitiſh tribe. They were a wicked people, and therefore devoted to deſtruction. They lived to the eaſt of the Lacus Aſphaltites; next the Moabites to the ſouth, and the Ammonites to the north. A branch of them dwelt to the ſouth of Canaan.

AMALFI, an ancient city of Italy, ſituated in E. Long. 15. 20. N. Lat. 40. 35.—It is generally ſuppoſed to have been founded about the year 600. It was at firſt ſubject to the dukedom of Naples, and was governed by annual prefects; but being afterwards erected into a duchy, it extended its territory, which reached eaſtward from Vico Vecchio, and weſtward to the promontory of Minerva, including likewiſe the iſland of Caprea, and the two iſlands of the Galli. Towards the north it comprehended the cities of Lettere, Gragnans, Pimontio, and Capule di Franchi; towards the ſouth, thoſe of Scala, Ravelli, Minori, Majuri, Atrani, Tramonti, Agerula, Citara, Prajano, and Roſilano.—The laws which this republic made with regard to trade and commerce, afterwards had the ſame authority in the kingdom of Naples as the Rhodian laws had among the Romans.——At preſent Amalfi is ſubject to Naples, and is the ſee of an archbiſhop. It is famous for giving birth to Flavius Blendus, inventor of the mariners compaſs.

AMALGAM, mercury united with ſome metal.

AMALGAMATION, the operation of making an amalgam, or mixing mercury with any metal *.

AMALTHÆA, the name of the Cumæan Sibyl, who offered to Tarquinius Superbus nine books, containing the Roman deſtinies, and demanded 300 pieces of gold for them. He derided her, whereupon ſhe threw three of them into the fire; and returning, aſked the ſame price for the other ſix: which being denied, ſhe burnt three more; and returned, ſtill demanding the ſame price. Upon which, Tarquin conſulting the pontiffs, was adviſed to buy them. Theſe books were in ſuch eſteem, that two magiſtrates were created to conſult them upon extraordinary occaſions.

AMALTHEA, in pagan mythology, the daughter of Meliſſus, king of Crete, and the nurſe of Jupiter, whom ſhe fed with goat's milk and honey. According

* See *Chemiſtry*, nº 421.

ing to others, Amalthea was a goat, which Jupiter tranſlated into the ſky, with her two kids, and gave one of her horns to the daughters of Meliſſus, as a reward for the pains they had taken in attending him. This horn had the peculiar property of furniſhing them with whatever they wiſhed for; and was thence called the *cornucopia*, or horn of plenty.

AMALTHÆUS (Jerome, John Baptiſta, and Corneille), three celebrated Latin poets of Italy, who flouriſhed in the 16th century. Their compoſitions were printed at Amſterdam in 1685. One of the prettieſt pieces in that collection is an epigram on two children, whoſe beauty was very extraordinary, though each of them was deprived of an eye:

'Lumine Acon dextro, capta eſt Leonilla ſiniſtro:
'Et poterat forma vincere uterque deos.
'Parve puer, lumen quod habes concede ſorori;
'Sic tu cæcus Amor, ſic erit illa Venus.'

AMAMA (Sixtinus), profeſſor of the Hebrew tongue in the univerſity of Franeker, a man of great learning, was born in Frieſland, and had ſtudied under Druſius. He publiſhed a criticiſm upon the tranſlation of the Pentateuch; collated the Dutch tranſlation of the Bible with the original and the moſt accurate tranſlations; and wrote a cenſure of the Vulgate tranſlation of the hiſtorical books of the Old Teſtament, Job, the Pſalms, and Canticles. It is impoſſible to anſwer the reaſons whereby he ſhews the neceſſity of conſulting the originals. This he recommended ſo earneſtly, that ſome ſynods, being influenced by his reaſons, decreed, that none ſhould be admitted into the miniſtry but ſuch as had a competent knowledge of the Hebrew and Greek text of the Scripture. He died in 1629.

AMANCE, a town in the duchy of Lorrain, upon a rivulet of the ſame name. E. Long. 6. 10. N. Lat. 48. 45.

AMAND (St), a city of France, in Bourbonois, on the confines of Berry, ſeated upon the river Cher. It was built in 1410 on the ruins of Orval. E. Long. 3. 30. N. Lat. 46. 32.

Amand (St), a city of the Low Countries, in the earldom of Flanders, ſeated upon the river Scarpe. It contains about 600 houſes, and 3000 or 4000 inhabitants. The abbot of the place is the temporal lord, and diſpoſes of the magiſtracy. It was given to France by the treaty of Utrecht. E. Long. 2. 35. N. Lat. 50. 27.

AMANICÆ PYLÆ, (Ptolemy); Amanides Pylæ, (Strabo); Amani Portæ, (Pliny): ſtraits or defiles in mount Amanus, through which Darius entered Cilicia; at a greater diſtance from the ſea than the Pylæ Ciliciæ or Syriæ, through which Alexander paſſed.

AMANTEA, a ſea-port town and biſhop's ſee of the kingdom of Naples, ſituated near the bay of Euphemia, in the province of Calabria, in E. Long. 16. 20. N. Lat. 39. 15.

AMANUS, a mountain of Syria, ſeparating it from Cilicia; a branch of mount Taurus, (Cicero, Strabo, Pliny); extending chiefly eaſtward, from the ſea of Cilicia, to the Euphrates: now called *Monte Negro*, or rather *Montagna Neres*, by the inhabitants; that is, the watery mountain, as abounding in ſprings and rivulets.

AMAPALLA, a city and port-town of north America, in the province of Guatimala, ſeated on the gulph of the ſame name, in the Pacific ocean. W. Long. 63. 20. N. Lat. 12. 30.

AMARANTE, an order of knighthood, inſtituted in Sweden by Queen Chriſtina, in 1653, at the cloſe of an annual feaſt, celebrated in that country, called *Wirtſchaſt*. This feaſt was ſolemnized with entertainments, balls, maſquerades, and the like diverſions, and continued from evening till the next morning.—That princeſs, thinking the name too vulgar, changed it into that of the *feaſt of the gods*, in regard each perſon here repreſented ſome deity as it fell to his lot. The Queen aſſumed the name of *Amarante;* that is, unfading, or immortal. The young nobility, dreſſed in the habit of nymphs and ſhepherds, ſerved the gods at the table.—At the end of the feaſt, the queen threw off her habit, which was covered with diamonds, leaving it to be pulled in pieces by the maſques; and, in memory of ſo gallant a feaſt, founded a military order, called in Swediſh *Ceſchilſchafft*, into which all that had been preſent at the feaſt were admitted, including 16 lords and as many ladies, beſides the queen. Their device was the cypher of *Amarante*, compoſed of two A's, the one erect, the other inverted, and interwoven together; the whole incloſed by a laurel crown, with this motto, *Dolce nella memoria.*

Bulſtrode Whitlock, the Engliſh ambaſſador from Cromwell to the court of Sweden, was made a knight of the order of *Amarante:* on which account it ſeems to be, that we ſometimes find him ſtyled Sir Bulſtrode Whitlock.

AMARANTHOIDES, in botany, the trivial name of a ſpecies of illecebrum. See Illecebrum,

AMARANTHUS, (of α privative, and μαραινω to wither, becauſe the flower of this plant when cropped does not ſoon wither,) Amaranth, or flower-gentle; a genus of the pentandria order belonging to the monœcia claſs of plants.

Species. Of this genus, Linnæus enumerates 19 ſpecies; the moſt remarkable of which are the following. 1. The tricolor, or three-coloured amaranthus. This has been long cultivated in gardens, on account of the beauty of its variegated leaves, which are of three colours, green, yellow, and red; and very elegantly mixed. When the plants are in full vigour, the leaves are large, and cloſely ſet from the bottom to the top of the ſtalks, and the branches form a ſort of pyramid; ſo that there is not a more beautiful plant than this, when it is in full luſtre. 2. The melancholicus, bicolor, or two-coloured amaranthus. This greatly reſembles the former in its manner of growth; but the leaves have only two colours, which are an obſcure purple, and a bright crimſon. Theſe are ſo blended as to ſet off each other, and, when the plants are vigorous, make a fine appearance. 3. The triſtis, with oval heart-ſhaped leaves. This has very little beauty; and is mentioned only on account of its being uſed by the Indians as an eſculent plant, and ſubſtituted for ſpinach. 4. The caudata, with very long hanging cylindrical ſpikes. This ſpecies is a native of America. It hath an upright ſtem three feet high; the leaves and ſtalks are of a pale green colour. The ſpikes of flowers are produced from the wings of the ſtalks, and alſo at the extremities of the branches. They are of a bright purple colour, and hang downward, ſometimes to the length of two feet and an half, ſo that many of them touch the ground. 5. The maximus, or tree-like amaranthus, grows with a ſtrong ſtem, to the height of ſeven or eight feet. Towards the top it ſends forth many horizontal branches, garniſhed with oblong rough green leaves. At the extremity of every ſhoot, the cylindrical ſpikes of flowers are produced. They are of a purple colour, and hang downward like the laſt; but are ſeldom half the length, tho' much thicker than the former. 6. The lividus, with roundiſh ſpikes of flowers. This grows near three feet high, putting out ſeveral ſide-branches, which are garniſhed with oval blunt leaves. At the ends of the branches the ſpikes of flowers are produced in cluſters, and grow erect. Theſe are of a deep purple colour. 7. The flavus, with oval pointed leaves. This grows naturally in Portugal, where it is accounted a culinary herb. It grows to the height of four feet; the ſtalks are inclined to red; the leaves are of an oval figure, marked with purple ſpots, and have very long foot-ſtalks. The ſpikes of flowers are of a pale green colour, and grow erect. They come out from the extremity of the branches in cluſters, and alſo from the wings of the ſtalks. 8. The ſanguineus, with compound ſpikes, and oblong oval leaves. This is a native of the Bahama iſlands. It is an eſculent plant, and bears fine flowers. It grows to the height of three feet, with purple ſtalks and leaves. The ſpikes are ſhort and cylindrical, of a bright purple at firſt, but afterwards fade to a darker colour. They are frequently produced from the wings of the ſtalks; but at the extremity of the ſtalk ariſes a large cluſter of ſpikes, which are placed croſs-wiſe, with one upright ſtalk in the middle. 9. The oleraceus, with obtuſe indented leaves. This has no beauty; but it is uſed by the Indians as a ſubſtitute to ſpinach, to which, however, it is greatly inferior.

Culture. The ſpecies moſt worthy of cultivation are the firſt and ſecond. Next to theſe are the fourth, fifth, and eighth ſorts.—The two firſt being tender plants, require ſome art and care to bring them to perfection in Britain. They ſhould be ſown on a good hot-bed in February, or in the beginning of March; and in about a fortnight's time the plants will riſe. Another hot-bed muſt then be prepared, covered with fine mould to about four inches deep, and the young plants muſt be carefully raiſed, and removed from the other, and planted at about four inches diſtance every way, and gently watered, to ſettle the earth to their roots. In the middle of the day they muſt be ſcreened with mats from the heat of the ſun; and they muſt have air given them, by raiſing the glaſs that covers the bed; and the glaſſes muſt be either turned, or wiped from their moiſture, as often as they appear wet. In about three weeks or a month's time, theſe plants will have grown ſo large as to require another hot-bed; this muſt be of a moderate temperature, and covered ſix inches deep with fine earth: then take them carefully up, and preſerve as much of the earth about their roots as may be, and plant them in this bed at eight inches diſtance; then let them be watered frequently a little at a time, and ſhaded with mats in the heat of the day. In the beninning of May another hot-bed muſt be prepared, with a deep frame, that the plants may have room to grow: in this ſet as many pots as it will conveniently hold; let theſe be filled with freſh earth, and the intermediate ſpaces every way be filled alſo with earth. The plants are now to be raiſed with as much earth about their roots as may be, and planted in theſe pots. In about three weeks more, theſe plants will be grown to a large ſize, and muſt have air given them more and more every day in good weather; and in July they are to be ſet out in their places, often watering them. The ſeeds of the fourth, fifth, and eighth ſpecies, ſhould be ſown upon a moderate hot-bed, towards the end of March; and when the plants come up, they ſhould have a large ſhare of air admitted to them in mild weather, to prevent their drawing up weak. When they are large enough to tranſplant, another moderate hot-bed muſt be provided, in which they ſhould be planted at ſix inches diſtance every way, obſerving to water them, as alſo to ſhade them from the ſun, until they have taken new root. After this the air may be freely admitted to them at all times, when the weather is favourable; their waterings ſhould be frequent, but not in great quantities. As the plants advance, and the warmth of the ſeaſon increaſes, they ſhould have a greater ſhare of air, that by degrees they may be hardened to bear the open air. The beginning of June they may be taken up, with large balls of earth to their roots, and planted, ſome into pots, and others into borders, obſerving to ſhade them well until they have taken good root; after which they muſt be watered frequently, eſpecially thoſe in the pots, which in warm dry weather will require it every evening. The fifth ſort will not thrive in pots; ſo ſhould be planted in a rich, light ſoil; where if it is allowed room, and plentifully watered in dry weather, the plants will grow to a very large ſize, and make a fine appearance.

Where people are curious in having theſe annual plants in great perfection, there ſhould be a glaſs-caſe erected, with upright and ſloping glaſſes on every ſide, with a pit in the bottom for tan, in which the pots ſhould be plunged. If this is raiſed eight or nine feet to the ridge, and the upright glaſſes are five feet, there will be room enough to raiſe theſe and other annual plants to great perfection; and, in ſuch a building, many tender vegetables, which rarely perfect their ſeeds in this climate, may be every year brought forward ſo as to ripen their ſeeds.

Amaranthus Cristatus. See Celosia.

AMARYLLIS, lily daffodil; a genus of the monogynia order, belonging to the hexandria claſs of plants.

Species. 1. The lutea, or autumnal narciſſus. This is uſually ſold by gardeners, along with colchicums, for autumnal ornaments to gardens. For this purpoſe it is very proper, as it will keep flowering from the beginning of September to the middle of November, provided the froſt is not ſo ſevere as to deſtroy the flowers. Although there is but one flower in each cover, yet there is a ſucceſſion of flowers from the ſame root, eſpecially when they are ſuffered to remain three or four years unremoved. The flowers ſeldom riſe above three or four inches high. They are ſhaped ſomewhat like the flowers of the yellow crocus; the green leaves come up at the ſame time, like the ſaffron; and, after the flowers are paſt, the leaves increaſe all the winter. The roots are bulbous, and ſhaped like thoſe of the narciſſus; ſo are proper ornaments for ſuch borders as are planted with cyclamens, ſaffron, autumnal crocus, colchicums, and ſuch low autumnal flowers. 2. The alta-

Amaryllis.

Amaryllis.

Plate XI, fig. 1.

maſco, or atamuſco lily, is a native of Virginia and Carolina, where it grows plentifully in the fields and woods, making a very beautiful appearance when in flower. The flowers of this ſort are produced ſingle; and, at their firſt appearance, have a fine carnation colour on the outſide: but this fades away to a pale, or almoſt white colour, before they decay. The flowers of this ſort are almoſt as large as thoſe of the ſmall orange-lily, but do not grow above ſix or eight inches high. They appear the latter end of May, or beginning of June, or ſometimes it flowers in Auguſt in this country. 3. The formoſiſſima, or jacobæa lily, produces its flowers two or three times in a year, without being regular to any ſeaſon. The flowers are of a deep red, the under petals very large, and the whole flower ſtands nodding on one ſide of the ſtalk, making a beautiful appearance. The ſtems of theſe flowers are produced from the ſides of the bulbs; ſo that when the flowers produced on one ſide are decayed, another ſtalk ariſes from the other ſide of the bulb; but there is no more than one flower produced on the ſame ſtalk. When the roots are in vigour, flowers will be produced from March to the beginning of September. 4. The ſarnienſis, or Guernſey lily, is ſuppoſed to have come originally from Japan, but has been many years cultivated in the gardens of Guernſey and Jerſey; in both which places they ſeem to thrive as well as if it was their native country, and from theſe iſlands their roots are ſent annually to the curious in moſt parts of Europe. The flowers of this ſpecies are admired for the richneſs of their colour, which is commonly red, though they have no ſcent. They appear towards the end of September; and, if properly managed, will continue a month in beauty. The roots of theſe plants do not flower again the ſucceeding year, as is the caſe with many other bulbs: but if their bulbs contain two buds in their centre, which is often the caſe, they frequently flower twice in three years; after which the ſame individual root does not flower again in ſeveral years, but only the offſets from it. 5. The regina, or belladonna lily, is a native of Portugal, where it was formerly cultivated in great plenty; but of late it has been ſupplanted by the jacobæa lily, ſo that the roots which have been brought from that country for ſome time paſt, for the belladonna, have generally proved the jacobæa lily. This kind, if properly managed, will ſometimes put out two or three ſtems, growing near three feet high, and produce many flowers in each umbel, which make a fine appearance during the month of October. 6. The belladonna, or Mexican lily, ſeldom riſes more than one foot high; each ſtem ſupporting two, three, or four flowers, but rarely more than that number. The flowers are of a bright copper colour, inclining to red; the ſpatha or ſheath, which covers the buds before they open, divides into two parts to the bottom, ſtanding on each ſide the umbel of the flowers, joined to the ſmall footſtalks. 7. The longifolia, with many flowers in one cover, produces, in each umbel, a great number of flowers, which appear in December; on which account they are the more valuable, there being few flowers at that ſeaſon. They are of a deep purple colour; but the ſtalk, which ſupports them, ſeldom riſes to more than three or four inches high. The roots of this ſpecies are large, and the leaves long and narrow. 8. The zeylanica, or Ceylon lily, is a native of the Weſt Indies, and uſually flowers in June. Sometimes the ſame root will flower again in autumn, but the flowers are of no long duration. 9. The ciliaris, or African ſcarlet lily, ſeldom flowers in Britain. The leaves are long and narrow, not unlike the ſnowdrop. The roots are ſmall: the petals of the flower turn back, like thoſe of the Guernſey lily; but are of a lighter colour, inclining to ſcarlet. 10. The vernalis, or ſpring yellow lily narciſſus, grows naturally in Spain and Portugal, where it flowers early in January. In this country it flowers in April and the beginning of May; but the flowers are of no long duration. It was formerly kept in ſeveral curious gardens; but as it flowers at a ſeaſon when there are ſo many finer kinds in beauty, it was neglected, ſo that it is at preſent almoſt loſt in Britain. 11. The orientalis, or lily daffodil, with leaves ſhaped like a tongue. This is a native of the Cape of Good Hope. The bulbs of the root are large and almoſt round; the leaves long, broad, and rounded at their extremities; theſe ſpread two ways on the ſurface of the ground, and do not come up till after the flower-ſtem appears, which is generally in November. After the flowers are paſt, the leaves increaſe till ſpring, and in May they begin to decay; ſo that from the middle of June to October, the roots are entirely deſtitute of leaves. 12. The capenſis, with three leaves in one cover. This is alſo a native of Africa. The ſtems riſe near two feet high, and have commonly three flowers incloſed in each ſheath or cover. The flowers appear in February and March. They are as large as thoſe of the belladonna lily, and of the ſame form, but of a deeper red colour. The leaves are long and narrow; have a hollow furrow on their upper ſide, where there is a pale ſtripe running the length of the leaves; and are very like thoſe of the American pancratium. Theſe leaves decay in ſummer, about the ſame time as thoſe of the former, and appear again at the ſame ſeaſon.

Culture. The firſt ſort is very hardy, and will thrive in almoſt any ſoil or ſituation; but will ſucceed beſt in a freſh light dry ſoil, and not too near the dripping of trees, or too near walls. It increaſes very faſt by offſets, by which all the other ſpecies are alſo to be propagated. Theſe roots may be tranſplanted any time from May to the end of July; after which it will be too late to remove them.—The ſecond kind is likewiſe hardy enough to thrive in the open air in Britain, provided the roots are planted in a warm ſituation, and in a dry ſoil.——The jacobæa ought to be kept in a moderate ſtove all winter; in which caſe it will ſend forth plenty of offſets, that will produce vigorous plants.—The roots of the Guernſey lily are generally brought over in June and July; but the ſooner they are taken out of the ground after the leaves decay, the better: for, altho' the roots which are taken up when their flower-ſtems begin to appear, will flower; yet their flowers will not be ſo large, nor will their roots be near ſo good after, as thoſe which were removed before they ſent forth freſh fibres.

When theſe roots come over, they ſhould be planted in pots filled with freſh, light, ſandy earth, mixed with a little very rotten dung, and placed in a warm ſituation, obſerving now and then to refreſh the earth with water: but by no means let them have too much wet, which would rot their roots, eſpecially before they come up. About the middle of September, ſuch of the roots as are ſtrong enough to flower, will begin to ſhow the bud of their flower-ſtem; therefore theſe pots ought to be removed into a ſituation where they may have the benefit of the ſun, and be ſheltered from ſtrong winds; but by no means place them too near a wall, nor under glaſſes, as this would draw them up weak, and render them leſs beautiful. At this ſeaſon they ſhould be gently refreſhed with water, if the weather be warm and dry; but if wet, they ſhould be ſcreened from it.

When the flowers begin to open, the pots ſhould be removed under ſhelter, to prevent the flowers from being injured by too much wet: but they muſt not be kept too cloſe, nor placed in a ſituation too warm, as this would occaſion their colour to be leſs lively, and haſten their decay.—After the flowers are decayed, the green leaves will begin to ſhoot forth in length; and, if ſheltered from ſevere cold, will continue growing all winter: but they muſt have as much free air as poſſible in mild weather, and are to be covered only in great rains or froſts. For this purpoſe, a common hot-bed frame is the moſt proper ſhelter for them; the glaſſes of which may be taken off every day in dry open weather, which will encourage the leaves to grow ſtrong and broad. The roots ſhould be tranſplanted every fourth or fifth year, toward the end of June, or beginning of July; the offsets alſo ſhould be taken off, and planted in pots, where in three years time they will produce flowers.

The other ſpecies of the amaryllis may eaſily be raiſed by taking care to ſhelter them in a ſtove from the winter's cold.

AMARYNTHUS, (anc. geogr.) a hamlet of Eretrias, in the iſland of Eubœa, about ſeven ſtadia diſtant from its walls, (Strabo.) Here Diana was worſhipped by an annual ſolemnity, at which thoſe of Caryſtus aſſiſted; hence the title of the goddeſs was *Amarynthis*, and *Amaryſia*, (Livy, Pauſanias).

AMASIA, an ancient town of Turkey, in Natolia, remarkable for the birth of Strabo, the geographer. It is the reſidence of a baſhaw, and gives its name to the province it ſtands in, where there are the beſt wines and the beſt fruits in Natolia. It is ſeated near the river Caſalmack. E. Long. 36. 10. N. Lat. 39. 33.

AMATHUS, a very ancient town in the ſouth of Cyprus, (Strabo, Ptolemy); ſo called, from Amathus the founder; or, according to others, from *Amath*, a Phœnician town ſacred to Venus, with a very ancient temple of Adonis and Venus: and hence Venus is denominated *Amathuſia*, (Tacitus). According to Ovid, it was a place rich in copper-ore, and where the inhabitants became *Ceraſtæ*, or horned. Now called *Limiſſo*.

AMATHUS, (Joſephus), a town of the tribe of Gad, beyond Jordan; but whether at a greater or leſs diſtance from it, is not ſo eaſy to determine. Euſebius places it in the Lower Peræa; Reland, in Ramoth-Gilead. Gabinius, proconſul of Syria, eſtabliſhed five juridical conventions in Judea; two of which were on the other ſide Jordan; one at Gadara, the other at Amathus, (Joſephus).

AMATORII MUSCULI, in anatomy, a term ſometimes ued for the obliquus ſuperior and obliquus inferior muſcles of the eye, as theſe muſcles aſſiſt in oggling or drawing the eye ſideways.

AMATRICE, a city of the kingdom of Naples, in the farther Abruzzo, upon the confines of the pope's territories, and the marquiſate of Ancona.

AMAUROSIS, in medicine, a diſtemper in the eye, occaſioned by an inſenſibility of the retina*.

AMAZONS, a nation of female warriors, whoſe exiſtence has been eſteemed merely fabulous by Strabo, Arrian, Palephates, and ſome of the moderns: while others maintain that their exiſtence is ſufficiently proved, by the teſtimony of ſuch of the hiſtorians of antiquity as are moſt worthy of credit; by the monuments which many of them have mentioned; and by medals, ſome of which are ſtill remaining; and that there is not the leaſt room to believe that what is ſaid of them is fabulous.

The Scythians had a great part of Aſia under their dominion upwards of 400 years, till they were conquered by Ninus, the founder of the Aſſyrian empire. After his death, which happened about 1150 years before the Chriſtian æra, and that of Semiramis and their ſon Ninias, Ilinus and Scolopites, princes of the royal blood of Scythia, were driven from their country by other princes, who like them aſpired to the crown. They departed with their wives, children, and friends; and being followed by a great number of young people of both ſexes, they paſſed into Aſiatic Sarmatia, beyond mount Camaſſus, where they formed an eſtabliſhment, ſupplying themſelves with the riches they wanted, by making excurſions into the countries bordering on the Euxine Sea. The people of thoſe countries, exaſperated by the incurſions of their new neighbours, united, ſurpriſed, and maſſacred the men.

The women then reſolving to revenge their death, and at the ſame time to provide for their own ſecurity, reſolved to form a new kind of government, to chuſe a queen, enact laws, and maintain themſelves, without men, even againſt the men themſelves. This deſign was not ſo very ſurpriſing as at firſt ſight appears: for the greateſt number of the girls among the Scythians had been inured to the ſame exerciſes as the boys; to draw the bow, to throw the javelin, to manage other arms; to riding, hunting, and even the painful labours that ſeem reſerved for men; and many of them, as among the Sarmatians, accompanied the men in war. Hence they had no ſooner formed their reſolution, than they prepared to execute it, and exerciſed themſelves in all military operations. They ſoon ſecured the peaceable poſſeſſion of the country; and not content with ſhewing their neighbours that all their efforts to drive them thence or to ſubdue them were ineffectual, they made war upon them, and extended their own frontiers. They had hitherto made uſe of the inſtructions and aſſiſtance of a few men that remained in the country; but finding at length that they could ſtand their ground, and aggrandize themſelves, without them, they killed all thoſe whom flight or chance had ſaved from the fury of the Sarmatians; and for ever renounced marriage, which they now conſidered as an inſupportable ſlavery. But as they could only ſecure the duration of their new kingdom by propagation, they made a law to go every year to the frontiers, to invite the men to come to them; to deliver themſelves up to their embraces, without choice on their part, or the leaſt attachment; and to leave them as ſoon as they were pregnant. All thoſe whom age rendered fit for propagation, and were

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* See *Medicine*, under nº 790.

Amazons.

willing to ſerve the ſtate by breeding girls, did not go at the ſame time in ſearch of men: for in order to obtain a right to promote the multiplication of the ſpecies, they muſt firſt have contributed to its deſtruction; nor was any thought worthy of giving birth to children, till ſhe had killed three men.

If from this commerce they brought forth girls, they educated them; but with reſpect to the boys, if we may believe Juſtin, they ſtrangled them at the moment of their birth: according to Diodorus Siculus, they twiſted their legs and arms, ſo as to render them unfit for military exerciſes; but Quintus Curtius, Philoſtrates, and Jordarus, ſay, that the leſs ſavage ſent them to their fathers. It is probable, that at firſt, when their fury againſt the men was carried to the greateſt height, they killed the boys: that when this fury abated, and moſt of the mothers were filled with horrror at depriving the little creatures of the lives they had juſt received from them, they fulfilled the firſt duties of a mother; but, to prevent their cauſing a revolution in the ſtate, maimed them in ſuch a manner as to render them incapable of war, and employed them in the mean offices which theſe warlike women thought beneath them: in ſhort, that, when their conqueſts had confirmed their power, their ferocity ſubſiding, they entered into political engagements with their neighbours; and the number of the males they had preſerved becoming burthenſome, they, at the deſire of thoſe who rendered them pregnant, ſent them the boys, and continued ſtill to keep the girls.

As ſoon as the age of the girls permitted, they took away the right breaſt, that they might draw the bow with the greater force. The common opinion is, that they burnt that breaſt, by applying to it, at eight years of age, hot iron, which inſenſibly dried up the fibres and glands: ſome think that they did not make uſe of ſo much ceremony, but that when the part was formed they got rid of it by amputation: ſome, again, with much greater probability, aſſert, that they employed no violent meaſures; but, by a continual compreſſion of that part from infancy, prevented its growth, at leaſt ſo far as to hinder its ever being incommodious in war.

The Amazons were commonly cloathed in the ſkins of the beaſts they killed in hunting; which were tied on the left ſhoulder, and, leaving the right ſide uncovered, fell down to their knees. In war, the queens and other chiefs carried a corſelet, or ſlight armour for the body, formed of ſmall pieces of iron, in the manner of leaves or ſcales, faſtened by a girdle, below which the coat of arms hung to the knee. The head was armed with a helmet and plume of feathers. The reſt of their arms were a bow and arrows, lances, javelins, a battle-axe (ſaid to be invented by Pentheſilea one of their queens), and buckler nearly in the form of a creſcent, about a foot and a half in diameter, with the points upward. Thaleſtris appeared before Alexander with two lances in her hand, though ſhe only came to make him a gallant requeſt. Thoſe who accompanied her bore battle-axes with two edges, the handles of which were as long as the wood of a javelin.

They are ſaid to have made great conqueſts, and to have obtained very extenſive dominions, particularly Crimea and Circaſſia; and to have rendered Iberias, Colchis, and Albania, tributary to them. They enjoyed their power for ſeveral centuries; but an expedition into Greece, and into the iſland of Achilles, is ſaid to have ruined their empire.

Amazons, Amba,

The **Amazons** *of Africa* were female warriors, who were obliged to continue virgins to a certain period of their military ſervice. When that period was elapſed, they married, merely with the view of propagating the ſpecies. All the offices of ſtate were filled by them. The men were employed in domeſtic affairs, and paſſed their whole life in the houſe, as women did in other countries: for theſe imperious females uſurped from them every function that might awake their valour. As ſoon as the Amazons were delivered, they committed their children to the care of the men, who nouriſhed them with milk, and other food proper for infancy. If the child was a female, they burned its breaſts to prevent their growth, which would have been inconvenient in battle. Hiſtorians inform us, that they inhabited an iſland which was called Heſperia, becauſe it lay to the weſt of the lake Tritonis.

Amazons, (the river of), called by the Spaniards *Maranon*, is the greateſt river in the world. It received the name of *Amazons*, becauſe the Spaniards who firſt paſſed through the country on its banks, having ſome ſmart ſkirmiſhes with the natives, and afterwards examining the ſlain, found the bodies of ſome women among them. Orellana was the firſt who diſcovered this river, about the year 1539. The Maranon, after iſſuing from the lake from whence it takes its riſe, in about eleven degrees of ſouth latitude, runs towards the north to Jaen de Bracamoros, for the length of ſix degrees, from whence it directs its courſe towards the eaſt, almoſt parallel to the equinoctial line, as far as the north cape, where it diſcharges itſelf into the ocean directly under the equator, by a mouth 50 or 60 leagues broad. It runs from Jaen, where it begins to be navigable, thirty degrees of longitude, according to Condamine, who was ſent into theſe parts by the French king to diſcover the true meaſure of the earth. This is equal to 1800 miles of 60 to a degree. But if the turnings and windings are reckoned, it will then be at leaſt 2700 miles. It receives from the north and ſouth a prodigious number of rivers, ſome of which run 1500 miles, and are not inferior to the Danube or Nile. The country through which this river runs, is very little known to the Europeans.

AMBA, an Abyſſinian or Ethiopic word, ſignifying a *rock*. The Abyſſinians give names to each of their rocks, as *Amba-Dorho*, the rock of a hen, &c. Some of theſe rocks are ſaid to have the name of *Aorni*; and are of ſuch a ſtupendous height, that the Alps and Pyrenees are but low hills in compariſon of them. Amongſt the mountains, and even frequently in the plains, of this country, ariſe ſteep and craggy rocks of various forms, ſome reſembling towers, others pyramids, &c. ſo perpendicular, and ſmooth on the ſides, that they ſeem to be works of art; inſomuch, that men, cattle, &c. are craned up by the help of ladders and ropes: and yet the tops of theſe rocks are covered with woods, meadows, fountains, fiſhponds, &c. which very copiouſly ſupply the animals ſeated thereon with all the conveniencies of life. The moſt remarkable of theſe rocks is called *Amba-Geſhen*. It is prodigiouſly ſteep, in the form of a caſtle built of free-ſtone, and almoſt impregnable. Its ſummit is about half a Portugueſe league in breadth, and the circumference at the bottom about half a day's journey. The aſcent at firſt is eaſy; but grows afterwards ſo ſteep, that the Abaſſine oxen, which will otherwiſe clamber like goats, muſt be craned up, and let down with ropes. Here the princes of the blood were formerly confined, in low cottages amongſt ſhrubs and wild cedars, with an allowance barely ſufficient to keep them alive. There is, according to Kircher, in this country, a rock ſo curiouſly hollowed by nature, that at a diſtance it reſembles a looking-glaſs; and oppoſite to this, another, on the top of which nothing can be ſo ſoftly whiſpered but it may be heard a great way off. Between many of theſe rocks and mountains, are vaſt abyſſes, which appear very dreadful to the eye.

AMBAGES. See CIRCUMLOCUTION.

AMBARVALIA, in antiquity, a ceremony among the Romans, when, in order to procure from the gods an happy harveſt, they conducted the victims thrice round the corn-fields in proceſſion, before ſacrificing them.—*Ambarvalia* were either of a private or public nature: the private were performed by the maſter of a family; and the public by the prieſts who officiated at the ſolemnity, called *fratres ovales*. The prayer preferred on this occaſion, the formula of which we have in Cato *de Re Ruſtica*, cap. cxlii. was called *carmen ambarvale*. At theſe feaſts they ſacrificed to Ceres a ſow, a ſheep, and a bull or heifer, whence they took the name of *ſuovetaurilia*. The method of celebrating them, was, to lead a victim round the fields, while the peaſants accompanied it, and one of their number, crowned with oak, hymned forth the praiſes of Ceres, in verſes compoſed on purpoſe. This feſtival was celebrated twice a-year; at the end of January, according to ſome, or in April, according to others; and for the ſecond time, in the month of July.

AMBASSADOR, or EMBASSADOR, a public miniſter ſent from one ſovereign prince, as a repreſentative of his perſon, to another.

Ambaſſadors are either ordinary or extraordinary. Ambaſſador *in ordinary*, is he who conſtantly reſides in the court of another prince, to maintain a good underſtanding, and look to the intereſt of his maſter. Till about two hundred years ago, ambaſſadors in ordinary were not heard of: all, till then, were ambaſſadors *extraordinary;* that is, ſuch as are ſent on ſome particular occaſion, and who retire as ſoon as the affair is diſpatched.

By the law of nations, none under the quality of a ſovereign prince can ſend or receive an ambaſſador. At Athens, ambaſſadors mounted the pulpit of the public orators, and there opened their commiſſion, acquainting the people with their errand. At Rome, they were introduced to the ſenate, and delivered their commiſſions to the fathers.

Ambaſſadors ſhould never attend any public ſolemnities, as marriages, funerals, &c. unleſs their maſters have ſome intereſt therein: nor muſt they go into mourning on any occaſions of their own, becauſe they repreſent the perſon of their prince. By the civil law, the moveable goods of an ambaſſador, which are accounted an acceſſion to his perſon, cannot be ſeized on, neither as a pledge, nor for payment of a debt, nor by order or execution of judgment, nor by the king's or ſtate's leave where he reſides, as ſome conceive; for all actions ought to be far from an ambaſſador, as well that which toucheth his neceſſaries, as his perſon: if, therefore, he hath contracted any debt, he is to be called upon kindly; and if he refuſes, then letters of requeſt are to go to his maſter. Nor can any of the ambaſſador's domeſtic ſervants that are regiſtered in the ſecretaries of ſtate's office be arreſted in perſon or goods; if they are, the proceſs ſhall be void, and the parties ſueing out and executing it ſhall ſuffer and be liable to ſuch penalties and corporal puniſhment as the lord chancellor or either of the chief juſtices ſhall think fit to inflict. Yet ambaſſadors cannot be defended when they commit any thing againſt that ſtate, or the perſon of the prince, with whom they reſide; and if they are guilty of treaſon, felony, &c. or any other crime againſt the law of nations, they loſe the privilege of an ambaſſador, and may be ſubject to puniſhment as private aliens.

AMBE, in *ſurgery*, the name of an inſtrument for reducing diſlocated bones. In *anatomy*, a term for the ſuperficial jutting out of a bone.

AMBER, in natural hiſtory. See the article SUCCINUM; and CHEMISTRY, n° 313, 511.

AMBERG, a city of Germany, the capital of the palatinate of Bavaria, with a good caſtle, ramparts, baſtions, and deep ditches. It is ſeated near the confines of Franconia, on the river Wils. It drives a great trade in iron and other metals, found in the neighbouring mountains. E. Long. 12. 4. N. Lat. 29. 46.

AMBERGREASE, or AMBERGRISE, in natural hiſtory, is a ſolid, opaque, aſh-coloured, fat, inflammable ſubſtance, variegated like marble, remarkably light, rugged and uneven in its ſurface, and has a fragrant odour when heated. It does not effervеſce with acids; it melts freely over the fire, into a kind of yellow roſin; and is hardly ſoluble in ſpirit of wine.

Ambergriſe is in general the moſt agreeable of the perfumes, and rarely accompanied with the inconveniencies which other ſubſtances of this claſs frequently occaſion. It is looked upon as an high cordial; and eſteemed of great ſervice in all diſorders of the head, and in nervous complaints: a ſolution of it in ſpirit diſtilled from roſes, ſtands recommended by Hoffman as one of the moſt efficacious corroborants of the nervous ſyſtem. The Orientals entertain an high opinion of the aphrodiſiac virtues of this concrete; and likewiſe ſuppoſe that the frequent uſe of it conduces to long life.

Ambergriſe is found in great quantities in the Indian ocean, near the Molucca iſles; as alſo near Africa; and ſometimes near the northern parts of England, Scotland, and Norway. There have been many different hypotheſes concerning its origin; but the moſt probable is that which ſuppoſes it to be a foſſile bitumen, or naphtha, exſuding out of the bowels of the earth, in a fluid form, and diſtilling into the ſea, where it hardens and floats on the ſurface. See CHEMISTRY, n°513.

AMBERT, a ſmall town of France, in Lower Auvergne, the chief place of a ſmall territory called *Livradois*. It is remarkable for its paper manufactory and camblets. E. Long. 3. 35. N. Lat. 45. 28.

AMBETTUWAY, in botany, a barbarous name of a tree, the leaves of which, when boiled in wine, are ſaid to create an appetite, and is uſed by the people in Guinea with that intention.

AMBIANI, or AMBIANENSIS CIVITAS, now *Amiens*, a city of Picardy. It is called *Samarobriva* by Cæſar and Cicero; which, according to Valeſius, ſignifies the bridge of the *Samara* or *Somme*. *Ambiani* is a later name, taken from that of the people, after the uſual manner of the lower age.

AMBIDEXTER, a perſon who can uſe both hands with the ſame facility, and for the ſame purpoſes, that the generality of people do their right hands.—As to the natural cauſe of this faculty, ſome, as Hœfer, attribute it to an extraordinary ſupply of blood and ſpirits from the heart and brain, which furniſh both hands with the neceſſary ſtrength and agility: others, as Nicholas Maſſa, to an erect ſituation of the heart, inclining neither to the right-hand nor left; and others to the right and left ſubclavian arteries being of the ſame height, and the ſame diſtance from the heart, by which the blood is propelled with equal force to both hands.—But theſe are only conjectures, or rather chimeras. Many think, that, were it not for education and habit, all mankind would be ambidexters; and in fact, we frequently find nurſes obliged to be at a good deal of pains before they can bring children to forego the uſe of their left hands. How far it may be an advantage to be deprived of half our natural dexterity, may be doubted. It is certain, there are infinite occaſions in life, when it would be better to have the equal uſe of both hands. Surgeons and oculiſts are of neceſſity obliged to be ambidexters; bleeding, &c. in the left-arm or left ancle, and operations on the left-eye, cannot be well performed but with the the left-hand.—Various inſtances occur in hiſtory, where the left-hand has been exerciſed preferably to the right. But by the laws of the ancient Scythians, people were enjoined to exerciſe both hands alike; and Plato enjoins ambidexterity to be obſerved and encouraged in his republic.

AMBIDEXTER, among Engliſh lawyers, a juror or embracer, who accepts money of both parties, for giving his verdict; an offence for which he is liable to be impriſoned, for ever excluded from a jury, and to pay ten times the ſum he accepted of.

AMBIEGNÆ OVES, in the heathen ſacrifices, an appellation given to ſuch ewes as, having brought forth twins, were ſacrificed together with their two lambs, one on each ſide. We find them mentioned among other ſacrifices to Juno.

AMBIENT, a term uſed for ſuch bodies, eſpecially fluids, as encompaſs others on all ſides: thus, the air is frequently called an ambient fluid, becauſe it is diffuſed round the earth.

AMBIGENAL HYPERBOLA, a name given by Sir Iſaac Newton to one of the triple hyperbolas of the ſecond order, having one of its infinite legs falling within an angle formed by the aſſymptotes, and the other without.

AMBIGUITY, a defect of language, whereby words are rendered ambiguous. See the next article.

AMBIGUOUS, a term applied to a word or expreſſion which may be taken in different ſenſes.—An anonymous writer has publiſhed a dictonary of ambiguous words: *Lexicon Philoſophicum de Ambiguitate Vocabulorum*, Francof. 1597. 4to.—The reſponſes of the ancient oracles were always ambiguous.

AMBIT, in geometry, is the ſame with what is otherwiſe called the perimeter of a figure *.

AMBIT was particularly uſed, in antiquity, to denote a ſpace of ground to be left vacant betwixt one building and another. By the laws of the twelve tables, houſes were not to be built contiguous, but an ambit or ſpace of 2½ feet was to be left about each for fear of fire.—The ambitus of a tomb or monument, denoted a certain number of feet, in length and breadth, around the ſame, within which the ſanctity aſſigned to it was limited. The whole ground wherein a tomb was erected, was not to be ſecreted from the common uſes; for this reaſon, it was frequent to inſcribe the ambit on it, that it might be known how far its ſanctity extended: thus, *in fronte pedes tot, in agrum pedes tot*.

AMBITION, (*ambitio*), is generally uſed in a bad ſenſe, for an immoderate or illegal purſuit of power.

In the ſtrict meaning, however, of the word, it ſignifies the ſame with the *ambitus* of the Romans. See the next article.

AMBITUS, in Roman antiquity, the ſetting up for ſome magiſtracy or office, and formally going round the city to ſolicit the intereſt and votes of the people.

Ambitus differed from *ambition*, as the former lies in the act, the latter in the mind.

Ambitus was of two kinds; one lawful, the other infamous. The firſt, called alſo *ambitus popularis*, was when a perſon offered his ſervice to the republic frankly, leaving it to every body to judge of his pretenſions as they found reaſonable. The means and inſtruments here made uſe of were various. 1. *Amici*, or friends, under different relations, including *cognati, affines, neceſſarii, familiares, vicini, tribules, clientes, municipes, ſodales, collegæ*. 2. *Nomenclatura*, or the calling and ſaluting every perſon by his name; to which purpoſe, the candidates were attended with an officer, under the denomination of *interpres*, or *nomenclator*. 3. *Blanditia*; or obliging perſons, by ſerving them, or their friends, patrons, or the like, with their vote and intereſt on other occaſions. 4. *Prenſatio*; the ſhaking every perſon by the hand, offering him his ſervice, friendſhip, &c.—The ſecond kind was that wherein force, cajoling, money, or other extraordinary influence, was made uſe of. This was held infamous, and ſeverely puniſhed, as a ſource of corruption and other miſchiefs.

Ambitus was practiſed not only at Rome and in the forum, but in the meetings and aſſemblies of other towns in Italy, where numbers of citizens were uſually found, on account of trade and buſineſs.—The practice ceaſed in the city from the time of the emperors, by reaſon poſts were not then to be had by courting the people, but by favour from the prince.

Perſons who had cauſes depending practiſed the ſame, going about among the judges to implore their favour and mercy. They who practiſed this, were called *Ambitioſi*. Hence we alſo meet with *ambitioſa decreta*, and *ambitioſa juſſa*, uſed for ſuch ſentences and decrees as were thus procured from the judges, contrary to reaſon and equity, either gratuitouſly, or for money.

AMBLE, in horſemanſhip, a peculiar pace by which a horſe's two legs of the ſame ſide move at the ſame time.

AMBLESIDE, a town in Weſtmoreland, ſeated at one end of Winandermeer, W. long. 0. 49. N. lat. 54. 30.

AMBLETEUSE, a ſea-port town of France, in Picardy, defended with a battery of canon. E. long. 1. 30. N. lat. 49. 40.

* See *Perimeter.*

AMBLYGON, in geometry, denotes an obtuſe-angled triangle, or a triangle one of whoſe angles conſiſts of more than ninety degrees.

AMBLYOPY, among phyſicians, ſignifies an obſcuration of the ſight, ſo that objects at a diſtance cannot be clearly diſtinguiſhed. The word is Greek; and compounded of αμβλος dull, and ωψ, the eye.

AMBO, or Ambon, a kind of pulpit or deſk, in the ancient churches, where the prieſts and deacons ſtood to read, or ſing part of the ſervice, and preach to the people; called alſo *Analogium*. The term is derived from αναϐαινειν, to mount.—The ambo was mounted upon two ſides; whence ſome alſo derive the appellation from the Latin *ambo*, both.

The ambo was aſcended by ſteps; which occaſioned that part of the office performed there, to be called the *Gradual*. See Gradual.

Beſides the goſpel, which was read at the top of the ambo, and the epiſtle, which was read a ſtep lower, they likewiſe publiſhed from this place the acts of the martyrs, the commemoration of departed ſaints, and the letters of peace and communion ſent by one church to another: here, too, converts made a public profeſſion of their faith; and biſhops, their defence, when accuſed: treaties alſo were ſometimes concluded, and the coronations of emperors and kings performed, in the ſame place.

The modern reading-deſks and pulpits have been generally ſubſtituted to the ancient Ambos; though, in ſome churches, remains of the ambos are ſtill ſeen. In that of St John de Lateran at Rome, there are two moveable ambos.

AMBOHITSMENE, or Vohitsanghombe, a province of the iſland of Madagaſcar, ſo called from ſome red mountains of the ſame name, lying in S. lat. 20°. Theſe mountains are very high, reſembling the Tafelberg of the Cape of Good Hope. On one ſide of this ridge the ſea extends into the country for fifteen leagues; on the other is a flat country abounding in ponds and marſhes. Here is alſo a lake fifteen leagues in length, and the ſame in breadth, containing many ſmall iſlands. The inhabitants of the mountains are called *Zaferahongs*; and have plenty of gold, iron, cattle, ſilk, &c.

AMBONUM. See Oculus Beli.

AMBOISE, a town of France, in Touraine, ſeated at the confluence of the rivers Loire and Maſſee. E. Lon. 1. 30. N. Lat. 47. 25.

AMBOULE, a province of Madagaſcar, ſomewhat to the northward of S. lat. 23°. It is a fertile and agreeable country, watered by the river Manampani, whoſe mouth lies in S. lat. 23. 30. The country produces plants and fruits in plenty. Iron mines are alſo found here. The black cattle are extremely fat, and their fleſh excellent. In this province ſtands a large town of the ſame name; near which is a fountain of hot water, within 20 feet of a ſmall river whoſe ſand is almoſt burning. The water of the fountain is ſaid to boil an egg hard in two hours; and the inhabitants affirm it to be a ſovereign remedy againſt the gout. The people here are employed in different preparations of iron and ſteel, which they have from their own mines, and forge ſeveral inſtruments with tolerable ſkill. Their governor is honoured with the title of *Rabertau*, or *Great Lord*. He exerciſes ſovereign authority and abſolute power; but is frequently, in times of diſtreſs, ſurpriſed by his ſubjects, who aſſemble in great numbers, ſeize his perſon, and threaten him with death unleſs they are relieved. To extricate himſelf from this dilemma, he is inſtantly obliged to iſſue orders for diſtributing proviſions among them; but is uſually repaid with intereſt, a quadruple return being made in a plentiful harveſt. The people of Amboule live in great licentiouſneſs with their ſuperiors, and their country is generally a retreat for the roguiſh and lazy.

AMBOYNA, one of the Molucca iſlands, in the Eaſt Indies. It lies in S. lat. 3. 36. and E. long. 126. 20. and is remarkable for being the centre of the commerce for nutmegs and cloves, which is entirely monopolized by the Dutch Eaſt-India company. It is about 24 leagues in circumference. The air is but indifferent; and infects the body with a ſcrophulous diſorder, not unlike the French-pox, except its not being ſo painful, and not corroding the bones. This diſorder is ſaid to be eaſily cured in the firſt ſtage; but very difficultly, if allowed to proceed to any height.

The iſland is fertile in millet, tobacco, ſugar, coco, potatoes, oranges, lemons, citrons, &c. Here is likewiſe the ſago tree, a kind of palm, of the pith of which they make bread; and by cutting off one of the branches near the top, the ſap will flow out: this juice is very ſweet, and will ferment into a ſort of wine. A bitter root, called *oubat*, is made uſe of to prevent it from turning, otherwiſe it would ſoon grow ſour as vinegar. Some trees will yield 30 quarts in 24 hours.

The men wear large whiſkers, and but little hair upon their chin; and have only a ſlight piece of ſtuff wrapt round their middle. The women tie their hair in knots: the maids are bought of their fathers before they are married; and if the wife proves barren, the marriage is diſſolved. Some of the natives are Mahometans, and ſome Chriſtians: but they are all ſaid to be lazy, deceitful, and treacherous; and will rather die than leave their ancient cuſtoms. They make war with ſmall ſwift veſſels, in ſhape like dragons with regard to the head and tail. Their houſes are built of bamboo canes and ſago-trees. They ſleep on mats. Their weapons are bows and arrows, javelins, ſcymitars, and targets. They have likewiſe trunks, out of which they ſhoot poiſoned arrows. The women are very amorous; and if they are deceived by their gallants, they give them a ſlow poiſon, which cauſes them to linger a great while before they die.

Amboyna was firſt diſcovered by the Portugueſe, who built a fort upon it, which was taken from them by the Dutch in 1605. They did not, however, become maſters of the whole iſland at once. The Engliſh had here five factories, which lived under the protection of the Dutch caſtle; holding themſelves ſafe, in reſpect of the friendſhip between the two nations. Great differences had ariſen between the Dutch and Engliſh coloniſts in this part of the world; till at laſt, the Engliſh Eaſt-India company applying to King James, a treaty was concluded in 1619, by which the concerns both of the Engliſh and Dutch were regulated, and certain meaſures agreed upon for preventing future diſputes. This was an additional ſecurity to the Engliſh; and, by virtue of the treaty, they continued two years in Amboyna, trading with the Dutch. During this time, however, ſeveral differences happened; which occaſioning mutual diſcontents, the complaints were ſent to Jaccatra, in the iſland of Java Major, to the council of defence of both nations there reſiding: but they not agreeing, a ſtate of the caſe was ſent over to Europe, to be decided by the Eaſt-India Companies of both nations; or, in caſe they could not agree, by the King of England, and the States of Holland, according to an article in the treaty of 1619.—But before theſe diſputes could be decided in a legal way, the Dutch at Amboyna thought proper to invent a report of a plot intended by the Engliſh to ſurpriſe the Dutch fort and deſtroy them.

To give credit to this report, and to obtain a plauſible pretext for deſtroying the Engliſh, a Japaneſe ſoldier was apprehended for aſking ſome queſtions at a centinel concerning the ſtrength of the caſtle. Being cruelly tortured, he ſigned a confeſſion that he himſelf and ſeveral others of his countrymen had contrived the taking of the caſtle. Upon this, ſome other Japaneſe were alſo ſeized and tortured; as alſo a Portugueſe, the guardian of the ſlaves of the Dutch. This happened about the 11th of February 1622.—At this time there was one Abel Price, ſurgeon to the Engliſh, in priſon, for threatening to ſet a Dutchman's houſe on fire. Him they tortured, and ſoon made to confeſs whatever they pleaſed. The ſame day, (Feb. 15th) they ſent for Captain Towerſon, and all the Engliſh who were in the town, to come to ſpeak with the governor of the caſtle. They all went except one, who was left to keep the houſe. Being come to the governor, he told Captain Towerſon, that himſelf and others of his nation were accuſed of a conſpiracy to ſurpriſe the caſtle; and therefore, until further trial, were to remain priſoners. Immediately alſo they ſeized him who was left alone in the houſe; took the merchandiſe of the Engliſh company into their own cuſtody, by an inventory; and ſeized all the cheſts, boxes, books, and papers, in the Engliſh houſe.

The Dutch, having now got them into their power, proceeded to torment them in the moſt horrid manner. The cruelties practiſed upon them were of the ſame nature with thoſe inflicted by the inquiſitors on ſuch unhappy people as fell into their hands.—The miſerable victim was firſt hoiſted up by the hands with a cord, on a large door, where they made him faſt, upon two ſtapples of iron fixed on both ſides at the top of the door-poſts, hauling his hands one from the other as wide as they could ſtretch. Being thus made faſt, his feet were alſo ſtretched aſunder as far as they could, and made faſt beneath under the door-trees on each ſide. Then they tied a cloth about his neck and face, ſo cloſe that little water could get out. This being done, they poured water ſoftly upon his head, which running down, filled up the napkin, and ſtretched it out all round. They ſuffered the water to aſcend a little above his noſtrils, ſo that he could not draw breath without ſucking in a great quantity of water; with which he ſoon was filled to ſuch a degree as to be ready to burſt. If he happened to faint, which was often the caſe, the barbarians took him down, making him quickly vomit up the water, and then tied him up again. If this torture did not produce the confeſſion they deſired, they burnt the ſoles of his feet, arm-pits, and the moſt ſenſible parts of his body, with candles, till the fat dropped out upon them.

The unhappy ſufferers, exhauſted with theſe tortures, confeſſed whatever they thought would be agreeable to their ſavage tormentors; who having cauſed them ſign their confeſſions, and thereby obtained a colour of juſtice for their proceedings, put as many to death as they thought proper, and out of their great clemency ſpared the reſt.

That ſuch an unheard-of proceeding as this ſhould neither be reſented by the Britiſh, nor the perpetrators of it called to an account in their own country, may appear very ſurpriſing. It muſt, however, be conſidered, that at that time the liberty of the preſs was not ſo great as it is now. It was not till long after that the account was allowed to be publiſhed; and the troubles in which the nation was then involved, prevented much attention being paid to it.

By this tranſaction, the clove-trade fell entirely into the hands of the Dutch; and the more effectually to preſerve it, the company takes care to have all the clove-trees in the adjacent iſlands grubbed up. Sometimes alſo, when the harveſt is very large, part of the produce of Amboyna itſelf is burnt.—To prevent the rearing of cloves in any of the neighbouring iſlands, or the inhabitants from ſelling them to ſtrangers, the governor of Amboyna makes the tour of his government with a fleet of curricurries, conſiſting ſometimes of 20, and at others of 30, 40, or 50 ſail. This expedition is made with all the pomp imaginable, in order to gratify the pride and folly of the Indian chiefs. The true reaſon of their taking all this pains is, becauſe experience has ſhewn, that no contracts, however ſolemn, can prevent the inhabitants of thoſe iſlands from ſelling their ſpice to ſtrangers; and even now, frauds are ſo frequently practiſed by the Dutch themſelves, tho' the company is inexorable in puniſhing them, that the common people call the cloves *galken-kruid*, that is, the gallows-ſpice.

Beſides the cloves, coffee is alſo cultivated here by the Dutch, and a gold mine has been lately found out. This was diſcovered by the quantities of gold-duſt that were waſhed from ſome mountains by the torrents. Here alſo grows a kind of red wood, which, beſides the beauty of its colour, is exceedingly firm and durable; and, which is ſtill more remarkable, its grain is naturally embelliſhed with abundance of beautiful figures. Of this wood they make tables, chairs, eſcritoires, *&c.* for the principal perſons in the government; and the reſt is ſold all over the Indies at a very extravagant rate.

Amboyna is divided into two parts, *viz.* a greater and leſſer peninſula. The former, called *Hiton*, is 12 leagues in length, and two and a half broad. In this the Dutch have no leſs than five forts, or rather ſtrong redoubts, mounted with cannon. The other is called *Leytimor*, five leagues in length, and one and a half broad, which is the ſouthern part of the iſland; on this ſtands the fort of Victoria, which is the reſidence of the governor, and his council, compoſed of 15 gentlemen or merchants. The fortreſs is a ſquare, the ramparts mounted with 60 pieces of braſs cannon, and the garriſon uſually compoſed of 600 men. It is ſo ſtrong by nature and art, as to be in a manner impregnable; and ſo effectually does it command the harbour, that no veſſel could come in or go out without being ſunk by the cannon, if the governor choſe. The inhabitants of

Amboyna, are computed at 70 or 80,000, of whom but a ſmall number are Dutch; and this obliges them to be continually upon their guard, and to keep a competent number of troops in each of their forts, particularly in that of Middleburgh, which ſtands upon the iſthmus that connects theſe peninſulas. There are alſo redoubts and garriſons in all the iſlands of this government.

AMBRACIA, one of the moſt conſiderable cities of ancient Epirus, ſituated on the river Aracthus, at a ſmall diſtance from the ſea. At firſt it was a free city; but was afterwards reduced by the Æacidæ kings of Epirus, who choſe it for the place of their reſidence. In proceſs of time, the Ætolians made themſelves maſters of it, and held it till the year before Chriſt 189, when it fell into the hands of the Romans.

At this time Ambracia was a place of great ſtrength. It was defended on one ſide by the river Aracthus, and on the other by ſteep and craggy hills; and ſurrounded with an high and thick wall, above three miles in compaſs. The Roman conſul Fulvius began the ſiege by forming two camps, ſeparated by the river, but with a communication between them; the Romans were poſted in one, and the Epirots their allies in the other. He then threw up two lines, one of circumvallation, and the other of contravallation; and built a wooden tower, in form of a caſtle, over againſt the citadel, which ſtood on a hill. The Ætolians, however, before the lines were quite finiſhed, found means to throw about 1000 men into the place.

The lines being completed, the city was attacked in five different places at once. The battering-rams ſhook the walls on all ſides; and the Romans, from their moveable towers, pulled down the battlements with a kind of ſithes which they faſtened to long beams. The beſieged made a vigorous defence. They were night and day on the walls, and indefatigable in preventing the effects of the rams and ſythes. The ſtrokes of the former they deadened, by letting down beams, large ſtones, lumps of lead, &c. by means of pullies, upon them when they were in motion; the others they rendered uſeleſs, by pulling the beams to which they were faſtened into the city with hooks contrived for the purpoſe.

While Fulvius was carrying on the ſiege, Nicander the Ætolian prætor found means to throw 500 men into the city, under the command of one Nicodamus, with whom Nicander agreed to attack the Roman camp in the night-time; not doubting, that, if the garriſon from within, and the army from without, fell upon them at the ſame time, they would be obliged to raiſe the ſiege. Nicodamus narrowly watched the time at which he was ordered to ſally; and, though Nicander did not appear, marched out at the head of the garriſon, armed with fire-brands and torches. The Roman centinels, ſurpriſed at this ſight, ran to wake the legionaries, and ſoon ſpread a general alarm all over the camp. The legionaries marched in ſmall bodies as they happened to meet, to repulſe the enemy, whom they engaged in three different places. Two parties of the garriſon were driven back: but the third, commanded by two Ætolian generals, made a great ſlaughter of the Romans; and, not finding themſelves ſeconded by Nicander, retired in good order into the city.

Though the beſieged were thus abandoned, and had no hopes of aſſiſtance, they continued to defend themſelves with incredible vigour and reſolution. The Romans had no ſooner made a breach in the wall, but it was repaired, and a new one built behind it. The conſul, therefore, altered his meaſures; and, inſtead of making breaches with the ram, began to undermine the wall, in hopes of throwing down great part of it at once, and entering the city before the beſieged could have time to build a new wall. The miners being covered, were not obſerved by the garriſon, till the great quantities of earth brought out of the mine gave the alarm. The Ætolians immediately began to countermine; and, having dug a trench of the depth they ſuppoſed the mine to be, they carried it along the wall where they heard the ſtrokes of the pick-axes of the Romans. When the two mines met, a battle enſued, firſt with pick-axes and ſpades, and then with ſwords and ſpears: but this attack did not laſt long, each party making themſelves a kind of rampart with the looſe earth. The Ætolians, in order to drive their enemies quite out of the mine, invented a machine, which they brought to the place where the two mines met: this was an hollow veſſel, with an iron bottom, bored thro' in many places, and armed with ſpikes at proper diſtances to prevent the enemy from approaching it: this veſſel they filled with feathers, which they ſet on fire, and with bellows driving the ſmoke on the beſiegers, obliged them to leave the mine, half-ſuffocated. This interval the Ætolians made uſe of in repairing the foundations of the wall.

The vigorous reſiſtance made by the Ambracians, however, did not raiſe the courage of the nation in general, who were determined on a peace with Rome at all events. Fulvius, in the mean time, being deſirous of getting poſſeſſion of Ambracia before the concluſion of the peace, employed Amynander, king of the Athamanes, to perſuade the inhabitants to ſurrender. As Amynander had great intereſt in Ambracia, having long reſided there, he eaſily perſuaded them to capitulate on the following terms. *viz.* That the Ætolian garriſon ſhould have leave to march out of the city; that the inhabitants ſhould pay 500 talents, 200 down, and the reſt at ſix equal payments; and that they ſhould deliver to the conſul all the priſoners and deſerters that were in the city. The gates were then opened to Fulvius; and he was preſented with a crown of gold, together with many fine ſtatues and pictures, of which there were great numbers in the city, it having been the capital of Pyrrhus, who had enriched it with many valuable monuments.

From this time the city of Ambracia made no figure in hiſtory. It is ſcarce known at preſent where the city ſtood; but that called *Arba*, in upper Albania, ſeems beſt to agree with what is ſaid of the ancient ſituation of this city. The river Aracthus, on which Ambracia was ſituated, is now called, by the natives, *Spagmagmuriſi.*

AMBRESBERRY, a market-town in Wiltſhire, about ſix miles north of Saliſbury, and ſituated in W. Long. 1. 40. and N. Lat. 51. 20.

AMBRONES, a Gauliſh people who lived near the foot of the Alps, between Switzerland and Provence. They invaded the Roman territories in conjunction with the Cimbri and Teutones; but were defeated with great ſlaughter by Marius, about 101 years before Chriſt. Their women, who had ſtaid during the engagement in a kind of fortification made with their carts, on ſee-

Ambroſe-Iſland, Ambroſe.

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Ambrosia, a genus of the pentandria order, belonging to the monœcia claſs of plants. Of this genus five ſpecies are enumerated; but having no properties worthy of notice, we omit any farther account of them.

AMBROSIAN office, in church-hiſtory, a particular formula of worſhip in the church of Milan, which takes its name from St Ambroſe, who inſtituted that office in the fourth century. Each church originally had its particular office; and when the Pope, in aftertimes, took upon him to impoſe the Roman office upon all the weſtern churches, that of Milan ſheltered itſelf under the name and authority of St Ambroſe; from which time the Ambroſian ritual has prevailed.

AMBROSIN, in middle-age writers, denotes a coin ſtruck by the lords or dukes of Milan, whereon was repreſented St Ambroſe on horſeback, with a whip in his right hand. The occaſion of this coinage is ſaid to have been a viſion of that ſaint, who appeared to the Milaneſe general in 1339, during the time of a battle.

AMBROSIUS Aurelianus, or Aurelius Ambrosius, a famous general of the ancient Britons, of Roman extraction. He was educated at the court of Aldroen of Amorica; who, at the requeſt of the Britons, ſent him over with ten thouſand men, to aſſiſt them againſt the Saxons, whom Vortigern had invited into Britain. Ambroſius had ſuch ſucceſs againſt the Saxons, that the Britons choſe him for their king, and compelled Vortigern to give up to him all the weſtern part of the kingdom divided by the Roman highway called *Watling-ſtreet*. Some time after, the Britons being diſcontented with Vortigern, and having withdrawn their allegiance from him, he returned to a caſtle in Wales, where being beſieged by Ambroſius, and the caſtle taking fire, he periſhed in the flames, and left his rival ſole monarch of Britain; who now took upon him the imperial purple, after the manner of the Roman emperors. Geoffrey of Monmouth tells us, that Ambroſius built Stonehenge near Saliſbury, in Wiltſhire. Ambroſius, according to this hiſtorian, coming to a monaſtery near Caercaradoc, now *Saliſbury*, where three hundred Britiſh lords, maſſacred by Hengiſt, lay buried, and reſolving to perpetuate the memory of this action, he ordered his workmen to prepare a large quantity of ſtones and other materials. But having, at the inſtigation of Tremounus archbiſhop of Caerleon, conſulted the famous Merlin, this magician adviſed him to ſend over to Ireland for certain great ſtones, called *chorea gigantum*, the giant's dance, placed in a circle on a hill called *Killair*, having been brought thither by giants from the fartheſt borders of Africa. A body of forces were accordingly ſent into Ireland, under Pendragon, Ambroſius's brother, to fetch theſe ſtones; but were oppoſed in their attempt by Gilliomanus king of the country, who derided the folly of the Britons in undertaking ſo ridiculous an expedition. Nevertheleſs, the Britons having vanquiſhed this prince in battle, brought away the ſtones; and by the direction and aſſiſtance of Merlin, who had accompanied them, theſe wonderful ſtones, by order of Ambroſius, were placed over the graves of the Britiſh lords, and are now what is called *Stonehenge*. Alexander Mecham celebrates this fable in his poem *De divinæ ſapientiæ laudibus*. Polydore Virgil aſſigns another origin of Stonehenge: he tells us it was erected by the Britons as a monument to their general Ambroſius, on the place where he fell in battle, to perpetuate the memory of his glorious actions and ſervices done to his country. Both theſe ſtories are rejected by our beſt antiquaries; who, however, are by no means agreed as to the true origin of this famous piece of antiquity *.

After the Britons had defeated the Saxons, and obliged them to retire northward, Ambroſius is ſaid to have convened the princes and great men at York, where he gave orders for repairing the churches deſtroyed by the Saxons, and reſtoring the exerciſe of religion to its former luſtre. This is confirmed by Matthew of Weſtminſter; who highly applauds the great zeal of Ambroſius in repairing the churches, encouraging the clergy, and reſtoring the honour of religion. The Monmouth hiſtorian gives this prince a very high character: "He was a man (ſays he) of ſuch bravery and courage, that when he was in Gaul no one durſt enter the liſts with him; for he was ſure to unhorſe his antagoniſt, or to break his ſpear into ſhivers. He was, moreover, generous in beſtowing, careful in performing

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AMBROSE, or **St AMBROSE** *in the Wood*, an order of religious, who uſe the Ambroſian office, and wear an image of that ſaint engraven on a little plate: in other reſpects, they conform to the rule of the Auguſtins. See AMBROSIAN *Office*, and AUGUSTINS.

AMBROSIA, in heathen antiquity, denotes the ſolid food of the gods, in contradiſtinction from the drink, which was called *nectar*. It had the appellation *ambroſia*, (compounded of the particle α. and βροτος, *immortal*,) as being ſuppoſed to render thoſe immortal who fed on it.

AMBROSIA, a genus of the pentandria order, belonging to the monœcia claſs of plants. Of this genus five ſpecies are enumerated; but having no properties worthy of notice, we omit any farther account of them.

AMBROSIAN OFFICE, in church-hiſtory, a particular formula of worſhip in the church of Milan, which takes its name from St Ambroſe, who inſtituted that office in the fourth century. Each church originally had its particular office; and when the Pope, in aftertimes, took upon him to impoſe the Roman office upon all the weſtern churches, that of Milan ſheltered itſelf under the name and authority of St Ambroſe; from which time the Ambroſian ritual has prevailed.

AMBROSIN, in middle-age writers, denotes a coin ſtruck by the lords or dukes of Milan, whereon was repreſented St Ambroſe on horſeback, with a whip in his right hand. The occaſion of this coinage is ſaid to have been a viſion of that ſaint, who appeared to the Milaneſe general in 1339, during the time of a battle.

AMBROSIUS AURELIANUS, or **AURELIUS AMBROSIUS**, a famous general of the ancient Britons, of Roman extraction. He was educated at the court of Aldroen of Amorica; who, at the requeſt of the Britons, ſent him over with ten thouſand men, to aſſiſt them againſt the Saxons, whom Vortigern had invited into Britain. Ambroſius had ſuch ſucceſs againſt the Saxons, that the Britons choſe him for their king, and compelled Vortigern to give up to him all the weſtern part of the kingdom divided by the Roman highway called *Watling-ſtreet*. Some time after, the Britons being diſcontented with Vortigern, and having withdrawn their allegiance from him, he returned to a caſtle in Wales, where being beſieged by Ambroſius, and the caſtle taking fire, he periſhed in the flames, and left his rival ſole monarch of Britain; who now took upon him the imperial purple, after the manner of the Roman emperors. Geoffrey of Monmouth tells us, that Ambroſius built Stonehenge near Saliſbury, in Wiltſhire. Ambroſius, according to this hiſtorian, coming to a monaſtery near Caercaradoc, now *Saliſbury*, where three hundred Britiſh lords, maſſacred by Hengiſt, lay buried, and reſolving to perpetuate the memory of this action, he ordered his workmen to prepare a large quantity of ſtones and other materials. But having, at the inſtigation of Tremounus archbiſhop of Caerleon, conſulted the famous Merlin, this magician adviſed him to ſend over to Ireland for certain great ſtones, called *chorea gigantum*, the giant's dance, placed in a circle on a hill called *Killair*, having been brought thither by giants from the fartheſt borders of Africa. A body of forces were accordingly ſent into Ireland, under Pendragon, Ambroſius's brother, to fetch theſe ſtones; but were oppoſed in their attempt by Gilliomanus king of the country, who derided the folly of the Britons in undertaking ſo ridiculous an expedition. Nevertheleſs, the Britons having vanquiſhed this prince in battle, brought away the ſtones; and by the direction and aſſiſtance of Merlin, who had accompanied them, theſe wonderful ſtones, by order of Ambroſius, were placed over the graves of the Britiſh lords, and are now what is called *Stonehenge*. Alexander Mecham celebrates this fable in his poem *De divinæ ſapientiæ laudibus*. Polydore Virgil aſſigns another origin of Stonehenge: he tells us it was erected by the Britons as a monument to their general Ambroſius, on the place where he fell in battle, to perpetuate the memory of his glorious actions and ſervices done to his country. Both theſe ſtories are rejected by our beſt antiquaries; who, however, are by no means agreed as to the true origin of this famous piece of antiquity *.

After the Britons had defeated the Saxons, and obliged them to retire northward, Ambroſius is ſaid to have convened the princes and great men at York, where he gave orders for repairing the churches deſtroyed by the Saxons, and reſtoring the exerciſe of religion to its former luſtre. This is confirmed by Matthew of Weſtminſter; who highly applauds the great zeal of Ambroſius in repairing the churches, encouraging the clergy, and reſtoring the honour of religion. The Monmouth hiſtorian gives this prince a very high character: "He was a man (ſays he) of ſuch bravery and courage, that when he was in Gaul no one durſt enter the liſts with him; for he was ſure to unhorſe his antagoniſt, or to break his ſpear into ſhivers. He was, moreover, generous in beſtowing, careful in performing religious duties, moderate in all things, and more eſpecially abhorred a lie. He was ſtrong on foot, ſtronger on horſeback, and perfectly qualified to command an army." The ſame author tells us he was poiſoned at Wincheſter by one Eopa a Saxon, diſguiſed as a phyſician, and hired for that purpoſe by Paſcentius one of the ſons of Vortigern: but the generally received opinion is, that he was killed in a battle which he loſt in the year 508, againſt Cerdric, one of the Saxon generals.

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* See *Stonehenge*.

AMBRY, a place in which are depoſited all utenſils neceſſary for houſe-keeping. In the ancient abbeys and priories, there was an office under this denomination, wherein were laid up all charities for the poor.

AMBUBAJÆ, in Roman antiquity, were immodeſt women, who came from Syria to Rome, where they lived by proſtitution, and by playing on the flute: the word is derived from the Syriac *abub*, which ſignifies a flute; altho' others make it to come from *am* and *Baiæ*, becauſe theſe proſtitutes often retired to Baiæ. According to Cruquius, theſe women uſed likewiſe to ſell paint for ornamenting the face, *&c.*

AMBURBIUM, in Roman antiquity, a proceſſion made by the Romans round the city and pomœrium, in which they led a victim, and afterwards ſacrificed it, in order to avert ſome calamity that threatened the city.

AMBURY, or ANBURY, among farriers, denotes a tumour, wart, or ſwelling, which is ſoft to the touch, and full of blood.

This diſorder of horſes is cured by tying a horſe-hair very hard about its root; and, when it has fallen off, which commonly happens in about eight days, ſtrewing ſome powder of verdigris upon the part, to prevent the return of the complaint. If the tumour be ſo low that nothing can be tied about it, they cut it out with a knife, or elſe burn it off with a ſharp hot iron; and, in ſinewy parts, where a hot iron is improper, they eat it away with oil of vitriol, or white ſublimate.

AMBUSCADE, or AMBUSH, in the military art, properly denotes a place where ſoldiers may lie concealed, till they find an opportunity to ſurpriſe the enemy.

AMBY, a town of the Auſtrian Netherlands, in the province of Limburg, ſituated oppoſite to Maeſtricht, on the eaſt-ſide of the river Maeſe, in E. Long. 5. 45. N. Lat. 50. 57.

AMEDIANS, in church-hiſtory, a congregation of religious in Italy, ſo called from their profeſſing themſelves *amantes Deum*, lovers of God; or rather, *amati Deo*, beloved of God.

AMELIA, an epiſcopal city of Italy, in the ſtate of the church, ſeated on a mountain, in the duchy of Spoletto. E. Long. 13. 20. N. Lat. 42. 33.

AMELLUS, STARWORT, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants.—Of this there are two

Species. 1. The lynchitis, with one flower on each footſtalk. This is a native of the Cape of Good Hope. It is a perennial plant, riſing about three feet high, ſending out many branches on each ſide, ſo as to form a buſhy plant; the branches are garniſhed with obtuſe ſpear-ſhaped leaves placed oppoſite, and are terminated by ſingle naked flower-ſtalks, each ſupporting one violet-coloured flower, having a yellow diſk, which is ſucceeded by oblong ſeeds. 2. The umbellatus, with flowers growing in umbels, is a native of Jamaica; and riſes from two to three feet high, ſending out many branches cloathed with oppoſite leaves, which are terminated by ſmall flowers in umbels.

Culture. The firſt is eaſily propagated, either by cuttings planted in the ſummer-months, or by ſeeds ſown on a moderate hot-bed in the ſpring, but the plants require a ſlight ſhelter in winter. The ſecond is much more tender, and therefore requires to be preſerved in a ſtove during the winter-ſeaſon.

AMEN, in the ſcripture-language, a ſolemn formula, or concluſion to all prayer, ſignifying *ſo be it*. The term *amen* is Hebrew, being derived from the verb *aman*, *i. e.* to be true, faithful, *&c.* So that, ſtrictly ſpeaking, it ſignifies *truth*; and uſed adverbially, as is frequently done in the goſpels, *truly* or *verily*. Sometimes it is repeated twice together, and then it ſtands for the ſuperlative: as, *Amen, amen, dico vobis*; "*Verily, verily*, I ſay unto you."

AMEND, or AMENDE, in the French cuſtoms, a pecuniary puniſhment impoſed by a judge for any crime, falſe proſecution, or groundleſs appeal.

AMENDE *Honorable*, an infamous kind of puniſhment inflicted in France upon traitors, parricides, or ſacrilegious perſons, in the following manner: The offender being delivered into the hands of the hangman, his ſhirt is ſtripped off, a rope put about his neck, and a taper in his hand; then he is led into court, where he muſt beg pardon of God, the king, the court, and his country. Sometimes the puniſhment ends here; but ſometimes it is only a prelude to death, or baniſhment to the galleys.

AMENDE *Honourable* is a term alſo uſed for making recantation in open court, or in preſence of the perſon injured.

AMENDMENT, in a general ſenſe, denotes ſome alteration or change made in a thing for the better.

AMENDMENT, in law, the correction of an error committed in a proceſs, which may be amended after judgment, unleſs the error lies in giving judgment; for in that caſe it is not amendable, but the party muſt bring a writ of error. A bill may be amended on the file at any time before the plea is pleaded; but not afterwards, without motion and leave of the court.

AMENDMENT *of a Bill*, in parliament, is ſome alteration made in the firſt draught of it.

AMENTUM, in botany, the name of a ſpecies of calix, conſiſting of valves, and hanging down in different directions from the caulis. Common oats afford a good example of the amentum.

AMENTUM, in Roman antiquity, a thong tied about the middle of a javelin or dart, and faſtened to the fore-finger, in order to recover the weapon as ſoon as it was diſcharged. The ancients made great uſe of the amentum, thinking it helped to enforce the blow. It alſo denotes a latchet that bound their ſandals.

AMERCEMENT, or AMERCIAMENT, in law, a pecuniary puniſhment impoſed on offenders at the mercy of the court. It differs from a fine in being impoſed arbitrarily in proportion to the fault; whereas a fine is a certain puniſhment ſettled expreſsly by ſome ſtatute.

AMERICA, (from *Americus Veſputius*, falſely ſaid to be the firſt diſcoverer of the continent); one of the four quarters of the world, probably the largeſt of the whole, and, from its late diſcovery, frequently denominated the *New World*.

1 ndaries.

This vaſt country is bounded, on the eaſt, by the Atlantic ocean, which ſeparates it from Europe and Africa; on the weſt, by the Pacific ocean, or great South ſea, by which it is ſeparated from Aſia. On the ſouth, it is bounded by the Frozen ocean. But its boundaries towards the north have never been aſcertained; nor is it known whether the northern parts of America join to thoſe of Europe and Aſia or not. As far as it is known, America extends from Lat. 80° N. to 56° S. and from 35° to 136° Long. W. from London; its length being between 8000 and 9000 miles, and its greateſt breadth 3690.

2 th and h conti- ts.

America is by no means of equal breadth throughout its whole extent; but is divided into two great continents, called *North* and *South America*, by an Iſthmus 1500 miles long, and which at Darien, about Lat. 9° N. is only 60 miles over. This iſthmus forms, with the northern and ſouthern continents, a vaſt gulph, in which lie a great number of iſlands, called the *Weſt Indies*, in contradiſtinction to the eaſtern parts of Aſia, which are called the *Eaſt Indies*.

3 arkable alence old.

Between the New World and the Old, there are ſeveral very ſtriking differences; but the moſt remarkable is the general predominance of cold throughout the whole extent of America. Though we cannot, in any country, determine the preciſe degree of heat, merely by the diſtance from the equator; becauſe the elevation above the ſea, the nature of the ſoil, &c. affect the climate; yet, in the ancient continent, the heat is much more in proportion to the vicinity to the equator, than in any part of America. Here the rigour of the frigid zone extends over half that which ſhould be temperate by its poſition. Even in thoſe latitudes where the winter is ſcarcely felt on the old continent, it reigns with great ſeverity in America, tho' during a ſhort period. Nor does this cold, prevalent in the New world, confine itſelf to the temperate zones; but extends its influence to the torrid zone alſo, conſiderably mitigating the exceſs of its heat.—Along the eaſtern coaſt, the climate, tho' more ſimilar to that of the torrid zone in other parts of the earth, is nevertheleſs conſiderably milder than in thoſe countries of Aſia and Africa which lie in the ſame latitude. From the ſouthern tropic, to the extremity of the American continent, the cold is ſaid to be much greater than in parallel northern latitudes even of America itſelf.

For this ſo remarkable difference between the climate of the New continent and the Old, various cauſes have been aſſigned by different authors. The following is the opinion of the learned Dr Robertſon on this ſubject. "Though the utmoſt extent of America towards the north be not yet diſcovered, we know that it advances nearer to the pole than either Europe or Aſia. The latter have large ſeas to the north, which are open during part of the year; and, even when covered with ice, the wind that blows over them is leſs intenſely cold than that which blows over land in the ſame latitudes. But, in America, the land ſtretches from the river St Lawrence towards the pole, and ſpreads out immenſely to the weſt. A chain of enormous mountains, covered with ſnow and ice, runs through all this dreary region. The wind paſſing over ſuch an extent of high and frozen land, becomes ſo impregnated with cold, that it acquires a piercing keenneſs, which it retains in its progreſs through warmer climates; and is not entirely mitigated until it reach the Gulph of Mexico. Over all the continent of North America, a northweſterly wind and exceſſive cold, are ſynonimous terms. Even in the moſt ſultry weather, the moment that the wind veers to that quarter, its penetrating influence is felt in a tranſition from heat to cold, no leſs violent than ſudden. To this powerful cauſe we may aſcribe the extraordinary dominion of cold, and its violent inroads into the ſouthern provinces in that part of the globe.

4 Robert- s reaſons this ſu- or de- of cold. ry of r. vol. I. 53.

"Other cauſes, no leſs remarkable, diminiſh the active power of heat in thoſe parts of the American continent which lie between the tropics. In all that portion of the globe, the wind blows in an invariable direction from eaſt to weſt. As this wind holds its courſe acroſs the ancient continent, it arrives at the countries which ſtretch along the weſtern ſhore of Africa, inflamed with all the fiery particles which it hath collected from the ſultry plains of Aſia, and the burning ſands in the African deſarts. The coaſt of Africa is, accordingly, the region of the earth which feels the moſt fervent heat, and is expoſed to the unmitigated ardour of the torrid zone. But this ſame wind, which brings ſuch an acceſſion of warmth to the countries lying between the river of Senegal and Cafraria, traverſes the Atlantic ocean before it reaches the American ſhore. It is cooled in its paſſage over this vaſt body of water; and is felt as a refreſhing gale along the coaſts of Braſil and Guiana, rendering thoſe countries, tho' amongſt the warmeſt in America, temperate, when compared with thoſe which lie oppoſite to them in Africa. As this wind advances in its courſe acroſs America, it meets with immenſe plains, covered with impenetrable foreſts; or occupied by large rivers, marſhes, and ſtagnating waters, where it can recover no conſiderable degree of heat. At length it arrives at the Andes, which run from north to ſouth thro' the whole continent. In paſſing over their elevated and frozen ſummits, it is ſo thoroughly cooled, that the greater part of the countries beyond them hardly feel the ardour to which they ſeem expoſed by their ſituation. In the other provinces of America, from Terra Firma weſtward, to the Mexican empire, the heat of the climate is tempered, in ſome places, by the elevation of the land above the ſea; in others, by their extraordinary humidity; and in all, by the enormous mountains ſcattered over this tract. The iſlands of America in the torrid zone are either ſmall or mountainous, and are fanned alternately by refreſhing ſea and land breezes.

"The cauſes of the extraordinary cold towards the ſouthern limits of America, and in the ſeas beyond it, cannot be aſcertained in a manner equally ſatisfying. It was long ſuppoſed, that a vaſt continent, diſtinguiſhed by the name of *Terra Auſtralis Incognita*, lay between the ſouthern extremity of America and the antarctic pole. The ſame principles which account for the extraordinary degree of cold in the northern regions of America, were employed in order to explain that which is felt at Cape Horn and the adjacent countries. The immenſe extent of the ſouthern continent, and the rivers which it poured into the ocean, were mentioned and admitted by philoſophers as cauſes ſufficient to occaſion the unuſual ſenſation of cold, and the ſtill more uncommon appearances of frozen ſeas in that region of the globe. But the imaginary continent to which ſuch influence was aſcribed having been ſearched for in vain, and the ſpace which it was ſuppoſed to occupy having been found to be an open ſea; new conjectures muſt be formed with reſpect to the cauſes of a temperature of climate, ſo extremely different from that which we experience in countries removed at the ſame diſtance from the oppoſite pole.

Ibid. *p.* 451. *note* xxxi.

"The moſt obvious and probable cauſe of this ſuperior degree of cold, towards the ſouthern extremity of America, ſeems to be the form of the continent there. Its breadth gradually decreaſes as it ſtretches from St Antonio ſouthwards, and from the bay of St Julian to the ſtraits of Magellan its dimenſions are much contracted. On the eaſt and weſt ſides, it is waſhed by the Atlantic and Pacific oceans. From its ſouthern point, it is probable, that an open ſea ſtretches to the antarctic pole. In which ever of theſe directions the wind blows, it is cooled before it approaches the Magellanic regions, by paſſing over a vaſt body of water; nor is the land there of ſuch extent, that it can recover any conſiderable degree of heat in its progreſs over it. Theſe circumſtances concur in rendering the temperature of the air in this diſtrict of America, more ſimilar to that of an inſular, than to that of a continental climate; and hinder it from acquiring the ſame degree of ſummer-heat, with places in Europe and Aſia, in a correſponding northern latitude. The north wind is the only one that reaches this part of America, after blowing over a great continent. But, from an attentive ſurvey of its poſition, this will be found to have a tendency rather to diminiſh than augment the degree of heat. The ſouthern extremity of America, is properly the termination of the immenſe ridge of the Andes, which ſtretches nearly in a direct line from north to ſouth, through the whole extent of the continent. The moſt ſultry regions in South America, Guiana, Braſil, Paraguay, and Tucuman, lie many degrees to the eaſt of the Magellanic regions. The level country of Peru, which enjoys the tropical heats, is ſituated conſiderably to the weſt of them. The north wind, then, though it blows over land, does not bring to the ſouthern extremity of America an increaſe of heat collected in its paſſage over torrid regions; but, before it arrives there, it muſt have ſwept along the ſummit of the Andes, and come impregnated with the cold of that frozen region."

5 Theſe reaſons inſufficient.

Was the ſouthern part of America only moderately cool, no doubt the above reaſons would be entirely ſatisfactory; but it muſt be remembered, that the cold at the ſouthern extremity of America is not only much greater than in thoſe parts of Europe or Aſia lying under equal parallels of north latitude, but even the places in North America itſelf which lie in the ſame latitudes. We muſt even obſerve, with all due deference to the abilities of our learned and eloquent hiſtorian, that the reaſons he gives, as a philoſopher, for the extreme cold in North and South America, contain a direct contradiction.—The wind which blows over frozen land, he tells us, p. 253. is colder than that which blows over frozen ſea. This of itſelf is ſomewhat problematical; however, we ſhall accept of it without diſpute. North America, then, is colder than Europe or Aſia, becauſe the continent is larger than the northern parts of Europe and Aſia put together. This hath never been proved, and is not far from being incredible; but ſtill we ſhall not diſpute. North America is exceſſively cold becauſe it is a *large* continent; but why is South America ſtill colder?—Becauſe it is a *ſmall* one.

6 Diſcuſſio of the q ſtion wh continen are cold than iſla

We are now led into a diſcuſſion of the philoſophical queſtion concerning the reaſon why cold predominates more in large continents than in iſlands; and if we determine this queſtion in the common way, namely, that the vicinity of the ſea keeps the cold from becoming ſo violent in the latter as in the former, it is plain, we ſhall then run into the ſame difficulty which we have juſt now obſerved Dr Robertſon unſucceſsfully endeavouring to ſolve. It will be proper, however, before entering upon either of theſe queſtions, to conſider the general cauſes by which different degrees of heat are produced in different parts of the world; and then to examine the ſtate of facts with regard to the different degrees of cold in North and South America.

Though the ſun is the prime agent in nature by which every degree of ſenſible heat is produced, and to the preſence or abſence of his rays heat and cold are to be ultimately aſcribed; yet ſo many circumſtances concur in augmenting or diminiſhing the effect of his light, that ſome philoſophers have not ſcrupled to aſſert, that this luminary does not *produce* heat, but only *regulate* that which is produced from other cauſes *.

The determination of this queſtion we reckon to be of no importance at preſent; for if the ſun *produces* heat, why does he not produce it equally in countries equally expoſed to his action? If he only *regulates* it, why does he not regulate the heat equally in ſimilar parallels of northern or ſouthern latitude? Whether, therefore, we allow the ſun to be the original fountain, or only the regulator of heat, we muſt own that there are certain circumſtances peculiar to different countries, which tend very much to ſuperſede his action.

7 Some bo more ſuſc tible of h than oth

It is certain, that there are ſome kinds of bodies of ſuch a nature, that, though they are expoſed to equal degrees of heat, one of them will become much hotter to the touch than the other, in the ſame time. All ſolid bodies will become hot much ſooner than water, and will be alſo ſooner ſuſceptible of a violent degree of cold. Earth is therefore always diſpoſed to be ſooner affected than water by the influence of the ſun's rays; and conſequently to become much hotter in ſummer, as well as more violently cold in winter, than that element. The great quantity of moiſture with which the earth is always impregnated, can be no objection to the truth of this obſervation: for it is certain, that moiſt earth will be affected by froſt much ſooner than an equal ſurface of water; and it is a well known fact, that water can by no means be made to evaporate by heat ſo faſt as when it is mixed with earth, or ſome other ſolid ſubſtance in powder, ſo as to form a kind of paſte; provided that paſte is not ſuffered to harden in ſuch a manner as to detain the aqueous moiſture in the middle of it.

8 The ſummer neceſſarily very hot in continents.

This ſingle principle, therefore, namely, that water is leſs ſuſceptible of heat than earth, will in a great meaſure determine what muſt be the difference of climate between a large tract of land, and an equal one of ſea.—In ſummer, the land, being expoſed to the ſun's rays acting more powerfully than at other times, muſt neceſſarily acquire a great degree of heat, as long as their operation continues with much force. But as ſolid bodies are apt to part readily with their heat, the ſuperfluous quantity will be daily diſcharged into the atmoſphere; and the earth will have loſt ſo much heat during the night, as will enable it to receive a freſh quantity next day without injury to plants or animals. In conſequence of this, the air will gradually come to be very hot; and if there was not ſome cauſe whereby this continual increaſe of heat is limited, it might certainly become intolerable.

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Where there is a vaſt tract of ſea, the caſe muſt be widely different. Water is an element in itſelf not ſo eaſily heated as earth. By reaſon of its fluidity, alſo, the heat will penetrate deeper into it than into the earth; hence, in the courſe of one ſummer, equal tracts of land and ſea will be very unequally heated. The warmth of the latter will be much leſs, but it will extend much deeper, and will be more durable; and having leſs heat to communicate to the atmoſphere than earth, the climate, even in ſummer, muſt be much colder than on an equal tract of land.—On the approach of winter, the atmoſphere is firſt cooled by reaſon of its wanting the uſual influence of the ſun's rays. The ſurface of the earth then communicates part of its heat to the air, which abſorbs it with avidity; but, as the heat could not penetrate far into the earth, neither can the cold, and conſequently the dry land is expoſed to the action of heat or cold only for a ſmall ſpace downwards.—In water, the caſe is different: that element becomes ſpecifically heavier by cold: in conſequence of which, its uppermoſt ſurface is no ſooner cooled, ever ſo little beyond that which lies immediately below, than it ſinks down, and preſents a new ſurface to the action of the air; and, it is plain, that this muſt be repeated, till the whole body of water is reduced to the ſame temperature. In the inſtant of freezing, water diſcharges a great quantity of heat, as has been obſerved by Dr Black and others *. This affords a new ſupply to the atmoſphere; ſo that all the time water is freezing, the cold of the atmoſphere will be conſiderably moderated by the heat diſcharged from the newly formed ice. When the ice is once formed, indeed, the atmoſphere ſtill continues to act upon it, and to cool it ſtill more; but as it is now a ſolid body, this action will be confined to its ſurface, the under parts remaining pretty much inactive either as to the production of heat or cold beyond the freezing point.

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On the return of ſummer, the ice, which has been formed during the winter, will require as much heat merely to melt it, as would be ſufficient to heat a ſolid body of an equal bulk almoſt to 175° of Fahrenheit, as Dr Black's experiments have undeniably proved †; and tho' the ſnow and ice on land will require the ſame degree of heat to melt them as on ſea, yet their quantity at land muſt always be much leſs than at ſea, becauſe of the ſmall quantity of water on the land.—When the ſnow, with which the ground was covered, is totally melted, the ſun has then liberty to act upon the ground itſelf, and will heat it accordingly. Thus, on account of the much greater quantity of ice on ſea than on land, a great part of the ſummer will be ſpent before the water can be reduced to a temperature barely above the freezing point; while the land will have received as much heat as to communicate a very conſiderable degree to the atmoſphere.

12
Concluſion.

From what we have juſt now ſaid, it muſt be eaſy to diſcover, what will be the difference between the correſponding ſeaſons on ſea and on land.—On ſea, where there is much ice, the heat of the ſummer is in a manner totally abſorbed in a latent ſtate*, ſo as ſcarcely to be perceived. In winter, the extreme cold is moderated by the emiſſion of the latent heat formerly abſorbed on the melting of the ice, but now again diſcharged on its ſecond freezing. The whole year, therefore, on a large tract of ſea, will be in a manner one continued winter. On a continent, as the land does not abſorb much heat, the greateſt part will be reverberated into the atmoſphere, ſo that the ſummer muſt be extremely hot; and, in winter, as the ground has not abſorbed much heat, ſo it can communicate little to moderate the cold, which, of conſequence, will be exceſſive.—We may conclude, therefore, that, in a large continent, the winter will be exceſſively cold, and the ſummer exceſſively hot; but, on the ocean, or in iſlands at a conſiderable diſtance from the continent, the ſummer will neither be ſo hot nor the winter ſo cold as in the correſponding places on the continent; and if the heat of ſummer is not ſufficient to thaw the ice collected during the winter, there muſt be afterwards a perpetual abſence of ſummer without any violent degree of winter.

13
Supported by the teſtimonies of different authors.

What we have here advanced is ſupported by the teſtimonies of all reſpectable authors who have treated of the different degrees of heat found in different parts of the world.—In Lapland, the moſt northerly part of the continent of Europe, the winters are ſo ſevere, that it is not unuſual for people's lips to be frozen to the cup while they are attempting to drink, the limbs of the inhabitants very often mortify with cold, and the ground is covered with ſnow to the depth of ſeveral feet; but, in ſummer, the heat is exceſſive for a ſhort time. The heats of ſummer in Norway, alſo, are very great, according to the biſhop of Pontopiddan's account. The ſame thing is likewiſe related of Sweden, where, though the winter is extremely ſevere, the ſummer's heat is ſaid to be ſo great as ſometimes to ſet foreſts on fire; but this is undoubtedly an exaggeration. Certain it is, however, that in theſe northern countries, where the ſummer is very ſhort, it muſt be proportionally hotter than in this country, otherwiſe no kind of grain could be brought to perfection. In Siberia, the winter cold is exceſſive beyond what in this country we can have any notion of: and it may be well ſuppoſed to be ſo; as being environed by land on all ſides except the north, where it is probably bounded by the frozen ocean. According to ſome obſervations communicated to the Royal Academy of Sciences by M. de Liſle of Peterſburg, the mercury in Fahrenheit's thermometer, in the winter 1737, fell to 118° below 0; and this at Kirenga, a place lying only in N. Lat. 58° 10'. ſcarce ſo far to the northward as the ſhire of Caithneſs in Scotland. Yet even in Siberia, much farther north, within the arctic circle itſelf, we find ſeveral towns marked on our maps; and were not ſuch exceſſive cold balanced in ſome degree by a warm ſummer, it is utterly impoſſible that human creatures could ſupport the climate. At Peterſburg, lying in Lat. 60°, the cold was lately ſo intenſe, as to ſink the thermometer 40° below 0, when the remarkable experiment concerning the freezing of quickſilver was tried*: but even this

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this extreme cold was far ſhort of that juſt now mentioned at Kirenga; probably owing to the latter being more to the eaſtward, and farther in the continent, than Peterſburg. The cold at Kirenga was only 22° below what is ſufficient to freeze quickſilver, as Dr Black hath rendered very probable; and in ſome places of Siberia, lying near the polar circle, it is not improbable that mercury might freeze naturally without the help of artificial cold.

14
North American winters not ſo cold as thoſe of Aſia.

Though the climate of North America certainly appears colder to thoſe who have viſited it, than the correſponding places of Europe, yet we have no proof that the colds in that part of the world are abſolutely ſuperior to thoſe on the eaſtern continent; indeed we cannot well ſuppoſe any degree of cold ſuperior to what we have already mentioned. At Albany-fort, on Hudſon's-bay, ſituated in Lat. 53°. 20'. N. the thermometer in winter 1775 ſtood at 28° below 0. This was certainly very great, but far inferior to the abovementioned Siberian cold in Lat. 58° 10'; and it cannot be thought, that the ſmall difference in latitude would occaſion ſuch an enormous difference in the degree of cold.

In a ſtrict ſenſe, then, we muſt allow the climate of North America to be warmer than that of the eaſtern continent; for no experiments made with the thermometer have hitherto ſhewn ſuch a degree of cold to exiſt in North America as in Aſia. It is colder, however, in this reſpect, that the winter is, as it were, mixed with the ſummer; and this undoubtedly is owing to the continent being *ſmaller*, not larger as Dr Robertſon aſſerts, than Europe and Aſia put together.——It is certain, that where any country is ſo ſituated that great part of it is covered with ſnow throughout the whole year, thoſe places which lie near the ſnowy regions will be ſenſible of winter even in the midſt of ſummer. From the principles already laid down, if the ſummer heat is inſufficient to melt the ſnow, the air will continue almoſt as cold in ſummer as in winter, becauſe whatever quantity of heat is ſent forth by the ſun, it is all abſorbed and in a latent ſtate.——Here we cannot help remarking, that, notwithſtanding the learned Doctor's aſſertion, it is utterly impoſſible that a tract of land covered with ſnow, and a tract of ſea covered with ſnow, can affect the temperature of the atmoſphere differently. The reaſon is plain; becauſe it is only the ſnow or ice, and neither the land below it nor the ſea below it, that affects the atmoſphere. The vicinity of a tract of land covered with ſnow, or a tract of ſea covered with ſnow, muſt therefore prodigiouſly affect the ſummer of countries adjacent to them, and will undoubtedly produce chilling blaſts as often as the wind blows from that quarter; and this is the caſe with North America, as already mentioned.

The reaſon why ſuch large tracts in North America are conſtantly covered with ſnow, is probably the prodigious number and ſize of its mountains, greatly exceeding what are to be found on the eaſtern continent. The tops of high mountains are always exceſſively cold, even in the warmeſt regions; and they neceſſarily keep off the warmth of the ſun in ſummer from large tracts of ground. For this reaſon, they naturally produce cold ſummers; but they alſo afford ſhelter to the trees and other vegetables in winter; ſo that wood is found in America much farther north than in Aſia. This, which is a very ſtrong proof of the greater cold of the Aſiatic winters than the North American, will appear from the following account * of the climate of North America, contraſted with that of the eaſtern coaſt of Aſia.

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"The American land is in a much better ſtate, with regard to climate, than the farthermoſt eaſtern part of Aſia, though it lies near the ſea, and has every where high mountains, ſome of which are covered with perpetual ſnows; for that country, when its qualities are compared with thoſe of Aſia, has by far the advantage. The mountains of that part of Aſia are every where ruinous and cleft; from whence they have, long ſince, loſt their conſiſtency, and likewiſe their inward warmth; upon which account, they have no good metal of any kind; no wood nor herbs grow there, except in the valleys, where is ſeen ſmall bruſh-wood and ſtiff herbs. On the contrary, the mountains of America are firm, and covered on the ſurface, not with moſs, but with fruitful earth or mold; and therefore, from the foot to the very top, they are decked with thick and very fine trees. At the foot of them, grow herbs proper to dry places, and not to marſhy ones; beſides that, for the moſt part, thoſe plants are of the ſame largeneſs and appearance both on the lower grounds and on the very tops of the mountains, by reaſon that there is every where the ſame inward heat and moiſture. But, in Aſia, there is ſo great a difference between them, that of one kind of plants growing there, one would be apt to make ſeveral kinds, if one did not obſerve a rule, which holds generally with regard to thoſe places, *viz.* That, in lower grounds, herbs grow twice as large as on the mountains.

"In America, even the ſea-ſhores, at 60° latitude, are woody; but in Kamtchatka, at 51° lat. no place ſet with ſmall willows and alder-trees is found nearer than 20 verſtes from the ſea: plantations or woods of birch-trees are, for the moſt part, at the diſtance of 30 verſtes; and with regard to pitch-trees, on the river Kamchatka, they are at the diſtance of 50 verſtes, or more, from its mouth. At 62°, there is no wood at Kamtchatka.

"In Steller's opinion, from the aforementioned latitude of America, the land extends as far as 70°, and farther; and the chief cauſe of the aforeſaid growth of woods in that country, is the cover and ſhelter it has from the weſt. On the other hand, the want of wood on the Kamtchadalian ſhores, eſpecially on the ſhore of the Penſhinian ſea, doubtleſs comes from a ſharp north wind, to which it is much expoſed. That thoſe parts which lie from the Lopatka, farther to the north, are more woody and fruitful, is owing to cape Tchukotſki, and the land that has been obſerved over againſt it, by which thoſe parts are ſheltered from the ſharp winds.

"For this reaſon, alſo, fiſh come up the rivers of America earlier than thoſe of Kamtchatka. The 20th of July, there has been obſerved a great plenty of fiſh in thoſe rivers; whilſt at Kamtchatka, it is then but the beginning of an abundant fiſhery."

In the ſouthern hemiſphere the water bears a much larger proportion to the land than in the northern. From the chart prefixed to Mr Forſter's account of Capt Cook's voyages in 1772, 1773, 1774, and 1775, it appears, that the whole ſpace contained between the ſouth pole, and 30° of lat. all round the globe, is entirely occupied

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pied by the ocean, except a ſmall part of South America, a ſtill ſmaller part of Africa, the iſlands of New Zealand, and a very inconſiderable portion of New Holland. Here, according to what we have advanced, a perpetual winter ought to take place; and for a great part of the ſpace it actually does ſo. In 1766, Oct. 30th, Commodore Byron, while in lat. 35. 50 S. found the weather as cold as in the ſame month in England. In 1766, Nov. 12. Captain Wallis found it very cold in Lat. 30° S. though the month of November in that climate correſponds to that of May with us.—In 1769, January 3. Captain Cook's people complained of cold in lat. 47. 17. S. and were cloathed in their winter-garments; though this was the month which correſponds to July with us, and conſequently the warmeſt in the whole year: nay, on the 16th of this month, Dr Banks and Dr Solander having gone aſhore on Tierra del Fuego, lying in a ſouth latitude correſponding to that of England, they were overtaken by a violent ſtorm of ſnow, and the cold was ſo exceſſive as to kill two of their attendants. In 1770, March 18th, correſponding to the ſame day of September with us, the whole country of New-Zealand, in lat. 43. 4. S. was covered with ſnow. In November 1772, Captain Cook's people put on their winter-dreſs in lat. 42° S. and on December 5th, correſponding to the ſame day of June in this country, the thermometer ſunk to 38° during the night; and ſome ſnow fell next morning. Five days after, having advanced as far as lat. 49. 45. S. the thermometer ſunk to 32°, and freſh water began to freeze aboard their ſhip. The next morning, they fell in with ice floating on the ſea. Proceeding ſtill to the ſouthward, they were ſtopped in lat. 67. 15. S. by field ice, ſuch as is met with in the high northern latitudes, only much thicker.

When they had once fallen in with the ice, it does not appear that the cold had greatly increaſed: for though they afterwards proceeded as far as 71° 10′. S. the weather was far from being intolerable; for at that latitude, on January 30th 1774, the thermometer ſtood only at 32°.

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We ſhall conclude this ſubject with ſome obſervations made by Mr Forſter, on the climate of different places in the ſouthern hemiſphere. The following is an account of the climate of New Zealand in Novr. 1773.—"Scarce a day paſſed without heavy ſqualls of wind, which hurried down with redoubled velocity from the mountains; and ſtrong ſhowers of rain, which retarded all our occupations. The air commonly was cold and raw, vegetation made ſlow advances, and the birds were only found in the valleys ſheltered from the chilling ſouthern blaſt. This kind of weather, in all likelihood, prevails throughout the winter; and likewiſe, far into the middle of ſummer, without a much greater degree of cold in the former, or of warmth in the latter ſeaſon. Iſlands far from any continent, or at leaſt not ſituated near a cold one, ſeem in general to have an uniform temperature of air; owing, perhaps, to the ocean which every where ſurrounds them. It appears from the meteorological journals kept at Port Egmont, on the Falkland Iſlands; that the extremes of the greateſt cold and the greateſt heat obſerved there throughout the year, do not exceed 30° on Fahrenheit's ſcale. The latitude of that port is 51. 25. S. and that of Ship-cove, in Queen Charlotte's ſound, only 41. 5. This conſiderable difference of ſite, will naturally make the climate infinitely milder than that of Falkland's Iſlands, but cannot affect the general hypotheſis concerning the temperature of all iſlands; and the immenſe height of the mountains in New Zealand, ſome of which are covered with ſnow throughout the year, doubtleſs contributes to refrigerate the air, ſo as to aſſimilate it to that of the Falkland's Iſles, which are not ſo high."

18 Tierra del Fuego deſcribed.

Tierra del Fuego, the ſouthern extremity of America, is thus deſcribed. "On the 2d of December 1774, after a ſhort calm, we had a freſh breeze, which continued to blow without intermiſſion, but with different degrees of velocity, till the 18th, when we made the land, a little after midnight, near Cape Deſeado, on one of the weſtermoſt iſlands of Tierra del Fuego. The part of the world which was now in ſight, had a very unfavourable aſpect. About 3 o'clock in the morning, we ran along it, and found it for the greateſt part hid in a thick haze. The parts near us ſeemed to be ſmall iſlands, which, though not very high, were, however, very black, and almoſt entirely barren. Beyond them we ſaw ſome broken high lands, which were covered with ſnow, almoſt to the water's edge.—In the afternoon, we paſſed the iſland upon which cape Noir is ſituated, mentioned by M. Frezier.—We found many ſeparate iſlands, from the place where we made the coaſt, to Cape Noir; and ſhould perhaps have ſeen many more, if the weather had not been very hazy.

"We found the land to all appearance much more compact after paſſing Cape Noir; and the next morning, December 19th, in particular, the coaſt ſeemed to be entirely connected; the mountains roſe to a much greater height, immediately from the ſea-ſide, and were covered with ſnow in every part. The wind gradually leſſened, and towards noon we were entirely becalmed, having the fineſt ſunſhine and mild weather.—It was very amuſing to us to meet with mild weather in the neighbourhood of that tempeſtuous cape, of which the name alone has affrighted the mariners ever ſince Lord Anſon's voyage. The deſtruction of vulgar prejudices is of ſo much ſervice to ſcience, and to mankind in general, that it cannot fail of giving pleaſure to every one ſenſible of its benefits. We had this day the thermometer at 48°; which, conſidering the neighbourhood of the huge heaps of ſnow on ſhore, was very moderate. This part of the world has been called the *Coaſt of Deſolation* by the navigators who firſt viſited it, and ſeems fully to deſerve the appellation. Here we diſcovered nothing but vaſt mountains, of which the ſpiry ſummits were every where covered with eternal ſnow. Along the ſea, the neareſt rocks were clear of ſnow; but black, and deſtitute of graſſes and ſhrubbery. Some inlets appeared in different parts, where a few iſlands ſeemed to have a covering of green. We ſtood in to one of theſe in the evening, having obtained an eaſterly breeze. A huge perpendicular wall of rock formed its weſtern entrance, and Captain Cook called it the *York Minſter;* having diſcovered a ſtrong reſemblance between that Gothic building, and this dreary chaotic rock. It lies in 55. 30. S. and 70. 28. W. Along the coaſt we found regular ſoundings; but, in the mouth of the inlet, we could not reach the bottom with 150 fathom of line. This circumſtance had already happened to us before, at Duſky Bay (New-Zealand); but, as we ſaw a very ſpacious ſound before us, we ventured to ſtand on, amidſt different rude iſlands; on which the ſummits of the hills were ſometimes capped with ſnow.—After being much retarded by calms, we arrived about 9 o'clock in a ſmall cove, indifferently ſheltered either from wind or ſea, but a welcome place of refuge on account of the approach of night.

"The next morning Captain Cook, &c. went in a boat in queſt of a more ſafe and convenient anchorage. We only rowed round a ſingle point of the iſland under which our ſhip lay, and immediately found a fine cove ſheltered from all winds, and perfectly land-locked, with a little rill of water, and a ſhrubbery. The weather was mild, conſidering the climate; and ſeveral birds were heard on ſhore. We found many little clefts, which cannot properly be called valleys, where a few ſhrubs of different ſpecies ſprung up in a thin layer of ſwampy ſoil, being defended againſt the violence of ſtorms, and expoſed to the genial influence of reverberated ſunbeams. The rock, of which the whole iſland conſiſted, is a coarſe granite, compoſed of feld-ſpath, quartz, and black mica or glimmer. This rock is in moſt places entirely naked, without the ſmalleſt vegetable particle; but wherever the rains or melted ſnows have waſhed together ſome little rubbiſh, and other particles in decay, it is covered with a coating of minute plants, in growth like moſſes, which forming a kind of turf about an inch or more in thickneſs, very eaſily ſlip away under the foot, having no firm hold on the rock. In ſheltered places, a few other plants thrive among theſe moſſy ſpecies, and theſe at laſt form a ſufficient quantity of ſoil for the nutriment of ſhrubs, eſpecially in ſuch ſpots as I have mentioned before.——Barren as theſe rocks appeared, yet almoſt every plant we gathered on them was new to us; and ſome ſpecies were remarkable for the beauty of their flowers, or their ſmell.

"Early the next morning, Captain Cook ſet out to take bearings in the ſound, and we took that opportunity to examine its natural productions. The ſound is very ſpacious, and ſurrounded to the north and eaſt by ſeveral ranges of high mountains, which ſeem covered with permanent ſnow and ice.—On entering this ſound, and taking notice of its dreary deſolate appearance, we had ſuppoſed that the natives of Tierra del Fuego never touch upon this inhoſpitable part, but confine themſelves to the neighbourhood of the ſtraits of Magalhaens, and to the eaſtern ſide of Tierra del Fuego; but it ſeems that human nature is capable of withſtanding the greateſt inclemencies of weather, and of ſupporting its exiſtence alike in the burning ſands of Africa, and in the frozen extremities of the globe. We landed on ſeveral other iſlands, from whence we had a moſt extenſive proſpect acroſs the ſound, which looked wild and horrid in its wintery dreſs. This was, however, the firſt ſummer month of theſe regions; moſt of the plants we ſaw were in flower, and the birds were every where bringing up their young. From thence we may eaſily form an adequate idea of the torpid ſtate of theſe regions, where the ſun-beams cannot melt the ſnow, at a ſeaſon when their influence is the ſtrongeſt. The farther we advanced from the ſea, the more ſnow appeared on the mountains. In ſome places, we ſaw caſcades, and ſtreams, guſhing down over the ſnow, eſpecially where the rays of the ſun took effect by being frequently reflected. We found a moſt beautiful cove on this coaſt, which formed a circular baſon, where the water was ſmooth and tranſparent as a mirror. All the lower parts were fringed with trees, which we had no where ſeen ſo tall in the neighbourhood, and many ſtreams guſhed down with great impetuoſity between their roots, making a moſt convenient watering place. A prodigious number of ſmall birds ſat on every branch, and twittered around us in the ſun-ſhine. They were of many different ſpecies; but, unacquainted with men, hopped ſo near us, that it was impoſſible to ſhoot them, eſpecially as we had no other than coarſe ſhot left, and that in very ſmall quantity. Abundance of moſſes, ferns, and climbers, grew up between the trees, and were no ſmall impediment to us in walking. Various flowers enlivened theſe woods, and increaſed our collection with new ſpecies. Here, then, there was the appearance of ſummer; but if we looked up to the monſtrous cloud-capt mountains which formed almoſt perpendicular walls on all ſides of the harbour, and beheld them covered with ſnow and ice, which had ſometimes a blue, and ſometimes a yellowiſh tinge, we thought ourſelves tranſported to the Glaciers of Switzerland, where the ſeaſons ſeem likewiſe to be loſt and confounded in each other. The height of theſe mountains was very conſiderable, tho' not equal to the Alps; and their ſummits were divided into many ſharp and craggy points, between which the interval was filled with ſnow. We landed here; and walked along the ſhore to another port, formed by a number of low iſlands, which entirely ſheltered it from all winds.—We were fortunate enough to meet with an iſland entirely covered with the ſhrubs of a ſpecies of arbutus, loaded with red fruit, of the ſize of ſmall cherries, which were very well taſted, and combined an agreeable tartneſs with a ſweet and a bitter flavour. The rocks of the ſame iſland, at the water's edge, were covered with large muſcle-ſhells, of which we found the fiſh more delicious than oyſters.—To add to our good fortune, we met with ſeveral iſlands on our return, covered with excellent celery, which, tho' much ſmaller than that of New Zealand, was much higher flavoured, its juices being probably more concentrated. We loaded our boat with it, and returned late on board, after being overtaken by ſeveral ſmart ſhowers. On our return, we found that the neighbourhood of the ſhip was very ſenſibly warmer than the northern parts of the ſound, where the air was refrigerated by the abundance of ſnow on the mountains.——

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Tierra de
Fuego.

December 25th. "During our abſence, ſome of the natives, in four ſmall canoes, had viſited the ſhip: they were deſcribed to us as wretched and poor; but inoffenſive, and ready to part with their ſpears, ſeal-ſkins, and the like. We now regretted that we had loſt the opportunity of ſeeing them; but fortunately they returned the next morning, tho' the weather was rainy. The four canoes in which they came were made of the bark of trees, which could hardly have grown in this ſound, on account of their ſize. Several ſmall ſticks are the ribs which diſtend this bark, and another ſtick forms the gunwale, over which they have wrapped the extremity of the bark and ſewed it on. A few ſtones, with a ſmall quantity of earth, are laid in the bottom of each canoe, and on this the natives keep a conſtant fire. Their paddles are ſmall, and rudely formed, and they work very ſlowly with them. Each canoe contained from five to eight perſons, including children, who, contrary to the cuſtom of all the nations in the ſouth ſea, were very ſilent in their approach to the ſhip, and when aboard hardly pronounced any other word than *Peſſeray*. Thoſe whom M. Bougainville ſaw in the ſtrait of Magalhaens, not far from hence, uſed the ſame word, from whence he gave them the general name of *Pecherais*. We beckoned to them to come into the ſhip; and ſome accepted the invitation, tho' without the leaſt ſign of being pleaſed, and ſeemingly without the ſmalleſt degree of curioſity. Their perſons were ſhort, not exceeding five feet ſix inches at moſt, their heads large, the face broad, the cheek-bones very prominent, and the noſe very flat. They had little brown eyes without life; their hair was black and lank, hanging about their heads in diſorder, and beſmeared with train-oil. On the chin they had a few ſtraggling ſhort hairs inſtead of a beard, and from their noſe there was a conſtant diſcharge of mucus into their ugly open mouth. The whole aſſemblage of their features formed the moſt loathſome picture of miſery and wretchedneſs to which human nature can poſſibly be reduced.—The ſhoulders and cheſt were broad and bony; but the reſt of the figure was ſo lean and ſhrivelled, that to have ſeen it ſeparate, we could not have believed that it belonged to the ſame perſon. Their legs were lean and bowed, and their knees diſproportionally large. They had no other cloathing than a ſmall piece of old ſeal-ſkin, which hung from their ſhoulders to the middle of the back, being faſtened round the neck with a ſtring. The reſt of their body was perfectly naked, not the leaſt regard being paid to what Europeans would term decency. Their natural colour appeared to be an olive-brown, with a kind of gloſs, which has really ſome reſemblance to that of copper; but many of them had diſguiſed themſelves with ſtreaks of red paint, and ſometimes, tho' ſeldom, with white.—The women were nearly formed as the men, though ſomewhat leſs in ſtature; their features were not leſs uncouth and ugly, and their dreſs exactly the ſame. They had only added a ſmall piece of ſeal-ſkin, not ſo large as the palm of the hand, which hung down before, fixed to a ſtring which was tied about the waiſt. Round their necks they wore leather ſtrings, on which they had hung a number of ſhells; and on their heads they had a kind of bonnet, conſiſting of a few white quill-feathers of geeſe, which they occaſionally placed upright on the head, by that means giving them a reſemblance to the French head-dreſſes of the laſt century. There was but one ſingle perſon among them, who had a ſmall piece of a guanaco's ſkin ſewed on his ſeal-ſkin, to lengthen it. The children were perfectly naked; and, like their mothers, huddled continually about the fire, in each canoe, ſhivering continually with cold, and rarely uttering any other word than *Peſſeray*, which ſometimes ſounded like a word of endearment, and ſometimes ſeemed to be the expreſſion of complaint. Thoſe of the men who had come on deck, ſpoke a few other words, which contained many conſonants and gutturals, particularly the *ll* of the Welſh; and all ſeemed to liſp very ſtrongly, which contributed to make them wholly unintelligible. They accepted trifles, ſuch as beads, without ſeeming to value them; but, at the ſame time, they alſo gave away their own arms, or even their ragged ſeal-ſkins, without the leaſt concern; their whole character being the ſtrangeſt compound of ſtupidity, indifference, and inactivity."

From this deſcription of the country and inhabitants of Tierra del Fuego, we might reaſonably enough conclude that no ſpot on earth can be in a more wretched ſtate, unleſs it lies much nearer the ſouth-pole: but bad as this country is, it appears to profit conſiderably by the neighbourhood of the continent of South America; for ſmall iſlands lying at a great diſtance from the continent, and nearly in the ſame latitude with Tierra del Fuego, are in a much worſe ſtate; as evidently appears from the deſcription given by our author of South Georgia, and the ſouthern Thule.

20 South Georgia deſcribed.

1774, January 16th.—"We had very cold weather all this time, the thermometer being at 34½, and great falls of ſnow covering our decks. This morning we had ſight of the land again, and found its mountains of a vaſt height, covered with loads of ſnow and ice, in moſt places down to the water's edge. The only parts which were clear of ſnow were a few black and barren cliffs, and particularly ſome huge hollow rocks, that

——o'er their wave-worn baſis bowed. SHAKESPEARE.

"Towards the ſouth end of this land we ſaw ſeveral low iſlands, like the New-year's iſlands, which appeared to have ſome verdure upon them, and were therefore called the *Green Iſlands*. As it had been the main object of our voyage to explore the high ſouthern latitudes, my father ſuggeſted to Captain Cook, that it would be proper to name this land after the monarch who had ſet on foot our expedition, ſolely for the improvement of ſcience, and whoſe name ought therefore to be celebrated in both hemiſpheres.—It was accordingly honoured with the name of *Southern Georgia*, which will give it importance, and continue to ſpread a luſtre over it, which it cannot derive from its barrenneſs and dreary appearance.

"In the afternoon we ſaw two rocky iſlands at the north end of Georgia, which lay about a league aſunder, and were of a dull black colour. We ſteered towards them, and about five o'clock paſſed in the middle between them. The northernmoſt was a craggy cliff, nearly perpendicular, which contained the neſts of many thouſand ſhags, and was named *Willis's Iſland;* it is ſituated in 54° S. and 38. 25. W. The ſouthernmoſt ſloped gradually to the weſtward, being covered on that ſide with ſome graſs, and with innumerable flocks of birds of all ſorts, from the largeſt albatroſſes down to the leaſt petrels; for which reaſon, it was named *Bird Iſland*. Great numbers of ſhags, penguins, divers, and other birds, played about, and ſettled in the water around us, this cold climate ſeeming to be perfectly agreeable to them. Several porpeſſes were likewiſe noticed, and many ſeals, which probably came to breed on theſe unhoſpitable ſhores.

"We ran along the north-eaſt coaſt of the land, till it was dark, when we brought to, and did not reſume our courſe till the next morning at three o'clock. The aſpect of the land was extremely unpromiſing; the mountains were the moſt craggy we had ever ſeen, and formed many ſharp points, between which the intervals were filled with ſnow. We paſſed a bay, which, from the numbers of low green iſlands in it, was named the *Bay of Iſlands;* and opened another towards which we ſtood with the ſhip, having ſoundings at the diſtance of two or three miles.—Upon advancing into the furtheſt receſs of the bay, we ſoon obſerved a ſolid maſs of ice, America.

ſuch as is found in the harbours of Spitzbergen (N. Lat. 79. 30.) This maſs of ice bore a great reſemblance to thoſe detached iſlands of which we ſaw ſuch numbers floating upon the ocean in the high ſouthern latitudes. The ſhores of the bay nearer the ſea were clear of ſnow, but exceſſively dreary, and almoſt perpendicular. We landed in a ſpot which was perfectly ſheltered from the ſwell, and where the land formed a long projecting point. Here we ſaw a number of ſeals aſſembled on a ſtony beach; and among them a huge animal, which we had taken to be a rock at a diſtance, but which proved to be exactly the ſame animal with Lord Anſon's ſea-lion.—The ſeals which we found here, were more fierce than any we had ſeen on the New-year's Iſles, and did not run out of our way. The youngeſt cubs barked at us; and ran after our heels when we paſſed by them, trying to bite our legs.—We climbed upon a little hummock, about eight yards high, where we found two ſpecies of plants; one was the graſs which grows plentifully on the New-year's Iſles *(dactylis glomerata)*, and the other a kind of burnet *(ſanguiſorba)*. Here Captain Cook diſplayed the Britiſh flag, and performed the ceremony of taking poſſeſſion of theſe barren rocks, "in the name of his Britannic Majeſty, and his heirs for ever." A volley of two or three muſquets was fired into the air, to give greater weight to this aſſertion; and the barren rocks re-echoed with the ſound, to the utter amazement of the ſeals and penguins, the inhabitants of theſe newly diſcovered dominions. The rocks conſiſted of a bluiſh grey ſlate, in horizontal ſtrata, of which many fragments every where covered the beaches. As far as we were able to examine them, they contained no other minerals of any kind; the whole country being uſeleſs, and frightfully barren, in every reſpect. During our ſtay on ſhore, we ſaw ſome ſmall fragments of ice floating out to ſea, and heard the huge maſſes in the fartheſt part of the bay crack very loud from time to time. We continued to coaſt the land during the two following days, and diſcovered ſeveral bays and headlands upon it.—The appearance of the land was always nearly the ſame; its mountains towards the ſouth were exceſſively high: and divided into innumerable ragged points, like the flames in a raging fire.—On the 19th, we reached the S. E. extremity of ſouthern Georgia, which we now diſcovered to be an iſland, between 50 and 60 leagues in length.

"It has been ſuppoſed, that all parts of this globe, including thoſe which are barren and dreary in the higheſt degree, are fit to become the abode of men. Before we arrived at this iſland of Georgia, we had nothing to oppoſe to this opinion, ſince even the wintery ſhores of Tierra del Fuego were inhabited by human beings, who were ſtill one ſtep removed from brutes. But the climate of Tierra del Fuego is mild with reſpect to that of Georgia, the difference in the thermometer which we obſerved being at leaſt ten degrees. It has beſides the advantage of producing a quantity of ſhrubbery and wood ſufficient to ſupply the wants of the natives, who are by that means enabled to reſt ſheltered from the inclemencies of the air, and to light fires, which give them warmth, and may ſerve to make their food eatable and wholeſome. As New Georgia is wholly deſtitute of wood, and of any other combuſtible to ſerve as a ſuccedaneum, I apprehend it would be impoſſible for any race of men to live upon it, though they ſhould, inſtead of the ſtupidity of the Peſſerais, be poſſeſſed of the ingenuity of the Europeans. The ſummers of this new iſland are rigorouſly cold, the thermometer having never riſen ten degrees above the freezing point during our ſtay on the coaſt; and though we have reaſon to ſuppoſe, that the winters are not colder in the ſame proportion as in our hemiſphere, yet it is probable there will be at leaſt a difference of 20 or 30 degrees. This I think is ſufficient to kill any men who may ſurvive the ſummer there, ſuppoſing them provided with no other defence than that which the country affords. But South Georgia, beſides being uninhabitable, does not appear to contain any ſingle article for which it might be occaſionally viſited by European ſhips. Seals and ſea-lions, of which the blubber is accounted an article of commerce, are much more numerous on the deſart coaſts of South America, the Falkland and the New-Year's iſlands, where they may likewiſe be obtained at a much ſmaller riſk."

We can hardly expect an account of a country where winter prevails more perfectly than in New Georgia; yet even this iſland appears to have been greatly ſuperior to that named the ſouthern *Thule*, of which we have the following account.

21 Southern Thule deſcribed.

"The diſcovery of this land happened on the 31st of January, at ſeven in the morning, when the weather was ſo hazy, that we could not ſee four or five miles around us. We ran towards it near an hour, when we were within half a mile of the rocks, which were black, cavernous, and perpendicular to a vaſt height, inhabited by flocks of ſhags, and beaten by dreadful breakers. Thick clouds veiled the upper parts of the mountains; but one immenſe peak appeared towering beyond them, covered with ſnow. It was agreed by all preſent, that the perpendicular height of this mountain could not be far ſhort of two miles. We ſounded with 170 fathom cloſe in ſhore; and then put about, ſtanding to the ſouth, in order to weather the weſtern point, which we had now diſcovered. We had not run above an hour on this tack, when we ſaw high mountains to the S. S. E. about five or ſix leagues diſtant; which, from the courſe we had kept, we muſt have narrowly eſcaped about midnight. This being the ſouthernmoſt extremity of the land, my father named it the *Southern Thule*, a name which Captain Cook has preſerved. It is ſituated in 59. 30. S. and 27. 30. W.—Captain Cook, however, did not venture to loſe any time in the inveſtigation of this coaſt, where he was expoſed to imminent danger from the violence of weſterly winds. He choſe rather to explore its northern extremities, which beſides were doubtleſs the moſt likely to be of importance to navigators. We kept at the diſtance of two or three leagues from the land, having little winds, and ſeeing the coaſt every where ſteep and inacceſſible. The mountains appeared to be of vaſt height, their ſummits being conſtantly wrapped in clouds, and the lower part covered with ſnow down to the water's edge, in ſuch a manner, that we ſhould have found it difficult to pronounce whether we ſaw land or ice, if ſome hollow rocks had not ſhewn their black and naked caverns in ſeveral places.

Feb. 1. "We found ourſelves abreaſt of another projecting point in the morning, which Captain Cook has ſince named *Cape Montague*. Beyond it we diſcovered another point to the north, which, upon our nearer approach, was diſcovered to be a ſeparate iſland, and named *Saunders's Iſland*. It was not inferior in height to the mountainous coaſt to the ſouth of it, and was covered with ſnow and ice in the ſame manner. It is ſituated in 57. 48. S. and 26. 35. W.

" We had little wind during the night; but, with the return of day-light, ſtood to the eaſtward, in order to weather Saunders's Iſland.—We could not accompliſh our point with a ſingle board; but, the wind being contrary, tacked all the afternoon, in order to double the northern extremity of Saunders's iſland. We came very near it ſeveral times, and obſerved a flat point or beach running out to the northward, covered with heaps of ſhingle, which were piled up in the wildeſt manner, and offered nothing but ſharp points and ridges to the eye. The whole country had the moſt deſolate and horrid appearance which can poſſibly be conceived; not a ſingle graſs could be diſcerned upon it, and it ſeemed to be forſaken even by the amphibious and lumpiſh animals which dwelt on Southern Georgia. In ſhort, we could not help applying to it that remarkable expreſſion of Pliny,

Pars mundi damnata a rerum natura, et denſa merſa caligine.
Hiſt. Nat. lib. xv. c. 36.

3 s na- cold- n con- s.

We have now abundant reaſon to conclude, that all iſlands are colder than continents lying in the ſame parallels of latitude; and that the vicinity of the ocean by no means contributes to produce warmth, but the contrary: and though water, by its property of abſorbing heat in a latent ſtate, and then diſcharging it in a ſenſible one, may be ſaid to regulate the cold, ſo as to prevent its going to great extremes at any ſeaſon; yet, by this very property, the diſtinction of ſeaſons is loſt, ſo that an iſland ſituated at a great diſtance from land may be uninhabitable by reaſon of the cold, while parts of a continent much nearer the pole than that iſland might furniſh mankind with a comfortable abode.

4 ſs in ica ac- d for.

From its ſhape, America may almoſt be conſidered as conſiſting of two iſlands; for only a narrow iſthmus prevents the ſouthern continent from being entirely ſurrounded with water. Theſe, though very large, are far from equalling the bulk of Europe, Aſia, and Africa, put together. The ſouthern continent is not ſo big as Africa, and it is doubtful whether Aſia does not equal the bulk of both North and South America, eſpecially if we take in the new-diſcovered iſland of New Holland, which is very little if at all inferior in bulk to Europe.—The three old continents are connected with one another, and are no doubt conſiderably warmer on that account. America is at a vaſt diſtance; and cannot profit by the warmth either of Africa or Aſia, let it be ever ſo great. It is impoſſible, then, that the climate of New-York, New-England, and New-Scotland, can be ſo mild as that of France and Spain; becauſe the winter in them is moderated by their having the Mediterranean ſea to the ſouth, and the Atlantic ocean to the weſt and north, at the ſame time that the vicinity of Africa prevents this vaſt quantity of water from abſorbing much of their ſummer-heat. The American countries juſt now mentioned, have indeed the Atlantic Ocean on one ſide, but are ſurrounded with land on every other, nor have they any warm continent ſo near them as Aſia and Africa are to the ſouthern parts of Europe: and hence they are ſubject to violent extremes of heat and cold; ſo that, in the ſtreets of Boſton, the capital of New-England, the ice frequently lies a foot thick, for ſeveral months in winter; while the ſummer-heats are very great. In like manner is South America colder than Africa, becauſe of its inferiority in ſize, and its diſtance from any other continent; while the ſmall iſlands in the ſouthern ocean lying in latitudes correſponding to that of Britain, are utterly uninhabitable, and covered with perpetual ſnow and ice.

25 Extreme moiſture of the American climate.

Another particularity in the climate of America is its exceſſive moiſture in general. In ſome places, indeed, on the weſtern coaſt, rain is not known; but, in all other parts, the moiſtneſs of the climate is as remarkable as the cold; and this moiſture undoubtedly contributes to render America in general very unhealthy.——The foreſts wherewith it is every where covered, no doubt, partly occaſion the moiſture of its climate; but the moſt prevalent cauſe is the vaſt quantity of water in the Atlantic and Pacific Oceans with which America is invironed on all ſides. Hence thoſe places where the continent is narroweſt are deluged with almoſt perpetual rains, accompanied with violent thunder and lightning, by which ſome of them, particularly Porto Bello, are rendered in a manner uninhabitable.

26 Large rivers, and exceſſive luxuriance of vegetation.

This extreme moiſture of the American climate is productive of much larger rivers there, than in any other part of the world. The Danube, the Nile, the Indus, or the Ganges, are not comparable to the Miſſiſſippi, the River St Lawrence, or that of the Amazons; nor are ſuch large lakes to be found any where as thoſe which North America affords.—To the ſame cauſe we are alſo partly to aſcribe the exceſſive luxuriance of all kinds of vegetables in almoſt all parts of this country. In the ſouthern provinces, where the moiſture of the climate is aided by the warmth of the ſun, the woods are almoſt impervious, and the ſurface of the ground is hid from the eye, under a thick covering of ſhrubs, herbs, and weeds.—In the northern provinces, the foreſts are not encumbered with the ſame luxuriance of vegetation; nevertheleſs, they afford trees much larger of their kind than what are to be found any where elſe.

27 Moiſture of the climate unfavourable to animals.

The ſame moiſture which is ſo favourable to vegetation, is found to be very unfavourable to animal life. The brute creatures of America are generally of a ſmall ſize when compared with thoſe of Europe, Aſia, or Africa; nay, thoſe which have been imported by the Europeans, though they multiplied exceſſively, have never failed to degenerate in ſize, as well as in ſtrength and vigour. We may with the more certainty aſcribe this to the pernicious influence of the moiſture, as it is obſerved, that black cattle brought from other parts of the continent to Porto Bello, where the moiſture is exceedingly great, loſe their fleſh ſo faſt, as to become in a few weeks ſcarce eatable.—To this, however, there is one exception; for America produces a ſpecies of ravenous birds called *condor*, ſuperior both in ſize and ſtrength to any that are to be found in other parts of the world.

28 Produces vaſt numbers of inſects.

The ſame cauſes which check the growth and vigour of the more noble animals, are friendly to the propagation and increaſe of inſects. Accordingly, theſe, eſpecially ſuch as delight in taking up their habitation in moiſt earth, are to be found in immenſe quantities throughout the continent. At Porto Bello, toads are found in ſuch multitudes that they hide the ſurface of the earth. At Guyaquil, ſnakes and vipers are hardly leſs numerous. It doth not appear, however, that ſerpents abound more, or even ſo much, in America, as in ſome places of Africa; for there, according to the accounts given by Mr Adanſon, large plains are to be met with entirely covered with them. Nor have we any accounts of the locuſts, which ſometimes commit ſuch devaſtations on the eaſtern continent, being ever found in America. Inſtead of theſe, they have a kind of ants, which, in ſome of the iſlands, have frequently conſumed every vegetable production, and left the earth entirely bare, as if it had been burnt with fire. In Dec^{r} 1768, Captain Cook found the air at Rio Janeiro loaded with butterflies. They were chiefly of one ſort; but in ſuch numbers, that thouſands might be ſeen in every direction, and the moſt of them flew above the maſt head.

29
Account of the natives.

At the time America was diſcovered, it was found inhabited by a race of men no leſs different from thoſe in the other parts of the world, than the climate and natural productions of this continent are different from thoſe of Europe, Aſia, or Africa.—One great peculiarity in the native Americans is their colour, and the indentity of it throughout the whole extent of the continent. In Europe and Aſia, the people who inhabit the northern countries are of a fairer complexion than thoſe who dwell more to the ſouthward. In the torrid zone, both in Africa and Aſia, the natives are entirely black, or the next thing to it. This, however, muſt be underſtood with ſome limitation. The people of Lapland, who inhabit the moſt northerly part of Europe, are by no means ſo fair as the inhabitants of Britain; nor are the Tartars ſo fair as the inhabitants of Europe, who lie under the ſame parallels of latitude. Nevertheleſs, a Laplander is fair when compared with an Abyſſinian, and a Tartar if compared with a native of the Molucca iſlands.—In America, this diſtincton of colour was not to be found. In the torrid zone there were no negroes, and in the temperate and frigid zones there were no white people. All of them were of a kind of red copper-colour, which Mr Forſter obſerved, in the Peſſerays of Terra del Fuego, to have ſomething of a gloſs reſembling that metal. It doth not appear, however, that this matter hath ever been inquired into with ſufficient accuracy. The inhabitants of the inland parts of South America, where the continent is wideſt, and conſequently the influence of the ſun the moſt powerful, have never been compared with thoſe of Canada, or more northerly parts, at leaſt by any perſon of credit. Yet this ought to have been done, and that in many inſtances too, before it could be aſſerted ſo poſitively as moſt authors do, that there is not the leaſt difference of complexion among the natives of America. Indeed, ſo many ſyſtems have been formed concerning them, that it is very difficult to obtain a true knowledge of the moſt ſimple facts.—If we may believe the Abbe Raynal, the Californians are ſwarthier than the Mexicans; and ſo poſitive is he in this opinion, that he gives a reaſon for it. "This difference of colour," ſays he, "proves, that the civilized life of ſociety ſubverts, or totally changes, the order and laws of nature, ſince we find, under the temperate zone, a ſavage people that are blacker than the civilized nations of the torrid zone."—On the other hand, Dr Robertſon claſſes all the inhabitants of Spaniſh America together with regard to colour, whether they are civilized or uncivilized; and when he ſpeaks of California, takes no notice of any peculiarity in their colour more than others.—Certain it is, however, that the northern inhabitants of America are of a colour very different from the Europeans, or even the Aſiatics, in the ſame latitudes; nor are thoſe who dwell under the line ſo black as negroes.—The general appearance of the Americans in various diſtricts is thus deſcribed by Don Antonia Ulloa. They have a very ſmall fore-head, covered with hair towards its extremities, as far as the middle of the eye-brows; little eyes; a thin noſe, ſmall, and bending towards the upper lip; the countenance broad; the ears large; the hair very black, lank, and coarſe; the limbs well turned; the feet ſmall; the body of juſt proportion, and altogether ſmooth and free from hair, until old age, when they acquire ſome beard, but never on the cheeks."—The chevalier Pinto gives the following account of them. "They are all of a copper colour, with ſome diverſity of ſhade, not in proportion to their diſtance from the Equator, but according to the degree of elevation of the territory in which they reſide. Thoſe who live in a high country are fairer than thoſe in the marſhy low lands on the coaſt. Their face is round; farther removed, perhaps, than that of any people, from an oval ſhape. Their fore-head is ſmall; the extremity of their ears far from the face; their lips thick; their noſe flat; their eyes black, or of a cheſtnut colour, ſmall, but capable of diſcerning objects at a great diſtance. Their hair is always thick and ſleek, and without any tendency to curl. They have no hair on any part of their body but the head. At the firſt aſpect, a South-American appears to be mild and innocent; but, on a more attentive view, one diſcovers in his countenance ſomething wild, diſtruſtful, and ſullen."

Robertſon' *Hiſtory of Amer.* vol.
p. 460.

The Americans were alſo remarkable for their debility of body. They were not only averſe to toil, but incapable of it; and when rouſed by force from their native indolence, and compelled to work, they ſunk under taſks which people of the other continent would have performed with eaſe. On the continent, however, where many tribes employed themſelves in hunting, they acquired greater firmneſs; but ſtill they were more remarkable for agility than ſtrength. Of their ſwiftneſs, indeed, ſurpriſing accounts are given. Adair relates the adventures of a Chikkaſah warrior, who run through woods and over mountains, 300 computed miles in a day and an half and two nights.

Hiſtory of America, p. 396.

Another particularity in theſe people is the ſmallneſs of their appetite for food. This was ſo remarkable, that the Spaniards conſidered the conſtitutional temperance of the Americans, not only in the iſlands, but in ſeveral parts of the continent, as far exceeding the abſtinence of the moſt mortified hermits. On the other hand, the appetite of the Spaniards appeared to to them to be inſatiably voracious. They affirmed, that one Spaniard devoured more food in a day than was ſufficient for ten Americans. Nay, they even imagined, that the Spaniards had left their own country becauſe they could not find proviſions in ſufficient quantity to ſatisfy their ravenous appetites.

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Nor were the Americans leſs ſingular in their mental than their corporeal qualities. The underſtandings of many nations ſeemed to be ſo limited, that they were neither merica.

neither capable of forming an arrangement for futurity, nor did their ſolicitude or foreſight extend ſo far. They ſet no value upon thoſe things of which they were not in ſome immediate want. In the evening, when a Caribbee is going to reſt, no conſideration will tempt him to ſell his hammock; but in the morning, he will part with it for the ſlighteſt trifle. At the cloſe of winter, a North-American, mindful of what he has ſuffered from the cold, ſets himſelf with vigour to prepare materials for erecting a comfortable hut to protect him againſt the inclemency of the ſucceeding ſeaſon: but as ſoon as the weather becomes mild, he abandons his work, and never thinks of it more, till the return of the cold compells him to reſume it.—In ſhort, to be free from labour, ſeems to be the utmoſt wiſh of an American. They will continue whole days ſtretched in their hammocks, or ſeated on the earth, without changing their poſture, raiſing their eyes, or uttering a ſingle word. The men ſeem to be poſſeſſed of a degree of inſenſibility towards the women which is not to be found in any other part of the world; but it was not ſo with the women at the arrival of the Spaniards among them. Their paſſions in this reſpect ſeemed to be ſo ſtrong as to ſwallow up every other conſideration, inſomuch that they would have trampled over heaps of their countrymen, in order to give themſelves up to the embraces of the barbarians who had deprived them of life; nor would they heſitate at betraying their country, their neareſt relations not excepted, into the hands of theſe ſtrangers.

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Notwithſtanding the ſeeming imbecillity of their minds in moſt reſpects, there is one purſuit in which the Americans are indefatigable beyond what is recorded of any race of men either ancient or modern; and that is revenge. This they carry ſuch a length as we could ſcarce think would be done by any other than infernal ſpirits themſelves.—Among theſe ſavages the forgiveneſs of enemies is never heard of. They will not attack enemies who are prepared for them; but watch their opportunity to murder them when aſleep or incapable of making any reſiſtance. If they find it impoſſible to revenge themſelves when the injury is committed, they will diſſemble their reſentment, but no length of time is ſufficent to eradicate that paſſion from their breaſts; and whenever an opportunity offers, they will revenge themſelves with the ſame helliſh fury as if the offence was but juſt then committed. A ſingle warrior has been known to march ſeveral hundred miles to ſurpriſe and cut off a ſtraggling enemy. If a quarrel is once begun, theſe wretches are not ſatisfied with the deſtruction of the perſon who gave the offence; nor will their revenge be ſatiated with the death of all his family or relations, nothing leſs is aimed at than the extermination of the whole tribe or nation to which he belongs.—Agreeably to this principle their wars are carried on; and by acting upon this principle the Iroquois actually exterminated a nation called the *Eries*, from which one of the lakes of Canada took its name, ſo that now there is not the leaſt trace of their exiſtence. When two nations, at war, make peace with one another, it is not becauſe they are weary of ſlaughter, or that they think they have had revenge enough; but becauſe they find themſelves unable to carry on the war any longer. Hence the peace which the ſavage nations make with one another, may be conſidered only as a kind of truce, till both parties have recovered ſtrength enough to renew their hoſtilities.

America.

As the Indian nations are not populous, and many of them lie at a great diſtance from one another, it is impoſſible there could be any animoſities between them was the deſire of revenge to abate.—For declaring war, againſt a nation no new provocation is neceſſary, nor is it even pretended that any has been received. It is the memory of paſt quarrels only, which are thought not to be ſufficiently revenged, that incites them to war.—Private chiefs ſometimes invade their neighbours territories without conſulting the rulers of the community; nay, often ſingle perſons will take the field; and theſe expeditions are connived at by the elders, as tending to cheriſh a martial ſpirit, and to accuſtom their people to enterpriſe and danger. If a chief wiſhes to allure a band of warriors to follow him in invading an enemy's country, his perſuaſions are adreſſed to their favourite paſſion revenge. "The bones of our country-men," ſays he, "lie uncovered, their bloody bed has not been waſhed clean. Their ſpirits cry againſt us; they muſt be appeaſed. Let us go and devour the people by whom they were ſlain. Sit no longer inactive upon your mats; lift the hatchet; conſole the ſpirits of the dead, and tell them that they ſhall be avenged."—Animated by ſuch exhortations as theſe, the young men ſeize their arms, and ſally forth againſt their enemies, ſinging the war-ſong, which may be expreſſed in the following words. "I go to war to revenge the death of my brothers; I ſhall kill, I ſhall exterminate, I ſhall burn my enemies; I ſhall bring away ſlaves; I ſhall devour their heart, dry their fleſh, and drink their blood. I ſhall tear off their ſcalps, and make cups of their ſculls."

Such is the implacable nature of theſe ſavages, that they will go, for the purpoſe of revenge, 1000 miles in pathleſs woods, over hills and mountains, thro' huge ſwamps, expoſed to the extremities of heat and cold, the viciſſitude of ſeaſons, and to hunger and thirſt. All theſe difficulties they deſpiſe as trifles, provided they can obtain the ſcalps of their enemies.—A remarkable inſtance of their innate deſire of blood we have in the following anecdote of an Algonquin woman.

32
Anecdote of an Algonquin woman.

That nation being at war with the Iroquois, ſhe happened to be taken priſoner, and was carried to one of the villages belonging to them. Here ſhe was ſtripped naked, and her hands and feet bound with ropes in one of their cabbins. In this condition ſhe remained ten days, the ſavages ſleeping round her every night. The eleventh night, while they were aſleep, ſhe found means to diſengage one of her hands, with which ſhe immediately freed herſelf from the ropes, and went to the door. Tho' ſhe had now an opportunity of eſcaping unperceived, her revengeful temper could not let ſlip ſo favourable an opportunity of killing one of her enemies. The attempt was manifeſtly at the hazard of her own life; yet, ſnatching up a hatchet, ſhe killed the ſavage that lay next her, and, ſpringing out of the cabbin, concealed herſelf in a hollow tree which ſhe had obſerved the day before. The groans of the dying perſon ſoon alarmed the other ſavages, and the young ones immediately ſet out in purſuit of her.—Perceiving from her tree, that they all directed their courſe one way, and that no ſavage was near her, ſhe left her ſanctuary, and, flying by an oppoſite direction, ran into a foreſt without being perceived. The ſecond day after this happened, her footſteps were diſcovered; and they purſued her with ſuch expedition, that the third day ſhe diſcovered her enemies at her heels. Upon this ſhe threw herſelf into a pond of water, and, diving among ſome weeds and bulruſhes, ſhe could juſt breathe above water without being perceived. Her purſuers, after making the moſt diligent ſearch, were forced to return. —For 35 days this woman held on her courſe through woods and deſarts, without any other ſuſtenance than roots and wild berries. When ſhe came to the river St Lawrence, ſhe made with her own hands a kind of a wicker raft, on which ſhe croſſed it. As ſhe went by the French fort *Trois Rivieres*, without well knowing where ſhe was, ſhe perceived a canoe full of ſavages; and fearing they might be Iroquois, ran again into the woods, where ſhe remained till ſunſet.—Continuing her courſe ſoon after, ſhe ſaw Trois Rivieres, and was then diſcovered by a party whom ſhe knew to be Hurons, a nation in alliance with the Algonquins. She then ſquatted down behind a buſh, calling out to them that ſhe was not in a condition to be ſeen, becauſe ſhe was naked. They immediately threw her a blanket, and then conducted her to the fort, where ſhe recounted her ſtory.

33
Method of making war.

The deſire of revenge being ſo exceſſively prevalent among the Americans, we can ſcarce expect that their wars ſhould be any thing elſe than a ſeries of the moſt deliberate and diabolical murders that can be conceived. If the war is national, and undertaken by public authority, all their determinations are formal and ſlow. The elders aſſemble, and deliver their opinions in ſolemn ſpeeches. They expreſs themſelves in a bold figurative ſtyle, with violent geſtures. After this, if they happen to be well provided with food, they appoint a feaſt, of which almoſt the whole nation partakes. This feaſt is accompanied with dancing, and ſongs, in which the real or fabulous exploits of their forefathers are recounted. A leader offers himſelf to conduct the expedition; but no one is compelled to follow him contrary to his own inclination. All the young men, who are diſpoſed to go to war, give a bit of wood to the chief, as a token of their deſign. The leader faſts ſeveral days, during which he converſes with nobody, and is peculiarly careful to obſerve his dreams, which are generally as favourable as he could wiſh. A number of other ceremonies are made uſe of, ſuch as ſetting the war-kettle on the fire, as an emblem of their going out to devour their enemies; and a large ſhell is diſpatched to their allies, inviting them to come and drink their blood. Having finiſhed all the ceremonies previous to the war, they iſſue forth with their faces blackened with charcoal, intermixed with ſtreaks of vermilion, which gives them a moſt horrid appearance. Then they exchange their cloaths with their friends, and diſpoſe of their ornaments to the women, who generally accompany them to a conſiderable diſtance.

34
Amazing quickneſs of of their ſenſes.

As the intention of the Americans in going to war, is, not to conquer, but to deſtroy, they watch for their enemies in the ſame manner as they would do for wild beaſts.—Being accuſtomed to perpetual wandering in the foreſts, their ſenſes are ſharpened to a degree inconceivable by us. They can trace out their enemies by the ſmoke of their fires, which they ſmell at an immenſe diſtance. They can diſtinguiſh the tracts of their feet on the ground, which would be imperceptible to an European eye. They can even, in theſe traces, diſtinguiſh the footſteps of the different nations with which they are acquainted, and determine the preciſe time when they paſſed. But theſe precautions avail them little, as their enemies are no leſs quickſighted than they. When they go out, therefore, they take care to make uſe of nothing which might endanger a diſcovery. They light no fire to warm themſelves, or to prepare their victuals; they lie cloſe to the ground all day, and travel only in the night. They march along in files; and he that cloſes the rear, diligently covers their tract with leaves.—As war is begun without provocation, and no declaration of it made, the nation they attack is very often entirely ignorant of their deſigns, and not at all on their guard. In this caſe, they follow their track through the foreſt. They endeavour to become acquainted with their haunts. They lurk in ſome thicket near theſe, with the patience of a ſportſman waiting for game; and will continue their ſtation day after day, till they can ruſh upon their prey when moſt ſecure, and leaſt able to reſiſt them. If they meet with no ſtraggling party of the enemy, they advance towards their villages; but with ſuch ſolicitude to conceal their approach, that they often creep on their hands and feet through the wood, and paint their ſkins of the ſame colour with the withered leaves, in order to avoid detection. If they are ſo fortunate as to remain unobſerved, they ſet on fire the huts in the dead of the night, and maſſacre the inhabitants as they fly naked and defenceleſs from the flames. If they hope to effect a retreat without being purſued, they carry off ſome priſoners, either to adopt them in place of thoſe who may be loſt in the war, or to wreak their revenge upon them to the utmoſt.

35
Shocking
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their priſ
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After they are all returned home, the elders appoint a diſtribution of the captives; upon which, every perſon, who has taken a priſoner, preſents him where the chiefs direct. If thoſe to whom he is preſented receive him, he is immediately adopted, and becomes from that time forward a member of the community; but if he is refuſed, from whatever motive, his death is unavoidable.—Was it ſimply death, which was now to be inflicted, the ſame thing has often been practiſed by other nations on their priſoners; but here a ſcene of cruelty is diſplayed, which, though the invention of thoſe who in other reſpects ſeem ſcarce a degree above brutes, is ſufficient to make even an inquiſitor tremble.

All the captives who are ſentenced to death, being collected together, the whole nation is aſſembled at the execution, as for ſome great ſolemnity. A ſcaffold is erected, and the priſoners are tied to the ſtake, where they begin their death-ſong, and prepare for their torments with the greateſt reſolution. The conquerors, on the other hand, reſolve to put the conſtancy of the captive to the moſt ſevere trial. They begin at the extremity of his body, and gradually approach the more vital parts. One plucks out his nails by the roots, one by one; another takes a finger into his mouth, and tears off the fleſh with his teeth; a third thruſts the finger, mangled as it is, into the bowl of a pipe made red hot, which he ſmokes like tobacco; then they pound his toes and fingers to pieces between two ſtones; they pull off the fleſh with their teeth, cut circles about his joints, and make gaſhes in the fleſhy parts of his limbs, which they ſear immediately with red-hot irons, cutting, burning, and pinching them alternately; they pull off his fleſh, thus mangled and roaſted, bit by bit, devouring it with greedineſs, and ſmearing their faces with the blood in an enthuſiaſm of horror and fury. When they have thus torn off the fleſh, they twiſt the bare nerves and tendons about an iron, tearing and ſnapping them, whilſt others are employed in pulling and extending the limbs in every way that can increaſe the torment. This continues often five or ſix hours, and ſometimes days together. Then they frequently unbind him to give a breathing to their fury, to think what new torments they ſhall inflict, and to refreſh the ſtrength of the ſufferer, who, wearied out with ſuch a variety of unheard-of torments, often falls into ſo profound a ſleep, that they are obliged to apply the fire to awake him and renew his ſufferings. He is again faſtened to the ſtake, and again they renew their cruelty; they ſtick him all over with ſmall matches of wood, that eaſily take fire, but burn ſlowly; they continually run ſharp reeds into every part of his body; they drag out his teeth with pincers, and thruſt out his eyes; and, laſtly, after having burned his fleſh from the bones with ſlow fires; after having ſo mangled the body that it is all but one wound; after having mutilated the face in ſuch a manner as to carry nothing human in it; after having peeled the ſkin from the head, and poured a heap of red-hot coals, or boiling water, on the naked ſkull; they once more unbind the wretch, who, blind, and ſtaggering with pain and weakneſs, aſſaulted and pelted upon every ſide with clubs and ſtones, now up, now down, falling into their fires at every ſtep, runs hither and thither, until one of the chiefs, whether out of compaſſion, or weary of cruelty, puts an end to his life with a club or a dagger. The body is then put into a kettle, and this barbarous employment is ſucceeded by a feaſt as barbarous.

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The ſame infernal ſpirit which prompts the conquerors to inflict theſe tortures, prompts the ſufferer to bear them without a ſingle complaint. In the midſt of the moſt excruciating torments, he informs his enemies what cruelties he has inflicted on their countrymen, and threatens them with the revenge that will attend his death. Though his reproaches exaſperate them to madneſs, yet he continues his inſults; even telling them that they are ignorant of the art of tormenting; and pointing out to them more exquiſite methods than what they uſe, and more ſenſible parts of the body to be afflicted.

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If we take a view of the Americans in their domeſtic capacities, we ſhall find their character no better than what we have deſcribed. We have already taken notice of the uncommon indifference of the men towards the women. This, of itſelf, cauſes them treat their wives with contempt. Among theſe ſavages, alſo, the man properly buys his wife. In ſome places, he devotes his ſervice for a certain time to the parents of the maid whom he courts; in others, he hunts for them occaſionally, or aſſiſts in cultivating their fields and forming their canoes; in others, he offers ſuch preſents as are deemed moſt valuable on account of their uſefulneſs or rarity. In return for theſe, he receives his wife; and this circumſtance, added to the low eſtimation of women among ſavages, leads him to conſider her as a female ſervant, whom he has a title to treat as an inferior. In all unpoliſhed nations, the women muſt bear more than their ſhare of the common burden; but in America, their condition is peculiarly grievous, and their depreſſion is ſo complete, that ſervitude is a name too mild to deſcribe their wretched ſtate. A wife, among moſt tribes, is no better than a beaſt of burden, deſtined to every office of labour and fatigue. While the men loiter out the day in ſloth, or ſpend it in amuſement, the women are condemned to inceſſant toil. Taſks are impoſed upon them without pity, and ſervices are received without complacence or gratitude. They muſt approach their lords with reverence; they muſt regard them as more exalted beings; and are not permitted to eat in their preſence. There are diſtricts in America where this dominion is ſo grievous, and ſo ſenſibly felt, that ſome women, in a wild emotion of maternal tenderneſs, have deſtroyed their female children in their infancy, in order to deliver them from that intolerable bondage to which they knew they were doomed.

38
Revenge the only thing inſtilled into the American children.

It is not to be expected, that ſuch huſbands will inculcate upon their children any kind of filial duty towards their mothers. Indeed, with the American children, neither their fathers nor mothers are objects of greater regard than other perſons. They treat them always with neglect; and often with ſuch harſhneſs and inſolence, as to fill thoſe with horror who have been witneſſes of their conduct. The only piece of education which the ſavages take care to give their children is, to revenge themſelves on their enemies. For this purpoſe, they teach them to ſuffer pain in the moſt extreme degree without uttering the leaſt complaint; that, in caſe they fall into the hands of their enemies, they may *die like men*, as they term it: and to ſuch an extraordinary length do they go in this reſpect, that an American boy and girl will often, by way of amuſement, hold a burning coal between their naked hands or arms, to try who will ſooneſt ſhrink, or utter a complaint.

39
Terrible trials undergone by their chiefs.

As this horrid, implacable deſire of revenge is the only mental qualification which the Americans endeavour to cheriſh, the above-mentioned paſſive kind of courage becomes the only teſt of their capacity for any public office. Among the tribes on the banks of the Oroonoko, if a warrior aſpires to the poſt of captain, his probation begins with a long faſt, more rigid than any ever obſerved by the moſt abſtemious hermit. At the cloſe of this, the chiefs aſſemble; and each gives him three laſhes with a large whip, applied ſo vigorouſly, that his body is almoſt flayed. If he betrays the leaſt ſymptom of impatience, or even of ſenſibility, he is diſgraced for ever, and rejected as unworthy of the honour. After ſome interval, his conſtancy is proved by a more excruciating trial. He is laid in his hammock with his hands bound faſt; and an innumerable multitude of venomous ants, whoſe bite occaſions a violent pain and inflammation, are thrown upon him. The judges of his merit ſtand around the hammock; and whilſt theſe cruel inſects faſten upon the moſt ſenſible parts of his body, a ſigh, a groan, or an involuntary motion expreſſive of what he ſuffers, would exclude him from the dignity of which he is ambitious. Even after this evidence, his fortitude is not deemed to be ſufficiently aſcertained, till he has ſtood another teſt more ſevere, if poſſible, than the former. He is again ſuſpended in his hammock, and covered with the leaves of the palmetto. A fire of ſtinking herbs is kindled underneath, ſo as he may feel its heat, and be involved in ſmoke. Though ſcorched and almoſt ſuffocated, he muſt continue to endure this with the ſame patient inſenſibility. Many periſh in this eſſay of their firmneſs and courage; but ſuch as go through it with applauſe, receive the enſigns of their new dignity with much ſolemnity, and are ever after regarded as leaders of approved reſolution, whoſe behaviour, in the moſt trying ſituations, will do honour to their country. In North America, the previous trial of a warrior is neither ſo formal, nor ſo ſevere: Though, even there, before a youth is permitted to bear arms, his patience and fortitude are proved by blows; by fire; and by inſults, more intolerable to a haughty ſpirit than either.

40 Character of the Americans ſeems entirely deſtitute of a good principle.

41 Inſtances of their cowardice.

Thus we have given a particular account of the moſt remarkable differences between the natives of America, and thoſe of other countries. In their character, we wiſh, indeed, it were in our power to balance the bad qualities we have mentioned, with ſome good ones; but we are ſorry to ſay, that in all the different accounts of the native Americans which have fallen into our hands, the virtuous part of their character hath conſtantly been inviſible. Their conſtancy in bearing the moſt horrid tortures without a complaint, hath been extolled as the greateſt heroiſm and magnanimity; but we cannot help thinking, it very naturally flows from their inconceivably cruel and blood-thirſty diſpoſition, along with their inſatiable deſire of revenge, the meaneſt as well as the moſt diabolical paſſion in the human nature. Perſonal courage they have not; as appears from the following incidents, quoted from Charlevoix, by Lord Kaimes, in his Sketches of the Hiſtory of Man *. "The fort de Vercheres in Canada, belonging to the French, was, in the year 1690, attacked by ſome Iroquois: they approached ſilently, preparing to ſcalet he paliſade, when ſome muſquet-ſhot made them retire. Advancing a ſecond time, they were again repulſed, wondering that they could diſcover none but a woman, who was ſeen every where. This was Madame de Vercheres, who appeared as reſolute as if ſupported by a numerous garriſon. The hopes of ſtorming a place without men to defend it, occaſioned reiterated attacks. After two days ſiege, they retired, fearing to be intercepted in their retreat. Two years after, a party of the ſame nation appeared before the fort ſo unexpectedly, that a girl of fourteen, daughter of the proprietor, had but time to ſhut the gate. With the young woman, there was not a ſoul but one raw ſoldier. She ſhewed herſelf with her aſſiſtant, ſometimes in one place, and ſometimes in another; changing her dreſs frequently, in order to give ſome appearance of a garriſon; and always fired opportunely. The faint-hearted Iroquois decamped without ſucceſs."

We are ſenſible, that, in denying perſonal courage to the Americans, we differ from the learned Dr Robertſon; who attributes their method of making war to a policy adapted to the ſmallneſs of their number, and urges their deſperate valour on ſome extraordinary occaſions as a proof of their courage. To this it might eaſily be replied, that none will fight ſo deſperately as cowards, when they are prevented from running away; and, therefore, it was a maxim among the Spartans, never to purſue a flying enemy too cloſely, "leſt he ſhould think it better to fight, than run away." Beſides, ſavage cruelty hath in all ages been reckoned a ſign of cowardice: and we believe there are but few, (in which number we would not wiſh to include the Doctor) that will not ſtigmatize, as the moſt infamous cowards, thoſe who will not face their enemies in the open field, but murder them, together with their helpleſs women and infants, when aſleep. But as it is foreign to our purpoſe to enter into diſputes of this kind, we ſhall now proceed to conſider whether theſe peculiarities in the Americans give ſufficient grounds for determining them, as ſome authors have done, to be a race of men ſpecifically diſtinct from all others.

42 Whether they are to be reckoned a diſtinct ſpecies of men.

43 Lord Kaimes's arguments for different ſpecies.

In this queſtion, to avoid being tedious, we ſhall confine ourſelves to what hath been advanced by Lord Kaimes; who is of opinion, that there are many different ſpecies of men, as well as of other animals; and gives an hypotheſis, whereby his opinion may be maintained in a conſiſtency with Revelation. "If (ſays he) the only rule afforded by nature for claſſing animals can be depended on, there are different races of men as well as of dogs: a maſtiff differs not more from a ſpaniel, than a white man from a negro, or a Laplander from a Dane. And, if we have any faith in Providence, it ought to be ſo. Plants were created of different kinds, to fit them for different climates; and ſo were brute animals. Certain it is, that all men are not fitted equally for every climate. There is ſcarce a climate but what is natural to ſome men, where they proſper and flouriſh; and there is not a climate but where ſome men degenerate. Doth not then analogy lead us to conclude, that, as there are different climates on the face of this globe, ſo there are different races of men fitted for theſe different climates?

"M. Buffon, from the rule, That animals which can procreate together, and whoſe progeny can alſo procreate, are of one ſpecies; concludes, that all men are of one race or ſpecies; and endeavours to ſupport that favourite opinion, by aſcribing to the climate, to food, or to other accidental cauſes, all the varieties that are found among men. But is he ſeriouſly of opinion, that any operation of climate, or of other accidental cauſe, can account for the copper-colour and ſmooth chin univerſal among the Americans; the prominence of the pudenda univerſal among the Hottentot women, or the black nipple no leſs univerſal among the female Samoiedes?—It is in vain to aſcribe to the climate, the low ſtature of the Eſquimaux, the ſmallneſs of their feet, or the overgrown ſize of their heads. It is equally in vain to aſcribe to climate, the low ſtature of the Laplanders, or their ugly viſage. The black colour of negroes, thick lips, flat noſe, criſped woolly hair, and rank ſmell, diſtinguiſh them from every other race of men. The Abyſſinians, on the contrary, are tall and well made, their complexion a brown olive, features well proportioned, eyes large and of a ſparkling black, thin lips, a noſe rather high than flat. There is no ſuch difference of climate between Abyſſinia and Negroland, as to produce theſe ſtriking differences.

"Nor ſhall our author's ingenious hypotheſis concerning the extremities of heat and cold, purchaſe him impunity with reſpect to the ſallow complexion of the Samoiedes, Laplanders, and Greenlanders. The Finlanders, and northern Norwegians, live in a climate not leſs cold than that of the people mentioned; and yet are fair beyond other Europeans. I ſay more, there

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* B. I. Sk. I.

there are many inſtances of races of people preſerving their original colour, in climates very different from their own; but not a ſingle inſtance of the contrary, as far as I can learn. There have been four complete generations of negroes in Penſylvania, without any viſible change of colour; they continue jet black, as originally. Thoſe who aſcribe all to the ſun, ought to conſider how little probable it is, that the colour it impreſſes on the parents ſhould be communicated to their infant children, who never ſaw the ſun: I ſhould be as ſoon induced to believe with a German naturaliſt, whoſe name has eſcaped me, that the negro colour is owing to an ancient cuſtom in Africa, of dying the ſkin black. Let a European, for years, expoſe himſelf to the ſun in a hot climate, till he be quite brown; his children will nevertheleſs have the ſame complexion with thoſe in Europe. From the action of the ſun, is it poſſible to explain, why a negro, like a European, is born with a ruddy ſkin, which turns jet black the eighth or ninth day."

Our author next proceeds to draw ſome arguments for the exiſtence of different ſpecies of men, from the various tempers and diſpoſitions of different nations; which he reckons to be *ſpecific* differences, as well as thoſe of colour, ſtature, &c.; and having ſummed up his evidence, he concludes thus: "Upon ſumming up the whole particulars mentioned above, would one heſitate a moment to adopt the following opinion, were there no counterbalancing evidence, *viz.* 'That God created many pairs of the human race, differing from 'each other, both externally and internally; that he 'fitted thoſe pairs for different climates, and placed 'each pair in its proper climate; that the peculiarities of the original pairs were preſerved entire in 'their deſcendents; who, having no aſſiſtance but their 'natural talents, were left to gather knowledge from 'experience; and, in particular, were left (each tribe) 'to form a language for itſelf; that ſigns were ſufficient for the original pairs, without any language 'but what nature ſuggeſts; and that a language was 'formed gradually, as a tribe increaſed in numbers, 'and in different occupations, to make ſpeech neceſ'ſary?' But this opinion, however plauſible, we are not permitted to adopt; being taught a different leſſon by Revelation, *viz.* That God created but a ſingle pair of the human ſpecies. Though we cannot doubt of the authority of Moſes, yet his account of the creation of man is not a little puzzling, as it ſeems to contradict every one of the facts mentioned above. According to that account, different races of men were not formed, nor were men formed originally for different climates. All men muſt have ſpoken the ſame language. *viz.* That of our firſt parents. And what of all ſeems the moſt contradictory to that account, is the ſavage ſtate: Adam, as Moſes informs us, was endued by his Maker with an eminent degree of knowledge; and he certainly was an excellent preceptor to his children and their progeny, among whom he lived many generations. Whence then the degeneracy of all men unto the ſavage ſtate? To account for that diſmal cataſtrophe, mankind muſt have ſuffered ſome terrible convulſion. That terrible convulſion is revealed to us in the hiſtory of the tower of Babel, contained in the 11th chapter of Geneſis, which is, 'That, for many cen'turies after the deluge, the whole earth was of one 'language, and of one ſpeech; that they united to 'build a city on a plain in the land of Shinar, with a 'tower, whoſe top might reach unto heaven; that the 'Lord, beholding the people to be one, and to have 'all one language, and that nothing would be re'ſtrained from them which they imagined to do, con'founded their language that they might not under'ſtand one another, and ſcattered them abroad upon 'the face of all the earth.' Here light breaks forth in the midſt of darkneſs. By confounding the language of men, and ſcattering them abroad upon the face of all the earth, they were rendered ſavages. And to harden them for their new habitations, it was neceſſary that they ſhould be divided into different kinds, fitted for different climates. Without an immediate change of conſtitution, the builders of Babel could not poſſibly have ſubſiſted in the burning region of Guinea, nor in the frozen region of Lapland; houſes not being prepared, nor any other convenience to protect them againſt a deſtructive climate."

44 hypo- is con- ing the in of the rent ies.

45 Incomplete.

We ſhall firſt remark, on his Lordſhip's hypotheſis, that it is evidently incomplete: for, allowing the human race to have been divided into different ſpecies at the confuſion of languages, and that each ſpecies was adapted to a particular climate; by what means were they to get to the climates proper for them, or how were they to know that ſuch climates exiſted? How was an American, for inſtance, when languiſhing in an improper climate at Babel, to get to the land of the Amazons, or the banks of the Oroonoko, in his own country? or how was he to know that theſe places were more proper for him than others?—If, indeed, we take the ſcripture-phraſe, "The Lord *ſcattered them abroad* upon the face of all the earth," in a certain ſenſe, we may account for it. If we ſuppoſe that the different ſpecies were immediately carried off by a whirlwind, or other ſupernatural means, to their proper countries, the difficulty will vaniſh: but if this is his Lordſhip's interpretation, it is certainly a very ſingular one.

46 General principles to be kept in view in reaſoning on this ſubject.

Before entering upon a conſideration of the particular arguments uſed by our author for proving the diverſity of ſpecies in the human race; it will be proper to lay down the following general principles, which may ſerve as axioms. (1.) When we aſſert a multiplicity of ſpecies in the human race, we bring in a ſupernatural cauſe to ſolve a natural phenomenon: for theſe ſpecies are ſuppoſed to be the immediate work of the Deity. (2.) No perſon has a right to call any thing the immediate effect of omnipotence, unleſs by expreſs revelation from the Deity, or from a certainty that no natural cauſe is ſufficient to produce the effect. The reaſon is plain. The Deity is inviſible, and ſo are many natural cauſes: when we ſee an effect therefore, of which the cauſe does not manifeſt itſelf, we cannot know whether the immediate cauſe is the Deity, or an inviſible natural power. An example of this we have in the phenomena of thunder and earthquakes, which were often aſcribed immediately to the Deity, but are now diſcovered to be the effects of electricity. (3.) No perſon can aſſert natural cauſes to be inſufficient to produce ſuch and ſuch effects, unleſs he perfectly knows all theſe cauſes, and the limits of their power in all poſſible caſes: and this no man has ever known, or can know.

By keeping in view theſe principles, which we hope are ſelf-evident, we will eaſily ſee Lord Kaimes's arguments to conſiſt entirely in a *petitio principii.*—In ſubſtance they are all reduced to this ſingle ſentence: "Natural philoſophers have been hitherto unſucceſsful in their endeavours to account for the differences obſerved among mankind, therefore theſe differences cannot be accounted for from natural cauſes."

47
Inconſiſtency in Lord Kaimes's arguments.

But, beſides this negative evidence againſt his Lordſhip, we have poſitive proofs againſt him, and thoſe of the moſt unexceptionable kind.—The firſt evidence we ſhall produce is *himſelf.* He tells us in the paſſages already quoted, that, "a maſtiff differs not more from a ſpaniel, than a Laplander from a Dane;" that "it is vain to aſcribe to climate the low ſtature of the Laplanders, or their ugly viſage."—Theſe laſt words are ſcarce out of his mouth, when he tell us, in a note on the word *Laplanders*, that "by late accounts it appears, that the Laplanders are only degenerated Tartars; and that they and the Hungarians originally ſprung from the ſame breed of men, and from the ſame country."—The Hungarians are generally handſome and well made, like Danes, or like other people. The Laplanders, he tells us, differ as much from them as a maſtiff from a ſpaniel. Natural cauſes, therefore, according to Lord Kaimes himſelf, may cauſe two individuals of the ſame ſpecies of mankind differ from each other as much as a maſtiff does from a ſpaniel.

48
Remarkable difference of colour from accidental cauſes.

While we are treating this ſubject of colour, it may not be amiſs to obſerve, that a very remarkable difference of colour may accidentally happen to individuals of the ſame ſpecies. In the iſthmus of Darien, a ſingular race of men have been diſcovered.—They are of low ſtature, of a feeble make, and incapable of enduring fatigue. Their colour is a dead milk white; not reſembling that of fair people among Europeans, but without any bluſh or ſanguine complexion. Their ſkin is covered with a fine hairy down of a chalky white; the hair of their heads, their eye-brows, and eye-laſhes, are of the ſame hue. Their eyes are of a ſingular form; and ſo weak, that they can hardly bear the light of the ſun; but they ſee clearly by moon-light, and are moſt active and gay in the night. Among the negroes of Africa, as well as the natives of the Indian iſlands, a ſmall number of theſe people are produced. They are called *Albioas* by the Portugueſe, and *Kackerlakes* by the Dutch.

49
Colour no characteriſtic of a different ſpecies.

This race of men is not indeed permanent; but it is ſufficient to ſhew, that mere *colour* is by no means the characteriſtic of a certain ſpecies of mankind. The difference of colour in theſe individuals is undoubtedly owing to a natural cauſe. To conſtitute, then, a race of men of this colour, it would only be neceſſary that this cauſe, which at preſent is merely accidental, ſhould become permanent, and we cannot know but it may be ſo in ſome parts of the world.

50
Nor ſtature.

If a difference in colour is no characteriſtic of a different ſpecies of mankind, much leſs can a difference in ſtature be thought ſo.—In the ſouthern parts of America, there are ſaid to be a race of men exceeding the common ſize in height and ſtrength*. This account, however, is doubted of by ſome; but be that as it will, it is certain that the Eſquimaux are as much under the common ſize, as the Patagonians are ſaid to be above it. Nevertheleſs we are not to imagine, that either of theſe are ſpecific differences; ſeeing the Laplanders and Hungarians are both of the ſame ſpecies, and yet the former are generally almoſt a foot ſhorter than the latter; and if a difference of climate, or other accidental cauſes, can make the people of one country a foot ſhorter than the common ſize of mankind, undoubtedly accidental cauſes of a contrary nature may make thoſe of another country a foot taller than other men.

51
Different cauſes con-
tribute to-
wards an
teration in
colour.

Though the ſun has undoubtedly a ſhare in the production of the ſwarthy colour of thoſe nations which are moſt expoſed to his influence; yet the manner of living to which people are accuſtomed, their victuals, their employment, *&c.* muſt contribute very much to a difference of complexion. There are ſome kinds of colouring roots, which, if mixed with the food of certain animals, will tinge even their bones of a yellow colour.—It cannot be thought any great degree of credulity to infer from this, that if theſe roots were mixed with the food of a white man, they might, without a miracle, tinge his ſkin of a yellow colour. If a man and woman were both to uſe food of this kind for a length of time, till they became as it were *radically dyed*, it is impoſſible, without the intervention of divine power, or of ſome extraordinary natural cauſe, but their children muſt be of the ſame colour; and was the ſame kind of food to be continued for ſeveral generations, it is more than probable that this colour might reſiſt the continued uſe of any kind of food whatever.

52
Habit ca-
ble of al-
ing the in-
ſtinct of a
mals.

Of this indeed we have no examples, but we have an example of changes much more wonderful.—It is allowed on all hands, that it is more eaſy to work a change upon the body of a man, or any other animal, than upon his mind. A man that is naturally choleric may indeed learn to prevent the bad effects of his paſſion by reaſon, but the paſſion itſelf will remain as immutable as his colour.—But, to reaſon in a manner ſimilar to Lord Kaimes; though a man ſhould be naturally choleric, or ſubject to any other paſſion, why ſhould his children be ſo?——This way of reaſoning, however plauſible, is by no means concluſive, as will appear from the following paſſage in Mr Forſter's Voyage.

Voyage round the World, Vol. I. p. 23

June 9th. "The officers who could not yet reliſh their ſalt proviſions after the refreſhments of New Zealand, had ordered their black dog, mentioned p. 135, to be killed: this day, therefore, we dined for the firſt time on a leg of it roaſted; which taſted ſo exactly like mutton, that it was abſolutely undiſtinguiſhable. In our cold countries, where animal-food is ſo much uſed, and where to be carnivorous perhaps lies in the nature of men, or is indiſpenſibly neceſſary to the preſervation of their health and ſtrength, it is ſtrange that there ſhould exiſt a Jewiſh averſion to dogs-fleſh, when hogs, the moſt uncleanly of all animals, are eaten without ſcruple. Nature ſeems expreſsly to have intended them for this uſe, by making their offspring ſo very numerous, and their increaſe ſo quick and frequent. It may be objected, that the exalted degree of inſtinct, which we obſerve in our dogs, inſpires us with great unwillingneſs to kill and eat them. But it is owing to the time we ſpend on the education of dogs, that they acquire thoſe eminent qualities which attach them ſo much to us. The natural qualities of our dogs may receive a wonderful improvement; but education muſt give its aſſiſtance, without which the human mind itſelf, though capable of an immenſe expanſion, remains in a very contracted ſtate. In New Zealand, and (according to former accounts of voyages) in the tropical iſles of the ſouth ſea, the dogs are the moſt ſtupid, dull animals imaginable, and do not ſeem to have the leaſt advantage in point of ſagacity over our ſheep, which are commonly made the emblems of ſillineſs. In the former country they are fed upon fiſh, in the latter on vegetables, and both theſe diets may have ſerved to alter their diſpoſition. Education may perhaps likewiſe graft new inſtincts: the New Zealand dogs are fed on the remains of their maſter's meals; they eat the bones of other dogs; and the puppies become true canibals from their birth. We had a young New Zealand puppy on board, which had certainly had no opportunity of taſting any thing but the mother's milk before we purchaſed it: however, it eagerly devoured a portion of the fleſh and bones of the dog on which we dined to-day; while ſeveral others of the European breed, taken on board at the Cape, turned from it without touching it.

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* See *Patagonia.*

d. p. 143.

“ On the 4th of Auguſt, a young bitch, of the terrier breed, taken on board at the Cape of Good Hope, and covered by a ſpaniel, brought ten young ones, one of which was dead. The New Zealand dog mentioned above, which devoured the bones of the roaſted dog, now fell upon the dead puppy, and eat of it with a ravenous appetite. This is a proof how far education may go in producing and propagating new inſtincts in animals. European dogs are never fed on the meat of their own ſpecies, but rather ſeem to abhor it. The New Zealand dogs, in all likelihood, are trained up from their earlieſt age to eat the remains of their maſter's meals: they are therefore uſed to feed upon fiſh; their own ſpecies; and perhaps human fleſh; and what was only owing to habit at firſt, may have become inſtinct by length of time. This was remarkable in our canibal-dog; for he came on board ſo young, that he could not have been weaned long enough to have acquired a habit of devouring his own ſpecies, and much leſs of eating human fleſh; however, one of our ſeamen having cut his finger, held it out to the dog, who fell to greedily, licked it, and then began to bite it.”

From this account it appears, that even the inſtincts of animals are not unchangeable by natural cauſes; and if theſe cauſes are powerful enough to change the diſpoſitions of ſucceeding generations, much more may we ſuppoſe them capable of making any poſſible alteration in the external appearance.

53
firmed
n obſer-
on on
Franks.

We are not here neceſſitated to confine ourſelves to obſervations made on brute animals. The Franks are an example of the production of one general character, formed by ſome natural cauſe from a mixture of many different nations.—They were a motley multitude, conſiſting of various German nations dwelling beyond the Rhine; who, uniting in defence of their common liberty, took thence the name of *Franks;* the word *frank* ſignifying in their language, as it ſtill does in ours, *free*. Among them the following nations were mentioned, *viz.* the Actuarii, Chamavi, Bructeri, Salii, Friſii, Chauci, Amſwarii, and Catti. We cannot ſuppoſe one character to belong to ſo many different nations: yet it is certain that the Franks were nationally characterized as treacherous; and ſo deeply ſeems this quality to have been rooted in their nature, that their deſcendents have not got quite free of it in 1500 years. It is in vain, then, to talk of different ſpecies of men, either from their colour, ſize, or prevailing diſpoſitions, ſeeing we have undeniable proofs that all theſe may be changed, in the moſt remarkable manner, by natural cauſes, without any miraculous interpoſition of the Deity.

54
Conjectures concerning the peopling of America.

Having thus, we hope, ſufficiently ſhewn, that there are no good reaſons for ſuppoſing the Americans to be *ſpecifically* different from other nations, we muſt now conſider from what part of the old world America has moſt probably been peopled. This ſubject hath been very much canvaſſed; and many conjectures, derived from the ſimilarity of words, cuſtoms, *&c.* have been advanced. All theſe are very clearly refuted by Dr Robertſon; who hath evinced, to the ſatisfaction of every rational inquirer, that proofs of that kind are entirely fanciful, and may be made to ſerve any purpoſe. He himſelf is of opinion, that it was peopled from the north-eaſtern part of Aſia, on account of the vicinity of the two continents to each other. His reaſons we ſhall give in his own words.

Hiſtory of Amer. vol. I. p. 267.

55
Dr Robertſon's opinion.

Ibid. p. 273.

“ The actual vicinity of the two continents is ſo clearly eſtabliſhed by modern diſcoveries, as removes the chief difficulty with reſpect to the peopling of America. While thoſe immenſe regions which ſtretched eaſtward from the river Oby to the ſea of Kamchatka were unknown, or imperfectly explored, the north-eaſt extremities of our hemiſphere were ſuppoſed to be ſo far diſtant from any part of the New World, that it was not eaſy to conceive how any communication ſhould have been carried on between them. But the Ruſſians, having ſubjected the weſtern part of Siberia to their empire, gradually extended their knowledge of that vaſt country, by advancing towards the eaſt into unknown provinces. Theſe were diſcovered by hunters in their excurſions after game, or by ſoldiers employed in levying the taxes; and the court of Moſcow eſtimated the importance of thoſe countries only by the ſmall addition which they made to its revenue. At length, Peter the Great aſcended the Ruſſian throne: His enlightened, comprehenſive mind, intent upon every circumſtance that could aggrandize his empire, or render his reign illuſtrious, diſcerned conſequences of thoſe diſcoveries, which had eſcaped the obſervation of his ignorant predeceſſors. He perceived, that, in proportion as the regions of Aſia extended towards the eaſt, they muſt approach nearer to America; that the communication between the two continents, which had long been ſearched for in vain, would probably be found in this quarter; and that, by opening this intercourſe, ſome part of the wealth and commerce of the weſtern world might be made to flow into his dominions by a new channel. Such an object ſuited a genius that delighted in grand ſchemes. Peter drew up inſtructions with his own hand for proſecuting this deſign, and gave orders for carrying it into execution.

“ His ſucceſſors adopted his ideas, and purſued his plan. The officers whom the Ruſſian court employed in this ſervice, had to ſtruggle with ſo many difficulties, that their progreſs was extremely ſlow. Encouraged by ſome faint traditions among the people of Siberia concerning a ſucceſsful voyage in the year 1648 round the north-eaſt promontory of Aſia, they attempted to follow the ſame courſe. Veſſels were fitted out, with this view, at different times, from the rivers Lena and Kolyma; but in a frozen ocean, which nature ſeems not to have deſtined for navigation, they were expoſed to many diſaſters, without being able to accompliſh their purpoſe. No veſſel fitted out by the Ruſſian court ever doubled this formidable cape; we are indebted for what is known of thoſe extreme regions of Aſia, to the diſcoveries made in excurſions by land. In all thoſe provinces, an opinion prevails, that countries of great extent and fertility lie at no conſiderable diſtance from their own coaſts. Theſe the Ruſſians imagined to be part of America; and ſeveral circumſtances concurred not only in confirming them in this belief, but in perſuading them that ſome portion of that continent could not be very remote. Trees of various kinds, unknown in thoſe naked regions of Aſia, are driven upon the coaſt by an eaſterly wind. By the ſame wind, floating ice is brought thither in a few days; flights of birds arrive annually from the ſame quarter; and a tradition obtains among the inhabitants, of an intercourſe formerly carried on with ſome countries ſituated to the eaſt.

“ After weighing all theſe particulars, and comparing the poſition of the countries in Aſia which they had diſcovered, with ſuch parts in the north-weſt of America as were already known; the Ruſſian court formed a plan, which would have hardly occurred to any nation leſs accuſtomed to engage in arduous undertakings and to contend with great difficulties. Orders were iſſued to build two veſſels at Ochotz, in the ſea of Kamchatka, to ſail on a voyage of diſcovery. Though that dreary uncultivated region furniſhed nothing that could be of uſe in conſtructing them, but ſome larch-trees; though not only the iron, the cordage, the ſails, and all the numerous articles requiſite for their equipment, but the proviſions for victualling them, were to be carried through the immenſe deſerts of Siberia, along rivers of difficult navigation, and roads almoſt impaſſable, the mandate of the ſovereign, and the perſeverance of the people, at laſt ſurmounted every obſtacle. Two veſſels were finiſhed; and, under the command of the captains Behring and Tſchirikow, ſailed from Kamchatka in queſt of the New World, in a quarter where it had never been approached. They ſhaped their courſe towards the eaſt; and tho' a ſtorm ſoon ſeparated the veſſels, which never rejoined, and many diſaſters befel them, the expectations from the voyage were not altogether fruſtrated. Each of the commanders diſcovered land, which to them appeared to be part of the American continent; and, according to their obſervations, it ſeems to be ſituated within a few degrees of the north-weſt coaſt of California. Each ſet ſome of his people aſhore: but in one place the inhabitants fled as the Ruſſians approached; in another, they carried off thoſe who landed, and deſtroyed their boats. The violence of the weather, and the diſtreſs of their crews, obliged both to quit this inhoſpitable coaſt. In their return they touched at ſeveral iſlands, which ſtretch in a chain from eaſt to weſt between the country which they had diſcovered and the coaſt of Aſia. They had ſome intercourſe with the natives, who ſeemed to them to reſemble the North Americans. They preſented to the Ruſſians the *calumet*, or pipe of peace, which is a ſymbol of friendſhip univerſal among the people of North America, and an uſage of arbitrary inſtitution peculiar to them.

That America *may* have been peopled from the north-eaſtern part of Aſia, is certainly poſſible; though that it actually was ſo, can by no means be evinced. Indeed, we are led into great difficulties, from whatever place we ſuppoſe its inhabitants to have come: for the whole continent, from north to ſouth, was peopled with tribes almoſt equally ſavage; and it is not eaſy to imagine how a few individuals, for we cannot ſuppoſe many to have come from theſe frozen parts of Aſia, could have formed themſelves into ſo many different tribes, each having the moſt inveterate malice againſt the others. Their colour, too, would incline us to think that their progenitors had been negroes rather than Tartars.

56 Another conjecture. It is certain, that there is a poſſibility of this continent having been peopled from the Eaſt Indies. We do not ſuppoſe that any nation ever ſent a colony thither. If they had done ſo, the characteriſtic marks of that nation would have remained in ſome degree; but the moſt ſavage tribes we have ever heard of on the ancient continent, were civilized nations, when compared with the Americans. So low, indeed, is their capacity ſaid to be, that the very African negroes deſpiſe them as a race of men inferior to themſelves.

We have already had occaſion to obſerve *, that the general character of a nation depends in a conſiderable degree upon that of the firſt founders of it. It is alſo a certain fact, that living in ſociety will improve the moſt barbarous nations. Had America, then, been peopled at once, or only received one colony of men into it, it is impoſſible but the nations muſt have begun ſome improvements through length of time.—We ſhall ſuppoſe a colony of Tartars had been by ſome accident driven on the coaſt of North America. They would have remembered their ancient cuſtoms, and tranſmitted them to their poſterity. Theſe people, we know, have the art of taming animals; and though they could not find animals of the ſame kind with thoſe they left in their own country, they would undoubtedly have endeavoured to render ſuch as they found in America ſubſervient to them; and the great utility of this practice would infallibly have preſerved it when once begun. It is very probable, therefore, that as the Americans had not this art, neither had their anceſtors; whom, for that reaſon, we can ſcarce ſuppoſe to have been any nation in the northern parts of Aſia, where that art has been always known.

The exceſſively ſavage ſtate of the Americans we may account for by ſuppoſing them to have come originally from the ſouthern parts of Aſia. From theſe places of the old continent lie a chain of iſlands with but very moderate diſtances between them, till we come to the Marqueſas and Society Iſlands, lying between 138° and 155° of W. long. and between 10° and 20° of S. lat. Then, indeed, the connection is in a great meaſure broken off; but not ſo much that we can ſuppoſe an impoſſibility of ſome of the inhabitants of thoſe iſlands reaching the continent of America. The ſolitary Iſland of Eaſther or S. Carlos lies at a very conſiderable diſtance from the Society Iſles in lat. 27° 4' S. long. 109° 46' W. and yet the inhabitants are manifeſtly of the ſame race, as they ſpeak almoſt the ſame language. Here they have very few domeſtic animals, and conſequently muſt be very deficient in the art of taming them, as they muſt likewiſe be in all the ſouth-ſea iſlands for the ſame reaſon.

The prodigious inclination the natives of America

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* Hiſtory of Agriculture.

have for war and cruelty, would alſo lead us to ſuſpect that its firſt inhabitants have been very ſoon harraſſed by others, who might have arrived ſhortly after. Being extremely deficient in the neceſſary arts of life when they arrived, and prevented by the attacks of invaders from paying attention to any thing but their own defence, and having ſo much room in the immenſe continent of America to ſeparate, and thereby grow daily more and more ſavage, they might at laſt degenerate into a ſtate below what is to be found in any other part of the globe.

That the immenſe extent of their country conduced very conſiderably to their extreme ſavageneſs, is evident; becauſe in the empires of Mexico and Peru, where the inhabitants were reduced under one governor, and obliged to live in ſociety, they had made a conſiderable progreſs in civilization.

Thus have we, as well as others, made a *poſſible* conjecture concerning the origin of the Americans. Perhaps it may be thought the more probable, becauſe the countries lying under or near the equator were better peopled than thoſe much to the ſouthward or northward, and we may always ſuppoſe thoſe places of a country to be the moſt populous near which the firſt inhabitants have arrived. Add to this, that the colour of the natives of the ſouth-ſea iſlands correſponds much better with the general colour of the Americans than that of any other people who are yet known.—We do not here mean to include the *Eſquimaux*, who inhabit the eaſtern coaſt of Hudſon's bay, as they are evidently a diſtinct race, and probably the ſame with the Greenlanders.—But we muſt now leave theſe regions of conjecture, to give ſome account of the diſcovery of this vaſt continent.

57 cients poſed to ve ſome tion of a w world.

It is believed by many, that the ancients had ſome imperfect notion of a new world, and ſeveral ancient authors are quoted in confirmation of this.—In a book aſcribed to the philoſopher Ariſtotle, we are told that the Carthaginians diſcovered an iſland far beyond the pillars of Hercules, large, fertile, and finely watered with navigable rivers, but uninhabited, This iſland was diſtant a few days ſailing from the continent: its beauty induced the diſcoverers to ſettle there; but the policy of Carthage diſlodged the colony, and laid ſtrict prohibition on all the ſubjects of the ſtate not to attempt any future eſtabliſhment. This account is alſo confirmed by an hiſtorian of no mean credit, who relates, that the Tyrians would have ſettled a colony on the new-diſcovered iſland, but were oppoſed by the Carthaginians for ſtate reaſons. The following paſſage has alſo been quoted from Seneca's *Medea*, in confirmation of this notion.

> ——*Venient annis*
> *Sæcula ſeris, quibus oceanus*
> *Vincula rerum laxet, & ingens*
> *Pateat tellus, Typhiſque novos*
> *Detegat orbes; nec ſit terris*
> *Ultima Thule.*——
>
> Act iii. ver. 375.

58 covery Colum- s.

Other authors are alſo quoted in ſupport of this belief: but, however this may be, nobody ever believed the exiſtence of this continent ſo firmly as to go in queſt of it; and the diſcovery of America was by no means owing to any previous knowledge of its exiſtence, but to the following circumſtances.—Towards the cloſe of the 15th century, Venice and Genoa being rivals in commerce, in which the former had greatly the ſuperiority; Chriſtopher Columbus, a native of Genoa, whoſe knowledge of the true figure of the earth, however attained, was much ſuperior to the general notions of the age in which he lived, conceived a project of ſailing to the Eaſt-Indies by directing his courſe weſtward. This deſign was founded upon a miſtake of the geographers of thoſe days, who placed the eaſtern parts of Aſia immenſely too far to the eaſtward; ſo that, had they been in the right, the ſhorteſt way would have been to ſail directly weſtward.—He applied firſt to his own countrymen; but being rejected by them, he applied to France, where he was laughed at and ridiculed. He next applied to Henry VII. of England; but meeting with a diſapointment there, he made an application to Portugal, where he met with the ſame mortifying reception. Spain was his next reſource; where, after eight years attendance, he obtained, in 1492, a fleet of three ſhips, with which he ſet ſail in queſt of the Eaſt Indies. He quitted Spain on the 3d of Auguſt 1492; and after a tedious navigation, during which his ſailors often mutinied, arrived at Guinaya, one of the Lucayo iſlands, on the 12th of October.

In Columbus's firſt voyage he contented himſelf with diſcovering ſeveral of the Lucayo or Bahama iſlands, with thoſe of Cuba and Hiſpaniola. On his return to Spain, he found himſelf as much careſſed as he had before been mortified and diſappointed. His ſucceſs immediately produced a crowd of adventurers from all nations, who embarked in hopes of making themſelves rich by new diſcoveries; but it was not till 1519, that the extremity of the continent was diſcovered by a celebrated Portugueſe navigator, whoſe true name was *Fernando de Magalbaens*, by the Spaniards called *Hernando Magalhanes*, and by the French *Magellan*, from whom the ſtraits between the ſouthern point of the continent and the iſland of Terra del Fuego take their name.

59 Diviſion of the continent.

Notwithſtanding the many ſettlements of the Europeans in this continent, great part of America remains ſtill unknown. The northern continent contains the Britiſh colonies of Hudſon's bay, Canada, Nova Scotia, New England, New York, New Jerſey, Penſylvania, Maryland, Virginia, North and South Carolina, Georgia, Eaſt and Weſt Florida. It contains alſo the Spaniſh territories of Louiſiana, New Mexico, California, and Mexico. Beſides theſe, there are immenſe regions to the weſt and north, the boundaries of which have never yet been diſcovered. In ſuch as are in any degree known, dwell the Eſquimaux, the Algonquins, the Hurons, the Iroquois, the Cherokees, the Chikaſaws, and many other tribes of Indians.—In the ſouthern continent lie the Spaniſh provinces of Terra Firma, Guiana, Peru, Paraguay, and Chili; together with that of Braſil, belonging to the Portugueſe; and the country of Surinam, belonging to the Dutch. Vaſt tracts, however, in the inland parts, are unknown, being comprehended under the general name of *Amazonia*. A large diſtrict alſo, ſaid to be the reſidence of a gigantic race of men, lies on the eaſt ſide of the continent, between the ſtraits of Magellan and the province of Paraguay.

60 Advantages &c. from its diſcovery.

The acquiſition of theſe countries was not effected without the moſt horrid devaſtations, and maſſacres of the inhabitants, by the Spaniards. The riches they afford have alſo been the occaſion of much bloodſhed among the Europeans themſelves; and indeed, were the advantages which the Europeans have gained from their conqueſts in America, duely contraſted with the loſſes they have ſuſtained from them, it is doubtful whether the latter would not preponderate.——It is undeniable, however, that many real and ſolid advantages have accrued to the Europeans by their connections with this continent. Gold and ſilver have been rendered more plentiful in the European regions than ever they were before. The Materia Medica hath been enriched by the acquiſition of the Peruvian bark and Ipecacuanha; medicines of ſo great efficacy, that their good effects may juſtly be ſuppoſed to balance the bad conſequences of the venereal diſeaſe ſaid to be imported from thence. But of the riches of America, as well as the hiſtory of its different provinces, their inhabitants, manners and cuſtoms, &c. we ſhall treat particularly under the names of each, as they occur in alphabetical order.—[*Erratum*, in marginal note, nº 11. For *cool*, write *moderate*.]

AMERICUS VESPUCIUS, by the encouragement of Emanuel king of Portugal, made, in 1497, ſome additional diſcoveries of that part of the world, which from him is called *America*, tho' firſt diſcovered by Columbus, a Genoeſe, in 1492, as narrated in the preceding article.

AMERSFORT, a city in the Netherlands, in the province of Utrecht, ſeated on the river Ems, E. long. 5. 20. N. lat. 52. 14. The moſt remarkable things are, The town-houſe; the grand palace, which is triangular; the public walk, planted with trees; and the great church, dedicated to St George. The land to the eaſt and ſouth of this city is very fruitful; on the north there is nothing but paſture-ground, and on the weſt it is woody. Not far from hence is a mountain called *Amersfort-berg*, on which they have planted a viſta of trees, which reaches to Utrecht.

AMERSHAM, or AGMONDESHAM, a market-town in Buckinghamſhire, conſiſting of about 200 houſes, with a free-ſchool, and four alms-houſes. It ſends two members to parliament, and has a market on Tueſday. It is a rectory rated at 48 l. 16 s. 8 d. in the king's books. The market-houſe is a very handſome ſtructure. W. long. 0. 15. N. lat. 51. 47.

AMES (William) D. D. a learned independent divine, famous for his controverſial writings, was born in 1576, and educated at Chriſt's college, in Cambridge. In the reign of King James I. he left the univerſity, and ſoon after the kingdom, on account of his being unwilling to conform to the rules of the church; and retired to the Hague, where he had not been long before he was invited to accept of the divinity-chair in the univerſity of Franeker, in Frieſland, which he filled, with admirable abilities, for above twelve years, during which his fame was ſo great, that many came from remote nations to be educated under him. He from thence removed to Rotterdam, for a change of air which his health demanded; and here he continued during the remainder of his life. His controverſial writings, which compoſe the greateſt part of his works, are chiefly againſt Bellarmine and the Arminians. He alſo wrote, 1. A freſh Suit againſt the Ceremonies. 2. *Lectiones in Pſalmos Davidis*. 3. *Medulla Theologiæ*; and ſeveral pieces relative to the ſciences. He died of an aſthma, at Rotterdam, in Nov. 1633.

AMESTRATA, a town of Sicily, (Cicero); *Ameſtratos*, (Stephanus); *Amaſtra*, (Silius Italicus); *Mutiſtratos*, (Polybius); now *Miſtretta*, in the Val di Demona, on the river Haleſus; a very ſtrong fort of the Carthaginians, beſieged in vain by the Romans for ſeven months with conſiderable loſs; at length, after another ſiege, taken and raſed, (Diodor. Siculus.) The appellation is Phœnician, according to Bochart, *Math-Aſtrata*, and *Am-Aſtrata*, the city and people of the goddeſs Aſtarte. The inhabitants are called by Cicero *Ameſtratini*, and *Mutiſtratini* by Pliny.

AMETHYST, a tranſparent gem of a purple colour, which ſeems compoſed of a ſtrong blue and a deep red; and, according as either of thoſe prevails, affording different tinges of purple, ſometimes approaching to violet, and ſometimes even fading to a pale roſe colour. Though the amethyſt is generally of a purple colour, it is nevertheleſs ſometimes found naturally colourleſs, and may at any time be eaſily made ſo by putting it into the fire; in which pellucid or colourleſs ſtate, it ſo reſembles the diamond, that its want of hardneſs ſeems the only way of diſtinguiſhing it. Some derive the name *amethyſt* from its colour, which reſembles wine mixed with water: whilſt others, with more probability, think it got its name from its ſuppoſed virtue of preventing drunkenneſs; an opinion, which, however imaginary, prevailed to that degree among the ancients, that it was uſual for great drinkers to wear it about their necks. Be this as it will, the amethyſt is ſcarce inferior to any of the gems in the beauty of its colour; and in its pureſt ſtate is of the ſame hardneſs, and at leaſt of equal value, with the ruby and ſapphire. It is found of various ſizes, from the bigneſs of a ſmall vetch, to an inch and an half in diameter, and often to much more than that in length. Its ſhape is extremely various, ſometimes roundiſh, ſometimes oblong, and at others flatted, at leaſt on one ſide: but its moſt common appearance is in a cryſtalliform figure, conſiſting of a thick column, compoſed of four plants, and terminated by a flat and ſhort pyramid, of the ſame number of ſides; or elſe, of a thinner and longer hexangular column; and ſometimes of a long pyramid, without any column. It makes the gayeſt figure in the laſt of theſe ſtates, but is hardeſt and moſt valuable in the roundiſh and pebble-like form. The amethyſt is found in the Eaſt and Weſt Indies, and in ſeveral parts of Europe; the oriental ones, at leaſt ſome of the finer ſpecimens, being ſo hard and bright as to equal any of the coloured gems in value. However, by far the greater number of amethyſts fall infinitely ſhort of theſe; as all the European ones, and not a few of thoſe brought from the Eaſt and Weſt Indies, are very little harder than common cryſtal.

Counterfeit or Factitious AMETHYST, a kind of glaſs made of cryſtal frit, manganeſe, and zaffer; which, in colour, greatly reſembles the natural amethyſt.

AMETHYST, in heraldry, a term for the purple colour in the coat of a nobleman, in uſe with thoſe who blazon with precious ſtones, inſtead of metals and colours. This, in a gentleman's eſcutcheon, is called *Purpure*; and in thoſe of ſovereign princes, *Mercury*.

AMETHYSTEA, AMETHYST; a genus of the monogynia order belonging to the diandria claſs of plants, of which only one ſpecies is known.

This plant is a native of Siberia, from whence the ſeeds were ſent to the imperial garden at Peterſburgh, and thence brought to Britain. It is an annual plant, with an upright ſtalk, which riſes about a foot high. Towards the top it puts forth two or three ſmall lateral branches, garniſhed with ſmall trifid leaves, ſawed on their edges, of a very dark green colour. The flowers appear in June or July, and are produced in ſmall umbels at the extremities of the branches. They are of a fine blue colour, as are alſo the upper part of the branches, and the leaves immediately under the umbel, ſo that they make a fine appearance.

Culture. The ſeeds of the amethyſtea ſhould be ſown in autumn, as they are apt to remain a whole year in the ground if kept till the ſpring. When the plants come up, nothing elſe is neceſſary than to keep them clear of weeds, and to thin them where they are too cloſe. They ought to be ſown where they are to remain, as they do not thrive when tranſplanted.

AMHAR, or AMHARA, a province of Abyſſinia, ſaid to extend forty leagues from eaſt to weſt. It is conſidered as the moſt noble in the whole empire, both on account of its being the uſual reſidence of the Abyſſinian monarchs, and having a particular dialect different from all the reſt, which, by reaſon of the emperors being brought up in this province, is become the language of the court and of the politer people. Here is the famed rock Amba-geſhen, where the young monarchs were formerly confined. See AMBA.

AMHURST (Nicholas), an Engliſh poet and political writer, was born at Marden in Kent, and entered of St John's college Oxford; from whence he was expelled for irregularity of conduct and libertine principles. Retaining great reſentment againſt the univerſity on this account, he abuſed its learning and diſcipline, and ſome of the moſt reſpectable characters in it, in a poem publiſhed in 1724, called *Oculus Britanniæ*, and in a book entitled *Terræ Filius*. He publiſhed, A Miſcellany of poems, ſacred and profane; and, The Convocation, a poem in 5 cantos, which was a ſatire on the biſhop of Bangor's antagoniſts. But he is beſt known for the ſhare he had in the political paper called *The Craftſman*; tho', after having been the drudge of his party for near 20 years, he was as much forgot in the famous compromiſe of 1742, as if he had never been born; and, when he died in that year of a broken heart, was indebted to the charity of his bookſeller for a grave.

AMIANTHUS, or EARTH-FLAX, in natural hiſtory, a fibrous, flexile, elaſtic, mineral ſubſtance, conſiſting of ſhort, abrupt, and interwoven filaments. It is found in Germany, in the ſtrata of iron ore, ſometimes forming veins of an inch in diameter. There is another kind of amianthus, which is to be met with in the marble quarries of Wales. But this kind Linnæus affirms to be an aſbeſtos *. The amianthus does not give fire with ſteel, nor ferment with acids. It endures an intenſe heat without injury to its texture.

AMICABLE, in a general ſenſe, denotes any thing done in a friendly manner, or to promote peace.

AMICABLE *Benches*, in Roman antiquity, were, according to Pitiſcus, lower and leſs honourable ſeats allotted for the *judices pedanei*, or inferior judges, who, upon being admitted of the emperor's council, were dignified by him with the title *amici*.

AMICABLE *Numbers*, ſuch as are mutually equal to the ſum of one another's aliquot parts. Thus the numbers 284 and 220 are amicable numbers: for the aliquote parts 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110, of 220, are together equal to the other number 284; and the aliquot parts 1, 2, 4, 71, 142, of 284, are together equal to 220.

AMICTUS, in Roman antiquity, was any upper garment worn over the tunica.

AMICTUS, among eccleſiaſtical writers, the uppermoſt garment anciently worn by the clergy; the other five being the alba, ſingulum, ſtola, manipulus, and planeta. The amictus was a linen garment, of a ſquare figure, covering the head, neck, and ſhoulders, and buckled or claſped before the breaſt. It is ſtill worn by the religious abroad.

AMICULUM, in Roman antiquity, a woman's upper garment, which differed from the pala. It was worn both by matrons and courteſans.

AMICUS CURIÆ, a law-term, to denote a byſtander who informs the court of a matter in law that is doubtful or miſtaken.

AMIDA, (anc. geog.) a principal city of Meſopotamia, (Liber Notitiæ); *Ammæa*, (Ptolemy); ſituated on a high mountain, on the borders of Aſſyria, on the Tigris, where it receives the Nymphius. —It was taken from the Romans, in the time of the emperor Conſtans, by Sapores king of Perſia. The ſiege is ſaid to have coſt him 30,000 men; however, he reduced it to ſuch ruin, that the emperor afterwards wept over it. According to Ammianus Marcellinus, the city was raſed; the chief officers were crucified; and the reſt, with the ſoldiers and inhabitants, either put to the ſword, or carried into captivity, except our hiſtorian himſelf, and two or three more, who, in the dead of the night, eſcaped thro' a poſtern unperceived by the enemy. The inhabitants of Niſibis, however, being obliged to leave their own city by Jovian's treaty with the Perſians, ſoon reſtored Amida to its former ſtrength; but it was again taken by Cavades in 501, but was reſtored to the Romans in 503. On the declenſion of the Roman power, it fell again into the hands of the Perſians; but was taken from them by the Saracens in 899. It is now in the poſſeſſion of the Turks. Here are above 20,000 Chriſtians, who are better treated by the Turks than in other places. A great trade is carried on in this city, of red Turky leather, and cotton cloth of the ſame colour. The Arabian name of Amida is *Diarbeker*, and the Turkiſh one *Kara-Amed*. E. long. 39. 0. N. lat. 36. 58.

AMIENS, a handſome, large, and ancient town of France, the capital of Picardy, and a biſhop's ſee. The nave of the cathedral church is a finiſhed piece of building, and the whole ſtructure ſtately; beſides which, there are ten pariſh-churches, and one in the ſuburbs, ſeveral religious houſes, an academy of belles lettres, five gates, and about 35,000 inhabitants. Three branches of the river Somme enter this city, over which there are as many bridges. It lies in the road from Calais to Paris, and was taken by the Spaniards in 1597, by the following ſtratagem: Soldiers, diſguiſed like peaſants, conducted a cart loaden with nuts, and let a bag of them fall juſt as the gate was opened; while the guard was buſy in gathering up the nuts, the Spaniards entered, and became maſters of the town. It was re-taken by Henry IV. who built a citadel here. It has manufactures in linen and woollen cloth; and lies in E. Long. 2. 30. N. Lat. 49. 34.

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* Aſbe-

AMILCAR, the name of ſeveral Carthaginian captains. The moſt celebrated of them is Amilcar Barcas, the father of Hannibal, who, during five years, infeſted the coaſt of Italy; when the Romans ſending out their whole naval ſtrength, defeated him near Trapani, 242 years before Chriſt; and this put an end to the firſt Punic war. Amilcar began the ſecond, and landed in Spain, where he ſubdued the moſt warlike nations; but, as he was preparing for an expedition againſt Italy, he was killed in battle, 228 years before the Chriſtian æra. He left three ſons, whom he had educated, as he ſaid, like three lions, to tear Rome in pieces; and made Hannibal, his eldeſt ſon, ſwear to an eternal enmity againſt the Romans.

AMILICTI, in the ancient Chaldean theology, one of the triads of perſons in the third order of the divine hierarchy. See HIERARCHY.

AMIRANTE, in the Spaniſh polity, a great officer of ſtate, anſwering to our lord high-admiral.

AMISUS, the chief city of the ancient kingdom of Pontus. It was built by the Mileſians, and peopled partly by them, and partly by a colony from Athens. It was at firſt a free city, like the other Greek cities in Aſia; but afterwards ſubdued by Pharnaces king of Pontus, who made it his metropolis. It was taken by Lucullus in the Mithridatic war, who reſtored it to its ancient liberty. Cloſe by Amiſus ſtood another city called *Eupatoria*, from Mithridates Eupator its founder. This city was likewiſe taken by Lucullus, who levelled it with the ground; but it was afterwards rebuilt by Pompey, who united it with Amiſus, giving them the name of *Pompeiopolis*. It was taken during the war between Cæſar and Pompey, by Pharnaces king of Pontus, who put moſt of its inhabitants to the ſword; but Cæſar, having conquered Pharnaces, made it again a free city.

AMITTERE LEGEM TERRÆ, among lawyers, a phraſe importing the loſs of liberty of ſwearing in any court: The puniſhment of a champion overcome or yielding in battle, of jurors found guilty in a writ of attaint, and of a perſon outlawed.

AMITERNUM, a town of the Sabines, in Italy, (Livy, Pliny); now extinct: The ruins are to be ſeen on the level ridge of a mountain, near S. Vittorino, and the ſprings of the Aternus; not far from Aquila, which roſe out of the ruins of Amiternum. The inhabitants are called *Amiternini*, (Livy, Pliny.) The epithet, *Amiternus*, (Virgil.)

AMMA, among eccleſiaſtical writers, a term uſed to denote an abbeſs or ſpiritual mother.

AMMAN, or AMMANT, in the German and Belgic policy, a judge who has the cognizance of civil cauſes.—It is alſo uſed among the French for a public notary, or officer who draws up inſtruments and deeds.

AMMANIA, a genus of the monogynia order belonging to the tetrandria claſs of plants.—Of this genus there are three ſpecies enumerated; all of them natives of warm climates. They have no beauty or other remarkable property, and conſequently merit no further deſcription.

AMMI, BISHOP'S-WEED, a genus of the digynia order, belonging to the pentandria claſs of plants. Of this there are three

Species. 1. The majus, or common biſhop's-weed, whoſe ſeeds are uſed in medicine. 2. The glaucifolium, with all its leaves cut in the ſhape of a ſpear. 3. The copticum, or Egyptian biſhop's-weed.

Culture, &c. The firſt is an annual plant; and therefore is to be propagated by ſeeds ſown in the autumn, in the place where the plants are to remain. In the ſpring, the ground ſhould be hoed, to cut up the weeds, and alſo to thin the plants, in the ſame manner as is practiſed for carrots, leaving them four or five inches aſunder; or if the ground is good where they grow, they muſt be left at leaſt ſix inches diſtant. After this they will require no farther care than to keep them clear of weeds. They will flower in June, and the ſeeds will ripen in Auguſt. They ſhould be gathered as they ripen, otherwiſe they will ſoon ſcatter. This plant will grow in any open ſituation, but thrives beſt in a light ſandy ſoil. The ſecond ſort is perennial, and very hardy. It thrives beſt in a moiſt ſoil, and may be propagated by ſeeds in the ſame manner as the former.

The third ſpecies is now no otherwiſe known, than by the figure of its ſeeds, which were formerly uſed in medicine, but have long ſince given place to thoſe of the common kind. The ſeeds of the ammi copticum are ſmall, ſtriated, of a reddiſh brown colour, a warm pungent taſte, and a pleaſant ſmell approaching to that of origanum. They are recommended as ſtomachic, carminative, and diuretic; but have long been ſtrangers to the ſhops. The ſeeds of the ammi majus, which are uſed in their place, are much weaker both in taſte and ſmell, and without the origanum flavour of the other.

AMMIANUS (Marcellinus,) an hiſtorian, born at Antioch. He wrote in Latin an intereſting hiſtory, of which there are now only 18 books extant. Though a Pagan, he ſpeaks with candour and moderation of the Chriſtian religion, and even praiſes it: his hero is the emperor Julian. He died about the year 390. The beſt edition of his hiſtory is that of *Gronovius*, in 1693.

AMMIRATO (Scipio), an eminent Italian hiſtorian, born at Lecca in Naples in 1531. After travelling over great part of Italy, without ſettling to his ſatisfaction, he was engaged by the great duke of Tuſcany to write *The Hiſtory of Florence*; for which he was preſented to a canonry in the cathedral there. He wrote other works while in this ſtation; and died in 1600.

AMMODYTES, or SAND-EEL, in ichthyology, a genus of fiſhes belonging to the order of apodes. This fiſh reſembles an eel, and ſeldom exceeds a foot in length. The head of the ammodytes is compreſſed, and narrower than the body; the upper jaw is larger than the under; the body is cylindrical, with ſcales hardly perceptible. There is but one ſpecies of the ammodytes, viz. the tobianus, or launce, a native of Europe. This fiſh gathers itſelf into a circle, and pierces the ſand with its head in the centre. It is found in moſt of our ſandy ſhores during ſome of the ſummer-months: it conceals itſelf, on the receſs of the tides, beneath the ſand, in ſuch places where the water is left, at the depth of about a foot; and is in ſome places dug out, in others drawn up by means of a hook contrived for that purpoſe. They are commonly uſed as baits for other fiſh, but they are alſo very delicate eating. Theſe fiſh are found in the ſtomach of the *Porpeſs*; an argument that the laſt roots up the ſand with its noſe, as hogs do the ground.

AMMON, anciently a city of Marmarica, (Ptolemy). Arrian calls it a *place*, not a city, in which ſtood the temple of Jupiter Ammon, round which there was nothing but ſandy waſtes. Pliny ſays, That the oracle of Ammon was twelve days journey from Memphis, and among the *Nomi* of Egypt he reckons the *Nomos Ammoniacus*: Diodorus Siculus, That the diſtrict where the temple ſtood, tho' ſurrounded with deſarts, was watered by dews which fell nowhere elſe in all that country. It was agreeably adorned with fruitful trees, and ſprings, and full of villages. In the middle ſtood the acropolis or citadel, encompaſſed with a triple wall; the firſt and inmoſt of which contained the palace; the others the apartments of the women, the relations and children, as alſo the temple of the god, and the ſacred fountain for luſtrations. Without the acropolis ſtood, at no great diſtance, another temple of Ammon, ſhaded by a number of tall trees: near which there was a fountain, called that of the ſun, or *Solis Fons*, becauſe ſubject to extraordinary changes according to the time of the day; morning and evening warm, at noon cold, at midnight extremely hot. A kind of foſſil ſalt was ſaid to be naturally produced here. It was dug out of the earth in large oblong pieces, ſometimes three fingers in length, and tranſparent as cryſtal. It was thought to be a preſent worthy of kings, and uſed by the Egyptians in their ſacrifices.—From this, our ſal-ammoniac has taken its name.

AMMON, or HAMMON, in heathen mythology, the name of the Egyptian Jupiter, worſhipped under the figure of a ram.

Bacchus having ſubdued Aſia, and paſſing with his army through the deſarts of Africa, was in great want of water: but Jupiter, his father, aſſuming the ſhape of a ram, led him to a fountain, where he refreſhed himſelf and his army; in requital of which favour, Bacchus built there a temple to Jupiter, under the title of *Ammon*, from the Greek αμμος, which ſignifies *ſand*, alluding to the ſandy deſart where it was built. His oracles laſted till the time of Theodoſius.

AMMON, the father of the Ammonites, was the ſon of Lot by his youngeſt daughter. Gen. xix. 38.

AMMON (Andreas), an excellent Latin poet, born at Lucca in Italy, was ſent by Pope Leo X. to England, in the characters of prothonotary of the Apoſtolic See, and collector-general of this kingdom. Being a man of ſingular genius and learning, he ſoon became acquainted with the principal literati of thoſe times; particularly with Eraſmus, Colet, Grocin, and others, for the ſake of whoſe company he reſided ſome time at Oxford. Ammon was Latin ſecretary to Henry VIII. but at what time he was appointed does not appear. In 1512, he was made canon and prebendary of the collegiate chapel of St Stephen, in the palace of Weſtminſter. He was likewiſe prebendary of Wells; and in 1514, was preſented to the rectory of Dychial in that dioceſe. About the ſame time, by the king's ſpecial recommendation, he was alſo made prebendary of Saliſbury. He died in the year 1517, and was buried in St Stephen's chapel in the palace of Weſtminſter. He was eſteemed an elegant Latin writer, and an admirable poet. The epiſtles of Eraſmus to Ammon abound with encomiums on his genius and learning.—His works are, 1. *Epiſtolæ ad Eraſmum*, lib. i. 2. *Scotici conflictus hiſtoria*, lib. i. 3. *Bucolica vel eclogæ*, lib. i. Baſil 1546, 8vo. 4. *De rebus nihil*, lib. i. 5. *Panegyricus quidam*, lib. i. 6. *Varii generis epigrammata*, lib. i. 7. *Poemata diverſa*, lib. i.

AMMONIAC, a concrete gummy reſinous juice, brought from the Eaſt-Indies, uſually in large maſſes, compoſed of little lumps or tears, of a milky colour, but ſoon changing, upon being expoſed to the air, of a yellowiſh hue. We have no certain account of the plant which affords this juice; the ſeeds uſually found among the tears reſemble thoſe of the umbelliferous claſs. Such tears as are large, dry, free from little ſtones, ſeeds, or other impurities, ſhould be picked out, and preferred for internal uſe: the coarſer kind is purified by ſolution and colature, and then carefully inſpiſſating it; unleſs this be artfully managed, the gum will loſe a conſiderable deal of its more volatile parts. There is often vended in the ſhops, under the name of ſtrained gum ammoniacum, a compoſition of ingredients much inferior in virtue.

Ammoniac has a nauſeous ſweet taſte, followed by a bitter one; and a peculiar ſmell, ſomewhat like that of galbanum, but more grateful: it ſoftens in the mouth, and grows of a whiter colour upon being chewed. Thrown upon live coals, it burns away in flame: it is in ſome meaſure ſoluble in water and in vinegar, with which it aſſumes the appearance of milk; but the reſinous part, amounting to about one half, ſubſides on ſtanding.

Ammoniac is an uſeful deobſtruent, and frequently preſcribed for opening obſtructions of the abdominal viſcera, and in hyſterical diſorders occaſioned by a deficiency of the menſtrual evacuations. It is likewiſe ſuppoſed to deterge the pulmonary veſſels; and proves of conſiderable ſervice in ſome kinds of aſthmas, where the lungs are oppreſſed by viſcid phlegm: in this intention, a ſolution of gum ammoniac in vinegar of ſquills proves a medicine of great efficacy, though not a little unpleaſant. In long and obſtinate colics proceeding from viſcid matter lodged in the inteſtines, this gummy reſin has produced happy effects, after the purges and the common carminatives had been uſed in vain. Ammoniac is moſt commodiouſly taken in the form of pills; about a ſcruple may be given every night, or oftener. Externally, it ſoftens and ripens hard tumours: a ſolution of it in vinegar ſtands recommended by ſome for reſolving even ſchirrhous ſwellings.

Sal AMMONIAC, a volatile ſalt, of which there are two kinds, ancient and modern. The ancient ſort, deſcribed by Pliny and Dioſcorides, was a native ſalt, generated in thoſe large inns or caravanſeras, where the crowd of pilgrims, coming from the temple of Jupiter Ammon, uſed to lodge; who, in thoſe parts, traveling upon camels, and thoſe creatures when in Cyrene, a province of Egypt, where that celebrated temple ſtood, urining in the ſtables, or (ſay ſome) in the parched ſands, out of this urine, which is remarkably ſtrong, aroſe a kind of ſalt, denominated ſometimes, from the temple, *Ammoniac*, and ſometimes, from the country, *Cyreniac*. Since the ceſſation of theſe pilgrimages, no more of this ſalt is produced there; and, from this deficiency, ſome ſuſpect there never was any ſuch thing: But this ſuſpicion is removed, by the large quantities of a ſalt, nearly of the ſame nature, thrown out by mount Ætna. The characters of the ancient ſal armoniac

niac are, that it cools water, turns aqua fortis into aqua regia, and conſequently diſſolves gold.

The modern ſal armoniac is entirely factitious; for which, ſee CHEMISTRY, n° 125, 189, 232, 234, 276, 331.

AMMONITÆ, in natural hiſtory. See CORNU *Ammonis*.

AMMONITIS, (anc. geogr.) a country of Arabia Petræa, occupied by the children of Ammon, whence the appellation. Its limits partly to the weſt and partly to the north were the river Jabbok, whoſe courſe is no where determined; though Joſephus ſays, that it runs between Rabbath-Ammon, or Philadelphia, and Geraſa, and falls into the Jordan.

AMMONIUS, ſurnamed SACEAS, was born in Alexandria, and flouriſhed about the beginning of the third century. He was one of the moſt celebrated philoſophers of his age. He took great pains in reconciling the differences between the Platoniſts and Peripatetics, in which he gained great reputation. Plotinus and Origen were both his diſciples. He died about the year 230.

AMMONIUS, ſurnamed LITHOTOME, a celebrated ſurgeon of Alexandria, ſo called from his inventing the operation of drawing the ſtone out of the bladder.

AMMUNITION, a general term for all warlike proviſions, but more eſpecially powder, ball, *&c.*

Ammunition, arms, utenſils of war, gun-powder, imported without licence from his Majeſty, are, by the laws of England, forfeited, and triple the value. And again, ſuch licenſe obtained, except for furniſhing his Majeſty's public ſtores, is to be void, and the offender to incur a premunire, and to be diſabled to hold any office from the crown.

AMMUNITION *Bread*, *Shoes*, &c. ſuch as are ſerved out to the ſoldiers of an army or garriſon.

AMNESTY, in matters of policy, denotes a pardon granted by a prince to his rebellious ſubjects, uſually with ſome exceptions: ſuch was that granted by Charles II. at his reſtoration.—The word is formed from the Greek αμνεστια, the name of an edict of this kind publiſhed by Thraſibulus, on his expulſion of the tyrants out of Athens.

AMNIOS, in anatomy, a thin pellucid membrane which ſurrounds the fœtus in the womb *.

* See *Fœtus*.

AMOEBÆUM, in ancient poetry, a kind of poem repreſenting a diſpute between two perſons, who are made to anſwer each other alternately: ſuch are the third and ſeventh of Virgil's eclogues.

AMOL, a town of Aſia, in the country of the Uſbecks, ſeated on the river Gihon. E. Long. 64. 30 N. Lat. 39. 20.

AMOMUM, in botany, a genus of the monogynia order, belonging to the monandria claſs of plants.—Of this genus there are four

Species. 1. The zingiber, or common ginger, is a native of the Eaſt, and alſo of ſome parts of the Weſt Indies; where it grows naturally without culture. The roots are jointed, and ſpread in the ground: they put out many green reed-like ſtalks in the ſpring, which ariſe to the height of two feet and an half, with narrow leaves. The flower-ſtems ariſe by the ſide of theſe, immediately from the root; theſe are naked; ending with an oblong ſcaly ſpike. From each of theſe ſcales is produced a ſingle blue flower, whoſe petals are but little lower than the ſquamous covering. 2. The zerumbet, or wild ginger, is a native of India. The roots are larger than thoſe of the firſt, but are jointed in the ſame manner. The ſtalks grow from three to near four feet high, with oblong leaves placed alternately. The flower-ſtems ariſe immediately from the root: theſe are terminated by oblong, blunt, ſcaly heads; out of each ſcale is produced a ſingle white flower, whoſe petals extend a conſiderable length beyond the ſcaly covering. 3. The cardamomum, or cardamom, is likewiſe a native of India; but is little known in this country except by its ſeeds, which are uſed in medicine. Of this there is a variety, with ſmaller fruit, which makes the diſtinction into cardamomum majus and minus. The firſt, when it comes to us, is a dried fruit or pod about an inch long, containing, under a thick ſkin, two rows of ſmall triangular ſeeds of a warm aromatic flavour. The cardamomum minus is a fruit ſcarce half the length of the foregoing, but conſiderably ſtronger both in ſmell and taſte. 4. The grana paradiſi ſpecies is likewiſe a native of the Eaſt-Indies. The fruit containing the grains of paradiſe is about the ſize of a fig, divided into three cells, in each of which are contained two roots of ſmall ſeeds like cardamoms. They are ſomewhat more grateful, and conſiderably more pungent, than cardamoms.

Culture. The firſt two ſpecies are tender, and require a warm ſtove to preſerve them in this country. They are eaſily propagated by parting the roots in the ſpring. Theſe ſhould be planted in pots filled with light rich earth, and plunged into a hot-bed of tanner's-bark, where they muſt conſtantly remain. Cardamoms and grains of paradiſe are not cultivated in this country. If we may believe the Abbe Raynal, the former propagate themſelves, in thoſe countries where they are natives, without either ſowing or planting. Nothing more is required than, as ſoon as the rainy ſeaſon is over, to ſet fire to the herb which has produced the fruit.

Uſes. The dried roots of the firſt ſpecies are of great uſe in the kitchen, as well as in medicine. They furniſh a conſiderable export from ſome of the American iſlands. The green roots, preſerved as a ſweet-meat, are preferable to every other kind. The Indians mix them with their rice, which is their common food, to correct its natural inſipidity. This ſpice, mixed with others, gives the diſhes ſeaſoned with it a ſtrong taſte, which is extremely diſagreeable to ſtrangers. The Europeans, however, who come into Aſia without fortunes, are obliged to conform to it. The others adopt it out of complaiſance to their wives, who are generally natives of the country.—Ginger is a very uſeful ſpice, in cold flatulent colics, and in laxity and debility of the inteſtines; it does not heat ſo much as thoſe of the pepper kind, but its effects are much more durable. The cardamoms and grains of paradiſe have the ſame medicinal qualities with ginger.

AMOMUM *Verum*, or *True Amomum*, is a round fruit, about the ſize of a middling grape; containing, under a membranous cover, a number of ſmall rough angular ſeeds, of a blackiſh brown colour on the outſide, and whitiſh within: the ſeeds are lodged in three diſtinct cells; thoſe in each cell are joined cloſely together, ſo as that the fruit, upon being opened, appears to contain only three ſeeds. Ten or twelve of theſe fruits grow together in a cluſter; and adhere, without any pedicle, to a woody ſtalk about an inch long: each ſingle fruit is ſurrounded by ſix leaves, in form of a cup; and the part of the ſtalk void of fruit is clothed with leafy ſcales.—The huſks, leaves, and ſtems, have a light grateful ſmell, and a moderately warm aromatic taſte: the ſeeds, freed from the huſks, are in both reſpects much ſtronger; their ſmell is quick and penetrating, their taſte pungent, approaching to that of camphor. Notwithſtanding amomum is an elegant aromatic, it has long been a ſtranger to the ſhops. See MATERIA MEDICA, n° 97.

AMOMUM *Vulgare*. See SISON.

AMONTONS (William), an ingenious experimental philoſopher, was born at Paris in 1663. While he was at the grammar-ſchool, he by ſickneſs contracted a deafneſs that almoſt excluded him converſation: in this ſituation, he applied himſelf to mechanics and geometry; and, it is ſaid, refuſed to try any remedy for his diſorder, either becauſe he deemed it incurable, or becauſe it increaſed his attention. He ſtudied the nature of barometers and thermometers with great care; and wrote *Obſervations and Experiments concerning a new Hour-glaſs, and concerning Barometers, Thermometers, and Hygroſcopes*; which, with ſome pieces in the Journal des Sçavans, are all his literary works. When the royal academy was new regulated in 1699, he was admitted a member; and read his *New Theory of Friction*, in which he happily cleared up an important object in mechanics. He died in 1705.

AMORÆANS, a ſect or order of gemaric doctors, or commentators on the Jeruſalem Talmud. The Amoræans ſucceeded the Miſchnic doctors. They ſubſiſted 250 years; and were ſucceeded by the Seburæans.

AMORGOS, or AMURGUS, (anc. geogr.) now *Morgo*, not far from Naxus to the eaſt, one of the European Sporades; the country of Simonides the Iambic poet, (Strabo.) To this iſland criminals were baniſhed, (Tacitus.) It was famous for a fine flax called *Emorgis*. See MORGO.

AMORITES. See AMORRHITIS.

AMORIUM, a town of Phrygia Major, near the river Sangarius, on the borders of Galatia.—It was taken from the Romans by the Saracens in 668; but ſoon after retaken by the Romans.—A war breaking out again between theſe two nations in 837, the Roman emperor Theophylus deſtroyed Sozopetra the birth-place of the khalif Al' Motaſem, notwithſtanding his earneſt intreaties to him to ſpare it. This ſo enraged the khalif, that he ordered every one to engrave upon his ſhield the word *Amorium*, the birthplace of Theophylus, which he reſolved at all events to deſtroy. Accordingly he laid ſiege to the place, but met with a vigorous reſiſtance. At length, after a ſiege of 55 days, it was betrayed by one of the inhabitants who had abjured the Chriſtian religion. The khalif, exaſperated at the loſs he had ſuſtained during the ſiege, put moſt of the men to the ſword, carried the women and children into captivity, and levelled the city with the ground. His forces being diſtreſſed for want of water on their return home, the Chriſtian priſoners roſe upon ſome of them, and murdered them; upon which the khalif put 6000 of the priſoners to death.—According to the eaſtern hiſtorians, 30,000 of the inhabitants of Amorium were ſlain, and as many carried into captivity.

AMORPHA, BASTARD INDIGO, a genus of the decandria order, belonging to the diadelphia claſs of plants.

Of this there is only one known ſpecies, a native of Carolina, where the inhabitants formerly made from it a coarſe kind of indigo, whence the plant took its name. It riſes, with many irregular ſtems, to the height of 12 or 14 feet, garniſhed with very long winged leaves, in ſhape like thoſe of the common acacia. At the extremity of the ſame year's ſhoots, the flowers are produced in long ſlender ſpikes of a deep purple colour. After they are paſt, the germen turns to a ſhort pod, having two kidney-ſhaped ſeeds; but theſe do not ripen in Britain. The ſeeds of this plant were firſt ſent to England by Mr Mark Cateſby in 1724, from which many plants were raiſed in the gardens near London. Theſe were of quick growth, and ſeveral of them produced flowers in three years.

Culture. The amorpha is moſt readily propagated by ſeeds, which ought to be procured annually from America. It may alſo be propagated by laying down the young branches, which in one year will make good roots; and may then be taken off, and planted either in the nurſery, or in the places where they are deſigned to remain. If they are put into a nurſery, they ſhould not remain there more than one year; for as the plants make large ſhoots, they do not remove well when they have remained long in a place.

AMORRHITIS, (anc. geogr.) the country of the Amorites, ſituated, according to Joſephus, between three rivers, like an iſland: the Arnon on the ſouth, the Jabbok on the north, and the Jordan on the weſt. The *Amoritæ*, or *Amorrhæi*, took their name from *Amor*, or *Emor*, the ſon of Canaan. They dwelt in the mountains of Judah to the ſouth, and in ſome parts mixed with the Hethæi; alſo about Sichem: but a great part of them croſſed the Jordan, and in a hoſtile manner occupied a conſiderable part of the country of the Moabites and Ammonites; which afterwards fell to the Iſraelites, on the defeat of Sihon their king.

AMORTIZATION, in law, the alienation of lands or tenements to a corporation or fraternity and their ſucceſſors. See MORTMAIN.

AMOS, the third of the twelve leſſer prophets, was an herdſman of the city of Tekoa. He propheſied under Uzzias and Jeroboam II. and foretold the captivity and re-eſtabliſhment of the ten tribes. He was put to death by Amaſius prieſt of Bethel, about 785 years before Chriſt.—He ought not to be confounded with Amos, the father of Iſaiah.

AMOY, an iſland in the province of Fokien, in China, where the Engliſh had a factory: but they have abandoned it, on account of the impoſitions of the inhabitants. Long. 136. 0. lat. 24. 30. It has a fine port, that will contain many thouſand veſſels. The emperor has a garriſon here of 7000 men.

AMPELIS, the vine, in botany. See VITIS.

AMPELIS, the *Chatterer*, in zoology, a genus of birds belonging to the order of paſſeres; the diſtinguiſhing characters of which are, that the tongue is furniſhed with a rim or margin all round, and the bill is conical and ſtrait. There are ſeven ſpecies, all natives of foreign countries, except the garrulus, which is a native both of Europe and the Weſt-Indies. In the former, the native country of theſe birds is Bohemia; from whence they wander over the reſt of Europe, and were once ſuperſtitiouſly conſidered as preſages of a peſtilence. They appear annually about Edinburgh, in February; and feed on the berries of the mountain-aſh. They alſo appear as far ſouth as Northumberland; and, like the field-fare, make the berries of the white-thorn their food. It is but by accident that they ever appear further ſouth. They are gregarious; feed on grapes, where vineyards are cultivated; are eaſily tamed; and are eſteemed delicious food. This ſpecies is about the ſize of the black-bird: the bill is ſhort, thick, and black; on the head is a ſharp pointed creſt reclining backwards: the lower part of the tail is black; the end of a rich yellow: the quill-feathers are black, the three firſt tipt with white; the ſix next have half an inch of their exterior margin edged with fine yellow, the interior with white. But what diſtinguiſhes this from all other birds, are the horny appendages from the tips of ſeven of the ſecondary feathers, of the colour and gloſs of the beſt red wax.

AMPELITES, CANNEL-COAL, a hard, opaque, foſſile, inflammable ſubſtance, of a black colour. It does not effervefce with acids. The ampelites, though much inferior to jet in many reſpects, is yet a very beautiful foſſile; and, for a body of ſo compact a ſtructure, remarkably light. Examined by the microſcope, it appears compoſed of innumerable very ſmall and thin plates, laid cloſely and firmly on one another; and full of very ſmall ſpecks of a blacker and more ſhining matter than the reſt, which is evidently a purer bitumen than the general maſs. Theſe ſpecks are equally diffuſed over the different parts of the maſſes. There is a large quarry of it near Alençon in France. It is dug in many parts of England, but the fineſt is in Lancaſhire and Cheſhire; it lies uſually at conſiderable depths. It makes a very briſk fire, flaming violently for a ſhort time, and after that continuing red and glowing hot a long while; and finally is reduced into a ſmall proportion of grey aſhes, the greater part of its ſubſtance having flown off in the burning.—It is capable of a very high and elegant poliſh; and, in the countries where it is produced, is turned into a vaſt number of toys, as ſnuff-boxes and the like, which bear all the nicety of turning, and are made to paſs for jet.—Huſbandmen ſmear their vines with it, as it kills the vermin which infeſts them. It is likewiſe uſed for the dyeing of hair black. In medicine, it is reputed good in colics, againſt worms, and of being in general an emollient and diſcutient; but the preſent practice takes no notice of it.

AMPELUSIA, a promontory of Mauritania Tingitana, called *Cottes* by the natives, which is of the ſame ſignification, (Mela); with a town of the ſame name, (Pliny); not far from the river Lixus, near the ſtraits of Gibraltar: now *Cape Spartel.* W. Long. 6. 30. Lat. 36. 0.

AMPHERES, in antiquity, a kind of veſſels wherein the rowers plied two oars at the ſame time, one with the right hand, and another with the left.

AMPHIATHROSIS, in anatomy, a term for ſuch junctures of bones as have an evident motion, but different from the diarthroſis, &c. See DIARTHROSIS.

AMPHIARAUS, in pagan mythology, a celebrated prophet, who poſſeſſed part of the kingdom of Argos. He was believed to excel in divining by dreams, and is ſaid to be the firſt who divined by fire. Amphiaraus knowing, by the ſpirit of prophecy, that he ſhould loſe his life in the war againſt Thebes, hid himſelf in order to avoid engaging in that expedition: but his wife Eriphyle, being prevailed upon by a preſent, diſcovered the place in which he had concealed himſelf; ſo that he was obliged to accompany the other princes who marched againſt Thebes. This proved fatal to him; for the earth being ſplit aſunder by a thunder-bolt, both he and his chariot were ſwallowed up in the opening.—Amphiaraus, after his death, was ranked among the gods; temples were dedicated to him; and his oracle, as well as the ſports inſtituted to his honour, were very famous.

AMPHIBIA, in zoology, the name of Linnæus's third claſs of animals; including all thoſe which live partly in water, and partly on land. This claſs he ſubdivides into four orders, *viz.* The amphibia reptiles; the amphibia ſerpentes; the amphibia nantes; and the amphibia meantes. See ZOOLOGY.

It has been a queſtion whether the animals commonly called *amphibious*, live moſt in the water or on land. If we conſider the words αμφι (*utrinque*, both ways), and βιος (*vita*, life), from which the term *amphibious* is derived; we ſhould underſtand, that animals, having this title, ſhould be capable of living as well by land, or in the air, as by water; or of dwelling in either conſtantly at will: but it will be difficult to find any animal that can fulfil this definition, as being equally qualified for either. An ingenious naturaliſt *, therefore, from conſidering their œconomy reſpectively, divides them into two orders, *viz.* 1. Such as enjoy their chief functions by land, but occaſionally go into the water. 2. Such as chiefly inhabit the water, but occaſionally go aſhore. What he advances on this ſubject is curious, and well illuſtrates the nature of this claſs. 1. Of the firſt order, he particularly conſiders the phocæ; and endeavours to ſhew, that none of them can live chiefly in the water, but that their chief enjoyment of the functions of life is on ſhore.

These animals (he obſerves) are really quadrupeds*; but, as their chief food is fiſh, they are under a neceſſity of going out to ſea to hunt their prey, and to great diſtances from ſhore; taking care that, however great the diſtance, rocks or ſmall iſlands are at hand, as reſting-places when they are tired, or when their bodies become too much macerated in the water; and they return to the places of their uſual reſort to ſleep, copulate, and bring forth their young, for the following reaſons, viz. It is well known, that the only eſſential difference (as to the general ſtructure of the heart) between amphibious and mere land animals, or ſuch as never go into the water, is, that in the former the oval hole remains always open. Now, in ſuch as are without this hole, if they were to be immerſed in water for but a little time, reſpiration would ceaſe, and the animal muſt die; becauſe a great part of the maſs of blood paſſes from the heart by the pulmonary artery through the lungs, and by the pulmonary veins returns to the heart, while the aorta is carrying the greater part of the maſs to the head and extremities, &c.

Now, the blood paſſes through the lungs in a continual uninterrupted ſtream, while reſpiration is gentle and moderate: but when it is violent, then the circu-

* Dr Parſons; in paper read before the Royal Society,

* See the ticle *Pho*

lation is interrupted, for inſpiration and exſpiration are now carried to their extent; and in this ſtate the blood cannot paſs through the lungs either during the total inſpiration or total exſpiration of the air in breathing: for, in the former caſe, the inflation compreſſes the returning veins; and, in the latter, by the collapſion of the lungs, theſe veins are interrupted alſo; ſo that it is only between theſe two violent actions that the blood can paſs: and hence it is, that the lives of animals are ſhortened, and their health impaired, when they are ſubjected to frequent violent reſpiration; and thus it is, that when animals have once breathed, they muſt continue to reſpire ever after, for life is at an end when that ceaſes.

There are three neceſſary and principal uſes of reſpiration in all land-animals, and in thoſe kinds that are counted amphibious.—The firſt is that of promoting the circulation of the blood through the whole body and extremities. In real fiſhes, the force of the heart is alone capable of ſending the blood to every part, as they are not furniſhed with limbs or extremities; but in the others mentioned, being all furniſhed with extremities, reſpiration is an aſſiſtant force to the arteries in ſending blood to the extremities, which, being ſo remote from the heart, have need of ſuch aſſiſtance, otherwiſe the circulation would be very languid in theſe parts: thus we ſee, that, in perſons ſubject to aſthmatic complaints, the circulation grows languid, the legs grow cold and oedematous, and other parts ſuffer by the defect in reſpiration.—A ſecond uſe of breathing is, that, in inſpiration, the variety of particles, of different qualities, which float always in the air, might be drawn into the lungs, to be inſinuated into the maſs of blood, being highly neceſſary to contemperate and cool the agitated maſs, and to contribute refined pabulum to the finer parts of it, which, meeting with the daily ſupply of chyle, ſerves to aſſimilate and more intimately mix the maſs, and render its conſtitution the fitter for ſupporting the life of the animal. Therefore it is, that valetudinarians, by changing foul or unwholeſome air for a free, good, open air, often recover from lingering diſeaſes.—A third principal uſe of reſpiration is, to promote the exhibition of voice in animals; which all thoſe that live on the land do according to their ſpecific natures.

From theſe conſiderations it appears, that the phocæ of every kind are under an abſolute neceſſity of making the land their principal reſidence. But there is another very convincing argument why they reſide on ſhore the greateſt part of their time; namely, that the fleſh of theſe creatures is analogous to that of other land animals; and therefore, by over long maceration, added to the fatigue of their chacing their prey, they would ſuffer ſuch a relaxation as would deſtroy them. It is well known, that animals, which have lain long under water, are reduced to a very lax and even putrid ſtate; and the phoca muſt baſk in the air on ſhore: for while the ſolids are at reſt, they acquire their former degree of tenſion, and the vigour of the animal is reſtored; and while he has an uninterrupted placid reſpiration, his blood is refreſhed by the new ſupply of air, as explained above, and he is rendered fit for his next cruiſe: for action waſtes the moſt exalted fluids of the body, more or leſs, according to its duration and violence; and the reſtorative reſt muſt continue a longer or ſhorter time, according to the quantity of the previous fatigue.

Let us now examine by what power theſe animals are capable of remaining longer under water than land-animals.

All theſe have the oval hole open between the right and left auricles of the heart; and, in many, the canalis arterioſus alſo: and while the phoca remains under water, which he may continue an hour or two more or leſs, his reſpiration is ſtopped; and the blood, not finding the paſſage thro' the pulmonary artery free, ruſhes through the hole from the right to the left auricle, and partly through the arterial canal, being a ſhort paſſage to the aorta, and thence to every part of the body, maintaining the circulation: but, upon riſing to come aſhore, the blood finds its paſſage again through the lungs the moment he reſpires.

Thus the fœtus * in utero, during his confinement, having the lungs compreſſed, and conſequently the pulmonary arteries and veins impervious, has the circulation of the blood carried on through the oval hole and the arterial canal. Now, ſo far the phoca in the water, and the fœtus in utero, are analogous; but they differ in other material circumſtances. One is, that the fœtus, having never reſpired, remains ſufficiently nouriſhed by the maternal blood circulating through him, and continues to grow till the time of his birth, without any want of reſpiration during nine months confinement: the phoca, having reſpired the moment of his birth, cannot live very long without it, for the reaſons given before; and this hole and canal would be cloſed in them, as it is in land-animals, if the dam did not, ſoon after the birth of the cub, carry him ſo very frequently into the water to teach him; by which practice theſe paſſages are kept open during life, otherwiſe they would not be capable of attaining the food deſigned for them by Providence.

Another difference is, that the phoca, as was ſaid before, would be relaxed by maceration in remaining too long in the water; whereas the fœtus in utero ſuffers no injury from continuing its full number of months in the fluid it ſwims in: the reaſon is, that water is a powerful ſolvent, and penetrates the pores of the ſkins of land-animals, and in time can diſſolve them; whereas the *liquor amnii* is an inſipid ſoft fluid, impregnated with particles more or leſs mucilaginous, and utterly incapable of making the leaſt alteration in the cutis of the fœtus.

Otters, beavers, and ſome kinds of rats, go occaſionally into the water for their prey, but cannot remain very long under water. "I have often gone to ſhoot otters, (ſays our author), and watched all their motions: I have ſeen one of them go ſoftly from a bank into the river, and dive down; and in about two minutes riſe, at ten or fifteen yards from the place he went in, with a middling ſalmon in his mouth, which he brought on ſhore: I ſhot him, and ſaved the fiſh whole." Now, as all fœtuſes have theſe paſſages open, if a whelp of a true water-ſpaniel was, immediately after its birth, ſerved as the phoca does her cubs, and immerſed in water, to ſtop reſpiration for a little time every day, it is probable that the hole and canal would be kept open, and the dog be made capable of remaining as long under water as the phoca.

Frogs, how capable ſoever of remaining in the water, yet cannot avoid living on land, for they reſpire;

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* See *Fœtus*.

and if a frog be thrown into a river, he makes to the ſhore as faſt as he can.

The lizard kind, ſuch as may be called water-lizards †, are all obliged to come to land, in order to depoſit their eggs, to reſt, and to ſleep. Even the crocodiles, who dwell much in rivers, ſleep and lay their eggs on ſhore; and, while in the water, are compelled to riſe to the ſurface to breathe: yet, from the texture of his ſcaly covering, he is capable of remaining in the water longer by far than any ſpecies of the phoca, whoſe ſkin is analogous to that of a horſe or cow.

The hippopotamus *, who wades into the lakes or rivers, is a quadruped, and remains under the water a conſiderable time; yet his chief reſidence is upon land, and he muſt come on ſhore for reſpiration.

The teſtudo, or ſea-tortoiſe ‡, though he goes out to ſea and is often found far from land; yet being a reſpiring animal, cannot remain long under water. He has indeed a power of rendering himſelf ſpecifically heavier or lighter than the water, and therefore can let himſelf down to avoid an enemy or a ſtorm: yet he is under a neceſſity of riſing frequently to breathe, for reaſons given before; and his moſt uſual ſituation, while at ſea, is upon the ſurface of the water, feeding upon the various ſubſtances that float in great abundance every where about him; theſe animals ſleep ſecurely upon the ſurface, but not under water; and can remain longer at ſea than any other of this claſs, except the crocodile, becauſe, as it is with the latter, his covering is not in danger of being too much macerated; yet they muſt go on ſhore to copulate and lay their eggs.

2. The conſideration of theſe is ſufficient to inform us of the nature of the firſt order of the claſs of amphibious animals; let us now ſee what is to be ſaid of the ſecond in our diviſion of them, which are ſuch as chiefly inhabit the waters, but occaſionally go on ſhore.

Theſe are but of two kinds: the eels, and water ſerpents or ſnakes of every kind. It is their form that qualifies them for loco-motion on land, and they know their way back to the water at will; for by their ſtructure they have a ſtrong periſtaltic motion, by which they can go forward at a pretty good rate: whereas all other kinds of fiſh, whether vertical or horizontal, are incapable of a voluntary loco-motion on ſhore; and therefore, as ſoon as ſuch fiſh are brought out of the water, after having flounced a while, they lie motionleſs, and ſoon die.

Let us now examine into the reaſon why theſe vermicular fiſh, the eel and ſerpent kinds, can live a conſiderable time on land, and the vertical and horizontal kinds die almoſt immediately when taken out of the water: and, in this reſearch, we ſhall come to know what analogy there is between land animals and thoſe of the waters. All land-animals have lungs, and can live no longer than while theſe are inflated by the ambient air, and alternately compreſſed for its expulſion; that is, while reſpiration is duly carried on, by a regular inſpiration and exſpiration of air.

In like manner, the fiſh in general have, inſtead of lungs, gills or branchiæ: and as in land-animals the lungs have a large portion of the maſs of blood circulating through them, which muſt be ſtopped if the air has not a free ingreſs and egreſs into and from them; ſo, in fiſh, there is a great number of blood-veſſels that paſs through the branchiæ, and a great portion of their blood circulates through them, which muſt in like manner be totally ſtopped, if the branchiæ are not perpetually wet with water. So that, as the air is to the lungs in land-animals a conſtant aſſiſtant to the circulation; ſo is the water to the branchiæ of thoſe of the rivers and ſeas: for when theſe are out of the water, the branchiæ very ſoon grow criſp and dry, the blood-veſſels are ſhrunk, and the blood is obſtructed in its paſſage; ſo, when the former are immerſed in water, or otherwiſe prevented from having reſpiration, the circulation ceaſes, and the animal dies.

Again, as land-animals would be deſtroyed by too much maceration in water; ſo fiſhes would, on the other hand, be ruined by too much exſiccation; the latter being, from their general ſtructure and conſtitution, made fit to bear, and live in, the water; the former, by their conſtitution and form, to breathe and dwell in the air.

But it may be aſked, why eels and water-ſnakes are capable of living longer in the air than the other kinds of fiſh? This is anſwered, by conſidering the providential care of the great Creator for theſe and every one of his creatures: for, ſince they were capable of loco-motion by their form, which they need not be if they were never to go on ſhore, it ſeemed neceſſary that they ſhould be rendered capable of living a conſiderable time on ſhore, otherwiſe their loco-motion would be in vain. How is this provided for? Why, in a moſt convenient manner: for this order of fiſhes have their branchiæ well covered from the external drying air; they are alſo furniſhed with a ſlimy mucus, which hinders their becoming criſp and dry for many hours; and their very ſkins always emit a mucous liquor, which keeps them ſupple and moiſt for a long time: whereas the branchiæ of other kinds of fiſh are much expoſed to the air, and want the ſlimy matter to keep them moiſt. Now, if any of theſe, when brought out of the water, were laid in a veſſel without water, they might be preſerved alive a conſiderable time, by only keeping the gills and ſurface of the ſkin conſtantly wet, even without any water to ſwim in."——

It has been advanced, that *man* may, by art, be rendered amphibious, and able to live under water as well as frogs. As the fœtus lives *in utero* without air, and the circulation is there continued by means of the foramen ovale; by preſerving the paſſage open, and the other parts *in ſtatu quo*, after the birth, the ſame faculty would ſtill continue. Now, the foramen, it is alleged, would be preſerved in its open ſtate, were people accuſtomed, from their infancy, to hold their breath a conſiderable time once a-day, that the blood might be forced to reſume its priſtine paſſage, and prevent its drying up as it uſually does. This conjecture ſeems, in ſome meaſure, ſupported by the practice of divers, who are taught from their childhood to hold their breath, and keep long under water, by which means the ancient channel is kept open.—A Calabrian monk at Madrid laid claim to this amphibious capacity, making an offer to the king of Spain, to continue twice twenty-four hours under water, without ever coming up to take breath. Kircher gives an account of a Sicilian, named the *fiſh Colas*; who, by a long habitude from his youth, had ſo accuſtomed himſelf to live in water, that his nature ſeemed to be quite altered; ſo that he lived rather after the manner of a fiſh than a man.

AMPHIBOLOGY, in grammar and rhetoric, a term

† See *Lacerta.*

* See *Hippopotamus.*

‡ See *Teſtudo.*

Plate. XI

Fig. 1. AMARYLLIS or Crimſon oriental Lilly

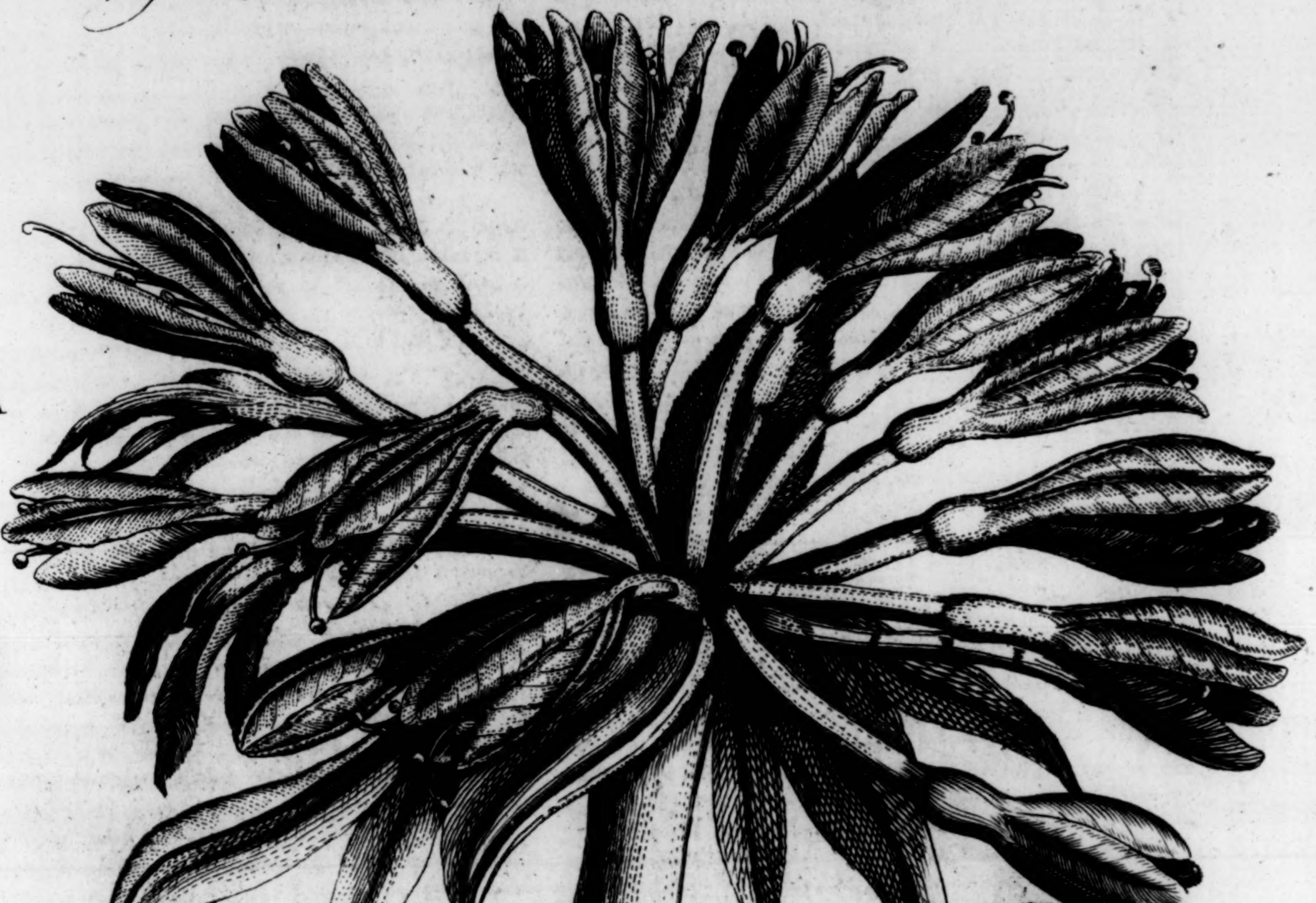


Fig. 2.

MPHISBÆNA

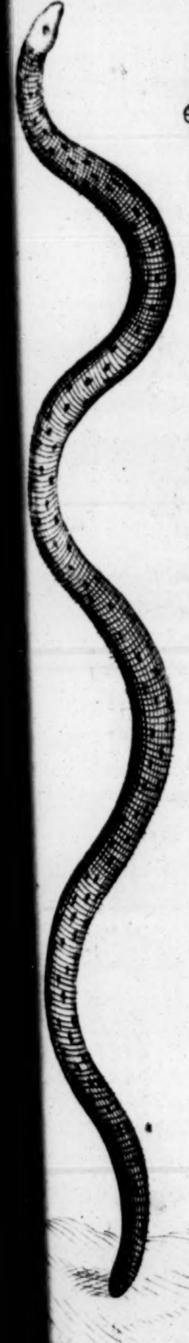
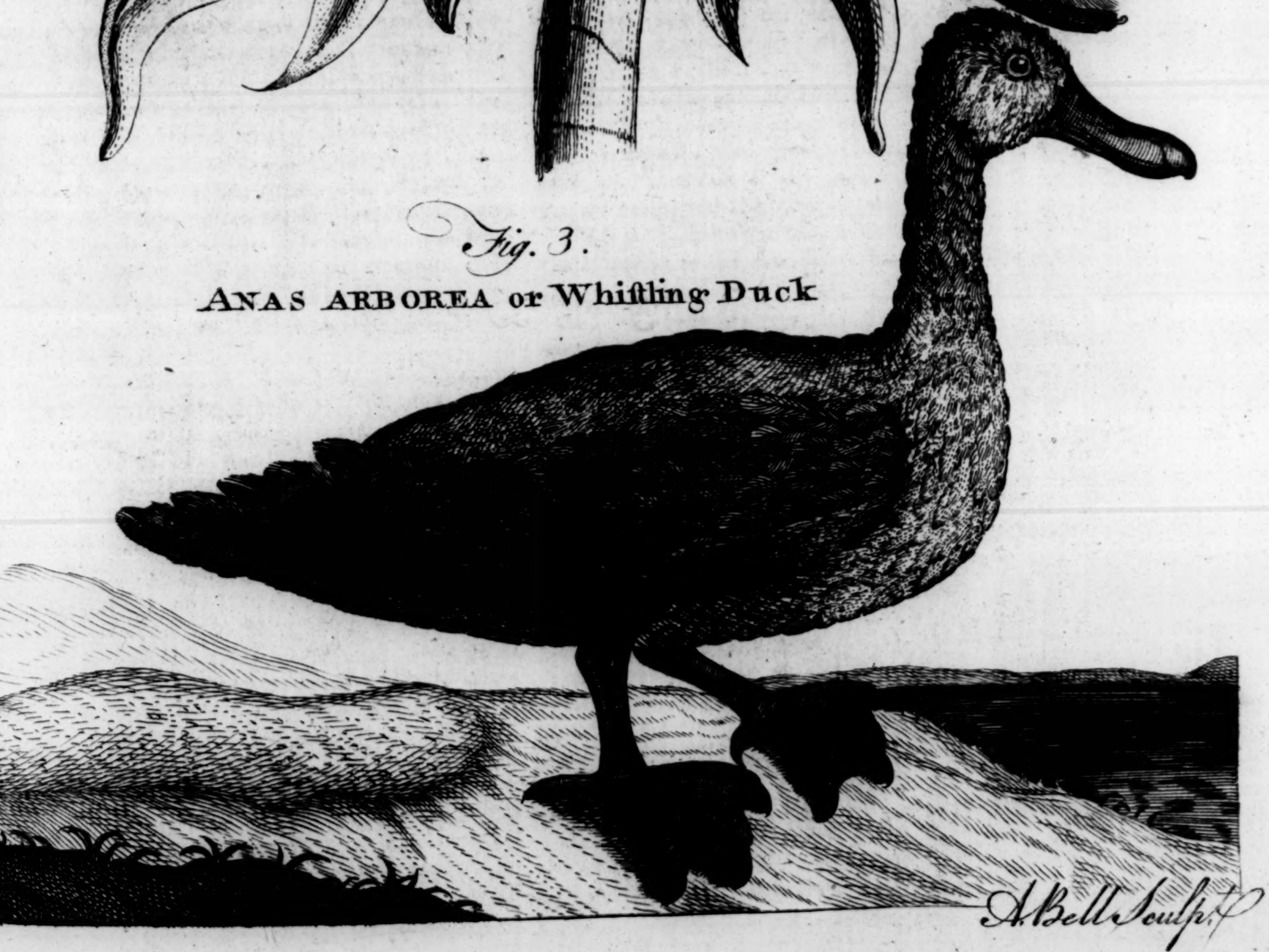


Fig. 3.

ANAS ARBOREA or Whiſtling Duck



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term uſed to denote a phraſe ſuſceptible of two different interpretations. Amphibology ariſes from the order of the phraſe, rather than from the ambiguous meaning of a word.

AMPHIBRACHYS, in ancient poetry, the name of a foot conſiſting of three ſyllables, whereof that in the middle is long, and the other two ſhort; ſuch is the word [ăbīrĕ].

AMPHICOME, in natural hiſtory, a kind of figured ſtone, of a round ſhape, but rugged, and beſet with eminences, celebrated on account of its uſe in divination. The word is originally Greek, αμφικομη, *q. d. utrinque comata*, or hairy on all ſides. This ſtone is alſo called *Erotylos*, Ερωτυλος, *Amatoria*, probably on account of its ſuppoſed power of creating love. The amphicome is mentioned by Democritus and Pliny, tho' little known among the moderns. Mercatus takes it for the ſame with the *lapis lumbricatus*, of which he gives a figure.

AMPHICTYONS, in Grecian antiquity, an aſſembly compoſed of deputies from the different ſtates of Greece; and reſembling in ſome meaſure, the diet of the German empire.—Some ſuppoſe the word Αμφικτιονες to be formed of αμφι, about, and κτιειν, or κτιζειν, in regard the inhabitants of the country round about met here in council: others, with more probability, from *Amphictyon*, ſon of Deucalion, whom they ſuppoſe to have been the founder of this aſſembly; though others will have Acriſius, king of the Argives, to have been the firſt who gave a form and laws to it.

Authors give different accounts of the number of the Amphictyons, as well as of the ſtates who were entitled to have their repreſentatives in this council. According to Strabo, Harpocration, and Suidas, they were twelve from their firſt inſtitution, ſent by the following cities and ſtates; the Ionians, Dorians, Perrhæbians, Bœotians, Magneſians, Achæans, Phthians, Melians, Dolopians, Ænianians, Delphians, and Phocians. Æſchines reckons no more than eleven; inſtead of the Achæans, Ænianians, Delphians, and Dolopians, he only gives the Theſſalians, Oetians, and Locrians. Laſtly, Pauſanias's liſt contains only ten, *viz.* the Ionians, Dolopians, Theſſalians, Ænianians, Magneſians, Melians, Phthians, Dorians, Phſcians, and Locrians.

In the time of Philip of Macedon, the Phocians were excluded the alliance, for having plundered the Delphian temple, and the Lacedæmonians were admitted in their place; but the Phocians, 60 years after, having behaved gallantly againſt Brennus and his Gauls, were reſtored to their ſeat in the Amphictyonic council. Under Auguſtus, the city Nicopolis was admitted into the body; and to make room for it, the Magneſians, Melians, Phthians, and Ænianians, who till then had diſtinct voices, were ordered to be numbered with the Theſſalians, and to have only one common repreſentative. Strabo ſpeaks as if this council were extinct in the times of Auguſtus and Tiberius: but Pauſanias, who lived many years after, under Antoninus Pius, aſſures us it remained entire in his time, and that the number of Amphictyons was then thirty.

The members were of two kinds. Each city ſent two deputies, under different denominations; one called Ἱερομνημων, whoſe buſineſs ſeems to have been more immediately to inſpect what related to ſacrifices and ceremonies of religion; the other Πυλαγορας, charged with hearing and deciding of cauſes and differences between private perſons. Both had an equal right to deliberate and vote, in all that related to the common intereſts of Greece. The *hieromnemon* was elected by lot; the *pylagoras* by plurality of voices.

Tho' the Amphictyons were firſt inſtituted at Thermopylæ, M. de Valois maintains, that their firſt place of reſidence was at Delphi; where, for ſome ages, the tranquillity of the times found them no other employment than that of being, if we may ſo call it, church-wardens of the temple of Apollo. In after-times, the approach of armies frequently drove them to Thermopylæ, where they took their ſtation, to be nearer at hand to oppoſe the enemies progreſs, and order timely ſuccour to the cities in danger. Their ordinary reſidence, however, was at Delphi.

Here they decided all public differences and diſputes between any of the cities of Greece; but before they entered on buſineſs, they jointly ſacrificed an ox cut into ſmall pieces, as a ſymbol of their union. Their determinations were received with the greateſt veneration, and even held ſacred and inviolable.

The Amphictyons, at their admiſſion, took a ſolemn oath never to diveſt any city of their right of deputation; never to avert its running waters; and if any attempts of this kind were made by others, to make mortal war againſt them: more particularly, in caſe of any attempt to rob the temple of any of its ornaments, that they would employ hands, feet, tongue, their whole power, to revenge it.—This oath was backed with terrible imprecations againſt ſuch as ſhould violate it; *e.gr.* May they meet all the vengeance of Apollo, Diana, Minerva, &c. their ſoil produce no fruit, their wives bring forth nothing but monſters, &c.

The ſtated terms of their meeting was in ſpring and autumn; the ſpring meeting was called Εαρινη Πυλαια, that in autumn Μετοπωρινη. On extraordinary occaſions, however, they met at any time of the year, or even continued ſitting all the year round.

Philip of Macedon uſurped the right of preſiding in the aſſembly of the Amphictyons, and of firſt conſulting the oracle which was called Προμαντεια.

AMPHIDROMIA, a feaſt celebrated by the ancients on the fifth day after the birth of a child.

AMPHIDRYON, in eccleſiaſtical writers, denotes the veil or curtain which was drawn before the door of the bema in ancient churches.

AMPHILOCHIA, the territory of the city of Argos in Acarnania; *Amphilochium*, (Thucydides); called *Amphilochi* (from the people,) in the lower age, (Stephanus.) A town alſo of Spain, in Gallicia, built by Teucer, and denominated from Amphilochus one of his companions, (Strabo:) now *Orenſe*. W. long. 8. 20. lat. 42. 36.

AMPHILOCHIUS, biſhop of Iconium, in the fourth century, was the friend of St Gregory Nazianzen and St Baſil. He aſſiſted at the firſt general council of Conſtantinople in 381; preſided at the council of Sidæ; and was a ſtrenuous oppoſer of the Arians. He died in 394; and his works were publiſhed in Greek and Latin, at Paris 1644, by Francis Combeſis.

AMPHILOCHIUS, ſon of Amphiaraus and Eriphyle, was a celebrated diviner. He had an altar erected to him at Athens, and an oracle at Mallus in Cilicia, which city was founded by him and Mopſus. The anſwers of this oracle were given by dreams; the party inquiring uſed to paſs a night in the temple, and that night's dream was the anſwer. Dion Caſſius mentions a picture done by order of Sextus Condianus, repreſenting the anſwer he received of the oracle, in the reign of the emperor Commodus.

AMPHIMACER, in ancient poetry, a foot conſiſting of three ſyllables, whereof the firſt and laſt are long, and that in the middle ſhort; ſuch is the word [Cāſtĭtās.]

AMPHION, ſon of Jupiter and Antiope; who, according to the poets, made the rocks follow his muſic; and at his harp the ſtones of Thebes danced into walls and a regular city.

AMPHIPOLES, in antiquity, the principal magiſtrates of Syracuſe. They were eſtabliſhed by Timoleon in the 109th Olympiad, after the expulſion of the tyrant Dionyſius. They governed Syracuſe for the ſpace of 300 years: and Diodorus Siculus aſſures us, that they ſubſiſted in his time.

AMPHIPOLIS, a city of Macedonia, an Athenian colony, on the Strymon, but on which ſide is not ſo certain: Pliny places it in Macedonia, on this ſide; but Scylax, in Thrace, on the other. The name of the town, *Amphipolis*, however, ſeems to reconcile their difference; becauſe, as Thucydides obſerves, it was waſhed on two ſides by the Strymon, which dividing itſelf into two channels, the city ſtood in the middle, and on the ſide towards the ſea there was a wall built from channel to channel. Its ancient name was Εννεα οδοι, the *Nine Ways*, (Thucydides, Herodotus.) The citizens were called *Amphipolitani*, (Livy.) It was afterwards called *Chriſtopolis*; now *Chriſopoli*, or *Chiſopoli*, (Holſtenius.)

AMPHIPOLIS, a town of Syria, on the Euphrates, built by Seleucus, called by the Syrians *Turmeda*, (Stephanus:) the ſame with *Thapſacus*, (Pliny); and ſuppoſed to have been only renewed and adorned by Seleucus, becauſe long famous before his time, (Xenophon.)

AMPHIPPII, in Grecian antiquity, ſoldiers who, in war, uſed two horſes without ſaddles, and were dexterous enough to leap from one to the other.

AMPHIPRORÆ, in the naval affairs of the ancients, veſſels with a prow at each end. They were uſed chiefly in rapid rivers and narrow channels, where it was not eaſy to tack about.

AMPHIPROSTYLE, in the architecture of the ancients, a temple which had four columns in the front, and as many in the aſpect behind.

AMPHISBÆNA, in zoology, a genus of ſerpents belonging to the order of amphibia ſerpentes, ſo called from the falſe notion of its having two heads, becauſe it moves with either end foremoſt.

The head of the amphiſbæna is ſmall, ſmooth, and blunt; the noſtrils are very ſmall; the eyes are minute and blackiſh; and the mouth is furniſhed with a great number of ſmall teeth. The body is cylindrical, about a foot long, and divided into about 200 annular convex ſegments like thoſe of a worm; and it has about 40 longitudinal ſtreaks, of which 12 on each ſide are in the form of ſmall croſſes like the Roman X; the anus is a tranſverſe ſlit; and the laſt ring or ſegment of the belly has eight ſmall papillæ, forming a tranſverſe line before the anus; the tail, *i. e.* all the ſpace below the anus, is ſhort, conſiſting of thirty annular ſegments, without being marked with the croſs-lines, and is thick and blunt at the point. The colour of the whole animal is black, variegated with white; but the black prevails moſt on the back, and the white on the belly. It has a great reſemblance to a worm, living in the earth, and moving equally well with either end foremoſt. There are but two ſpecies, *viz.* 1. The fuliginoſa, which anſwers exactly to the above deſcription, and is found in Libya and in different parts of America. 2. The alba, which is totally white, is a native of both the Indies, and is generally found in ant-hillocks. The bite of the amphiſbæna is reckoned to be mortal by many authors; but as it is not furniſhed with dog-fangs, the uſual inſtruments of conveying the poiſon of ſerpents, later writers eſteem it not to be poiſonous. They feed upon ants and earth-worms, but particularly the latter. See Plate XI. fig. 2.

AMPHISCII, among geographers, a name applied to the people who inhabit the torrid zone. The Amphiſcii, as the word imports, have their ſhadows one part of the year towards the north, and the other towards the ſouth, according to the ſun's place in the ecliptic. They are alſo called *Aſcii*. See ASCII.

AMPHISSA, the capital of the Locri Oxolæ, one hundred and twenty ſtadia (or 15 miles) to the weſt of Delphi, (Pauſanias.) So called, becauſe ſurrounded on all hands by mountains, (Stephanus.) Hence *Amphiſſæi*, the inhabitants; who plundered the temple at Delphi, (Demoſthenes.)—Alſo a town of Magna Græcia, at the mouth of the Sagra, on the coaſt of the Farther Calabria, ſituated between Locri and Caulona; now called *Rocella*. *Amphiſſius* the epithet, (Ovid.)

AMPHITANE, among ancient naturaliſts, a ſtone ſaid to attract gold, as the loadſtone does iron. Pliny ſays it was found in that part of the Indies where the native gold lay ſo near the ſurface of the earth as to be turned up in ſmall maſſes, among the earth of ant-hills; and deſcribes it to have been of a ſquare figure, and of the colour and brightneſs of gold. The deſcription plainly points out a well-known foſſil, called, by Dr Hill, *pyricubium*: this is common in the mines of moſt parts of the world; but neither this nor any other ſtone was ever ſuppoſed, in our times, to have the power of attracting gold.

AMPHITHEATRE, in antiquity, a ſpacious edifice, built either round or oval, with a number of riſing ſeats, upon which the people uſed to behold the combats of gladiators, of wild beaſts, and other ſports.

Amphitheatres were at firſt only of wood; and it was not till the reign of Auguſtus, that Statilius Taurus built one, for the firſt time, of ſtone. The loweſt part was of an oval figure, and called *arena*, becauſe, for the conveniency of the combatants, it was uſually ſtrewed with ſand; and round the arena were vaults ſtyled *caveæ*, in which were confined the wild beaſts appointed for the ſhews.

Above the caveæ was erected a large circular periſtyle, or podium, adorned with columns. This was the place of the emperors, ſenators, and other perſons of diſtinction.

The rows of benches were above the podium. Their figure was circular; and they were entered by avenues, at the end of which were gates called *vomitoriæ*.

The moſt perfect remains we now have of amphitheatres, are that of Veſpaſian called the *coliſeum*, that at Verona in Italy, and that at Niſmes in Languedoc.

AMPHITRITE, daughter of Oceanus and Doris, and wife to Neptune.

AMPHITRYON, ſon of Alcæus, leſs known by his own exploits than from his wife Alcmena's adventure. See ALCMENA.

AMPHORA, in antiquity, a liquid meaſure among the Greeks and Romans. The Roman amphora contained forty-eight ſextaries, and was equal to about ſeven gallons one pint Engliſh wine-meaſure; and the Grecian or Attic amphora contained one third more.

AMPHORA, was alſo a dry meaſure uſed by the Romans, and contained about three buſhels.

AMPHORA, among the Venetians, is the largeſt meaſure uſed for liquids, containing about 16 quarts.

AMPHORARIUM VINUM, in antiquity, denotes that which is drawn or poured into *amphoræ*, or pitchers; by way of diſtinction from *vinum doliare*, or caſk wine.—The Romans had a method of keeping wine in *amphoræ* for many years to ripen, by faſtening the lids tight down with pitch or gypſum, and placing them either in a place where the ſmoke came, or under ground.

AMPHOTIDES, in antiquity, a kind of armour or covering for the ears, worn by the ancient pugiles, to prevent their adverſaries from laying hold of that part.

AMPHTHILL, a town in Bedfordſhire, ſeated pleaſantly between two hills, but in a barren ſoil. W. Long. 0. 29. N. Lat. 52. 2.

AMPLIATION, in a general ſenſe, denotes the act of enlarging or extending the compaſs of a thing.

On a medal of the emperor Antoninus Pius, we find the title *Ampliator civium* given him, on account of his having extended the *jus civitatis*, or right of citizenſhip, to many ſtates and people before excluded from that privilege. In effect, it is generally ſuppoſed to have been this prince that made the famous conſtitution, whereby all the ſubjects of the empire were made citizens of Rome.

AMPLIATION, in Roman antiquity, was the deferring to paſs ſentence in certain cauſes. This the judge did, by pronouncing the word *amplius*; or by writing the letters N. L. for *non liquet*; thereby ſignifying, that, as the cauſe was not clear, it would be neceſſary to bring further evidence.

AMPLIFICATION, in rhetoric. See EXAGGERATION.

AMPLITUDE, in aſtronomy, an arch of the horizon intercepted between the eaſt or weſt point, and the centre of the ſun, or a planet, at its riſing or ſetting; and ſo is either north and ſouth, or ortive and occaſive.

Magnetical AMPLITUDE, the different riſing or ſetting of the ſun from the eaſt or weſt points of the compaſs. It is found by obſerving the ſun, at his riſing and ſetting, by an amplitude-compaſs.

AMPSAGA, a river of ancient Numidia *.

AMPSANCTI VALLIS, or AMPSANCTI LACUS, a cave or lake in the heart of the Hirpini, or Principato Ultra, near the city Tricento, (Cicero, Virgil, Pliny;) it is now called *Muſiti*, from Mephitis, the goddeſs of ſtench, who had a temple there. The ancient poets imagined that this gulf led to hell. It is alſo called *Anſancti*.

AMPULLA, in antiquity, a round big-bellied veſſel which the ancients uſed in their baths, to contain oil for anointing their bodies.—Alſo the name of a cup for drinking out of at table.

AMPURA, a province of the kingdom of Peru, before its conqueſt by the Spaniards. Here the inhabitants worſhipped two lofty mountains from a principle of gratitude, becauſe of the deſcent of the water from them by which their lands were fertilized. It is ſaid to have been conquered by Virachoca the 8th inca.

AMPURIAS, the capital of the territory of Ampurdan, in Catalonia, ſeated at the mouth of the river Fluvia, in E. Long. 2. 56. N. Lat. 42. 5. The land about it is barren, full of briars and bulruſhes, except in ſome places, which produce flax.

AMPUTATION, in ſurgery, the cutting off a limb, or any part, from the body *.

AMRAS, a ſtrong caſtle of Germany, ſeated in Tirol. E. Long. 11. 40. N. Lat. 47. 0. It is full of rarities of every kind; and has a library, with the portraits of many learned men.

AMSBURY, or AMBERSBURY, a town in Wiltſhire, lying in W. Long. 1. 20. N. Lat. 51. 29. It is the *Pagus Ambri*, famous for a monaſtery built by one Ambrus, and afterwards for a nunnery of noble women. There is a nobleman's ſeat here, built by Inigo Jones, to which new works were added under the direction of Lord Burlington. It is 80 miles weſt of London, and ſix miles north of Saliſbury.

AMSDORFIANS, in church-hiſtory, a ſect of Proteſtants in the XVIth century, who took their name from Amſdorf their leader. They maintained, that good works were not only unprofitable, but were obſtacles to ſalvation.

AMSTERDAM, the capital city of the province of Holland and of the United Netherlands, is ſeated on the river Amſtel and an arm of the ſea called the *Wye*. The air is but indifferent, on account of the marſhes that ſurround it, and render the city almoſt inacceſſible: but this inconvenience is abundantly recompenſed by the utility of its commerce, which the port ſerves greatly to promote; for it will contain above a thouſand large ſhips.

In 1204, it was nothing but a ſmall caſtle, called *Amſtel* from the name of the river, which its lords made a retreat for fiſhermen, who at firſt lived in huts covered with thatch: but it ſoon became conſiderable, and had a bridge and towers built about it, inſomuch that it roſe to a ſmall city; though, till the year 1490, it was ſurrounded with nothing but a weak palliſado. The walls were then built with brick, to defend it from the incurſions of the inhabitants of Utrecht, with whom the Hollanders were often quarrelling; but ſome months afterwards it was almoſt reduced to aſhes. In 1512, it was beſieged by the people of Guelderland; who, not being able to take it, ſet fire to the ſhips in the harbour. In 1525, an Anabaptiſt leader, with 600 of his followers, got into the city in the night-time, attacked the town-houſe, and defeated thoſe that made any reſiſtance. At length they barricaded, with wool and hop-ſacks, the avenues to the market-place, where theſe enthuſiaſts were poſted; and ſo put a ſtop to their fury till day appeared, at which time the citizens fell

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Al- nº 59.

* See *Surgery*, nº 28, 39.

Amſterdam.

upon them on all ſides, and forced them to retire into the town-houſe, where moſt of them were cut to pieces. About ten years after, there was another tumult raiſed by a parcel of fanatics, conſiſting of men and women, who ran about the ſtreets ſtark naked, and had a deſign of making themſelves maſters of the town-houſe. Their ſhrieks and cries, which were dreadful enough, ſoon alarmed the inhabitants, who ſeized the greateſt part of them, and gave them the chaſtiſement they deſerved.

Amſterdam was one of the laſt cities that embraced the reformed religion. It was beſieged by the Hollanders in 1578, and ſubmitted after a ſiege of ten months. One article of the capitulation was, a free exerciſe of the Roman-catholic religion: but this was not obſerved by the Proteſtants; for they ſoon drove the eccleſiaſtics, monks, and nuns, out of the city, broke the images, and demoliſhed the altars. From this time it became the general rendezvous of all nations and of every ſect, which raiſed it to that degree of grandeur and opulence it now enjoys. The inhabitants were often obliged to enlarge the bounds of their city, and in 1675 it was increaſed to its preſent extent. It was ſurrounded with a brick wall, and a large ditch, 80 feet broad, full of running water. The walls were fortified with 26 baſtions, on each of which there is now a windmill. There are eight gates towards the land, and one towards the water.

Amſterdam being ſeated in a marſhy ſoil, is built on piles of wood, for which reaſon no coaches are allowed, except to great men and phyſicians, who pay a tax for that privilege; and all kinds of goods are drawn on ſledges. It ſtands ſo low, that they would be expoſed to inundations, if they did not ſecure themſelves by dikes and ſluices. The fineſt ſtreets are, the Keyſar's Graft, or Emperor's Canal; the Heer Graft, or Lords Canal; the Cingel; and the ſtreet of Haerlem. The principal canal is remarkable for its houſes, which are magnificent ſtructures, of an equal height. Here are three prodigious ſluices, and a great number of canals, which croſs the city in many parts, and render the ſtreets clean and pleaſant. The canals are deep, their ſides are lined with hewn ſtone, they have generally rows of trees planted on each ſide, and many ſtone-bridges over different parts of them.

The fineſt is that called the *Ammarack*, which is formed by the waters of the Amſtel, into which the tide comes up, and on the ſides of which are two large quays. This canal has ſeveral bridges. The principal is that next the ſea, called *Pont-Neuf*, or the *New Bridge*: it is 660 feet long, and 70 broad, with iron baluſtrades on each ſide; it has 36 arches, of which 11 are very high, and eight are ſhut up to incloſe the yachts. From this bridge there is a moſt charming proſpect of the city, port, and ſea. The port is a mile and half in length, and above a thouſand paces in breadth: it is always filled with a multitude of veſſels, which look like a foreſt, or rather a floating city. The ſtreets in general are well paved, and the houſes built of brick or ſtone. Towards the ſides of the haven, the city is incloſed with great poles driven into the ground, which are joined by large beams placed horizontally. There are openings to let the ſhips in and out, which are ſhut every night at the ringing of a bell. Amſterdam is computed to be half as big as London; and the number of houſes are ſaid to amount to 26,035.

Amſterdam.

The public buildings are very magnificent. The ſtadt-houſe was founded in 1648; it is built upon 14,000 wooden piles; and its front is 282 feet long, its ſides 255 feet, and its height to the roof 116. There is a marble pediment in the front, whereon a woman is carved in relievo, holding the arms of the city; ſhe is ſeated in a chair, ſupported by two lions, with an olive-branch in her right hand; on each ſide are four Naiads, who preſent her with a crown of palm and laurel, and two other marine goddeſſes preſent her with different ſorts of fruit; beſides, there is Neptune with his trident, accompanied with Tritons, a ſea-unicorn, and a ſea-horſe. On the top ſtand three ſtatues in bronze, repreſenting Juſtice, Strength, and Plenty. On the top of the ſtructure is a round tower, 50 feet above the roof, adorned with ſtatues, and an harmonious chime of bells, the biggeſt of which weighs about 7000 pounds, and the next 6000; they are made to play different tunes every month. It has not one handſome gate, but only ſeven doors to anſwer to the number of the United provinces. On the floor of the great hall are two globes, the celeſtial and terreſtrial, which are 22 feet in diameter, and 69 in circumference; they are made of black and white marble, and are inlaid with jaſper and copper. In general, all the chambers are enriched with paintings, carvings, and gildings. While this ſtadt-houſe was building, the old one was ſet on fire, and conſumed with all the archives and regiſters.

Under the ſtadt-houſe is a prodigious vault, wherein is kept the bank of Amſterdam, where there is vaſt quantity of ingots both of gold and ſilver, as alſo bags, which are ſuppoſed to be full of money. The doors are proof againſt petards, and are never opened but in the preſence of one of the burgomaſters. The priſons for debtors and criminals are likewiſe under the ſtadt-houſe; as alſo the guard-room for the citizens, wherein the keys of the city are locked every night. At the end of the great hall is the ſchepens or aldermens chamber, where civil cauſes are tried. Beſides theſe, there are the chambers of the ſenate and council, the burgomaſter's chamber, the chambers of accounts, &c. In the ſecond ſtory is a large magazine of arms; and on the top of the building are ſix large ciſterns of water, which may be conveyed to any room in the houſe in caſe of fire, to prevent which the chimneys are lined with copper.

The bourſe, or exchange, where the merchants aſſemble, is all of free-ſtone, and built upon two thouſand wooden piles; its length is about two hundred feet, and its breadth one hundred and twenty-four; the galleries are ſupported by twenty-ſix marble columns, upon each of which are the names of the people that are to meet there; they are all numbered, and there is a place fixed for every merchandiſe under ſome one of theſe numbers. On the right hand of the gate is a ſuperb ſtaircaſe, which leads to the galleries, on one ſide of which there are ſeveral ſhops, and on the other a place to ſell clothes. It is not unlike the royal exchange in London.

The houſe belonging to the Eaſt-India company contains large magazines, full of the different ſorts of commodities brought from the Eaſt-Indies. The building was formerly uſed for the city arſenal. There are ſeveral magnificent new buildings added to it. The directors hold their aſſemblies there twice a-week.

The academy called the *Illuſtrious School*, is likewiſe a very fine building: it was formerly a convent belonging to the nuns of St Agnes. Here they teach Latin, the oriental languages, theology, philoſophy, hiſtory, *&c.* The lawyers and phyſicians have likewiſe their ſchools. There are eleven churches belonging to the eſtabliſhed religion, and one for Engliſh Preſbyterians, none beſides which are allowed to have bells. Other ſects may have churches, except the Roman-catholics, who meet in private houſes without moleſtation. The Jews have two fine ſynagogues, one for the Portugueſe, and the other for the Germans. Some of the churches are very ſtately buildings, but not ſo remarkable as to deſerve a particular deſcription.

Beſides theſe, there are ſeveral hoſpitals, or houſes for orphans, for poor widows, for ſick perſons, and for mad people; all which are regulated with much prudence. The Raſp-Houſe, which was formerly a nunnery, is now a ſort of a work-houſe for men that behave ill. They are commonly ſet to ſaw or raſp Braſil wood; and if they will not perform their taſk, they are put into a cellar which the water runs into, where if they do not almoſt conſtantly ply the pump, they run the riſk of being drowned. There is likewiſe a ſpin-houſe for debauched women, where they are obliged to ſpin wool, flax, and hemp, and do other work. All the hoſpitals are extremely neat, and richly adorned with pictures. They are maintained partly by voluntary contributions, which are raiſed by putting money into the poor's-boxes fixed up all over the city; and partly by taxing all public diverſions, as well at fairs as elſewhere. Likewiſe every perſon that paſſes thro' any of the gates at candle-light pays a penny for the ſame uſes. Theſe charities are taken care of by certain officers called *deacons*. The governors are nominated by the magiſtrates out of the moſt conſiderable men in the city.

The common ſort have places of diverſion called *Spiel-Houſes*, where there are muſic and dancing. They are much of the ſame kind as the hops which were ſo frequent about London. If ſtrangers go there, they muſt take care not to make their addreſſes to a woman that is engaged to any other man.

This city is governed by a ſenate or council, which conſiſts of 36 perſons, called a *Vroedſhap*, who enjoy their places for life; and when any of them dies, the remainder chuſe another in his ſtead. This ſenate elects deputies to be ſent to the States of Holland, and appoints the chief magiſtrates of the city, called *Burgomaſters*, or *Echevins*, who are like our aldermen. The number is twelve, out of which four are choſen every year to execute the office, and are called *Burgomaſters-regent*. Three of theſe are diſcharged every year, to make room for three others. One of the four is kept in to inform the new ones of the ſtate of affairs, and alſo preſides the three firſt months in the year, and the others three months each; ſo that, when they are in this office, they may be compared to the lord-mayor of the city of London. Theſe alterations and appointments are made by their own body. They diſpoſe of all inferior offices which become vacant during their regency. They have likewiſe the direction of all public works, which regard the ſafety, tranquillity, and embelliſhment of the city. The keys of the famous bank of this city are in the hands of theſe magiſtrates.

The college conſiſts of new burgomaſters or echevins, who are judges in all criminal affairs, without appeal; but in civil cauſes they may appeal to the council of the province. There are two treaſurers, a bailiff, and a penſionary. The bailiff continues in his office three years; and ſearches after criminals, takes care to proſecute them, and ſees their ſentence executed. The penſionary is the miniſter of the magiſtracy, is well verſed in the laws, makes public harangues, and is the defender of the intereſts of the city. The city of Amſterdam contributes to the public income above 50,000 livres per day, beſides the exciſe of beer, fleſh, and corn; which in all amounts to above one million ſix hundred thouſand pounds ſterling a-year. This is more than is paid by all the reſt of the provinces put together; and yet Amſterdam bears but the fifth rank in the aſſembly of the ſtates of Holland, with this diſtinction, that whereas other cities ſend two members, this ſends four.

The militia of Amſterdam is very conſiderable; they have ſixty companies, each of which has from 200 to 300 men. Jews and Anabaptiſts are excluded from this ſervice, not being admitted to bear arms. But they are obliged to contribute to the maintainance of the city-guard, which conſiſts of 1400 ſoldiers; as alſo to the night-watch, who patrole about the ſtreets, and proclaim the hour. Beſides theſe, there are trumpeters on every church ſteeple, who ſound every half hour; and if there happens a fire, they ring the fire-bell, and ſhow where it is. The inhabitants have excellent contrivances to extinguiſh it ſpeedily.

The trade of Amſterdam is prodigious: for almoſt the whole trade of the Eaſt-India company centres in this city, which beſides carries on a commerce with all the reſt of the world, inſomuch that it may be called the magazine or ſtore-houſe of Europe. They import a vaſt deal of corn from the Baltic, not ſo much for preſent conſumption, as to lay up againſt times of ſcarcity. The richeſt ſpices are entirely in the hands of the Eaſt-India company, who furniſh all Europe therewith. They have vaſt quantities of military ſtores, with which they ſupply ſeveral nations; which is owing to their engroſſing moſt of the iron works on the Rhine and other great rivers that run into Holland. The longitude of Amſterdam is 4. 30. E.; the latitude, 52. 25. N.

Amsterdam, is alſo the name of an iſland in the ſouth-ſea, ſaid to have been diſcovered by Taſman a Dutch navigator, but not taken notice of in our later diſcoveries.

AMULET, a charm, or preſervative againſt miſchief, witchcraft, or diſeaſes.

Amulets were made of ſtone, metal, ſimples, animals, and in a word of every thing that imagination ſuggeſted.

Sometimes they conſiſted of words, characters, and ſentences, ranged in a particular order, and engraved upon wood, *&c.* and worn about the neck, or ſome other part of the body *.

At other times they were neither written nor engraved; but prepared with many ſuperſtitious ceremonies, great regard being uſually paid to the influence of the ſtars. The Arabians have given to this ſpecies of amulet the name of *taliſman* †.

All nations have been fond of amulets: the Jews

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* See *Abracadabra*.

† See *Taliſman*.

were extremely ſuperſtitious in the uſe of them, to drive away diſeaſes; and the Miſna forbids them, unleſs received from an approved man who had cured at leaſt three perſons before by the ſame means.

Among the Chriſtians of the early times, amulets were made of the wood of the croſs, or ribbands with a text of ſcripture written in them, as preſervatives againſt diſeaſes. Notwithſtanding the progreſs of learning and refinement, there is not any country in Europe, even at this day, who do not believe in ſome charm or other. The pope is ſuppoſed to have the virtue of making amulets, which he exerciſes in the conſecrating of *Agnus Dei's*, ‡ &c. The ſpunge which has wiped his table, was formerly in great veneration on this account, as a preſervative from wounds, and death itſelf: on this account it was ſent with great ſolemnity by Gregory II. to the duke of Aquitain.

AMURAT, or AMURATH, I. the fourth emperor of the Turks, and one of the greateſt princes of the Ottoman empire, ſucceeded Solyman in 1360. He took from the Greeks Gallipoli, Thrace, and Adrianople, which laſt he choſe for the place of his reſidence. He defeated the prince of Bulgaria, conquered Miſnia, chaſtiſed his rebellious baſhaws, and is ſaid to have gained 36 battles. This prince, in order to form a body of devoted troops that might ſerve as the immediate guards of his perſon and dignity, appointed his officers to ſeize annually, as the imperial property, the fifth part of the Chriſtian youth taken in war. Theſe, after being inſtructed in the Mahometan religion, inured to obedience by ſevere diſcipline, and trained to warlike exerciſes, were formed into a body diſtinguiſhed by the name of *Janiſſaries*, or *New Soldiers*. Every ſentiment which enthuſiaſm can inſpire, every mark of diſtinction that the favour of the prince could confer, were employed in order to animate this body with martial ardour, and with a conſciouſneſs of its own pre-eminence. The Janiſſaries ſoon became the chief ſtrength and pride of the Ottoman armies, and were diſtinguiſhed above all the troops whoſe duty it was to attend on the perſon of the ſultan.—At length the death of Lazarus, deſpot of Servia, who had endeavoured in vain to ſtop the progreſs of Amurath's arms, touched Milo, one of his ſervants, in ſo ſenſible a manner, that, in revenge, he ſtabbed the ſultan in the midſt of his troops, and killed him upon the ſpot, A. D. 1389, after he had reigned 23 years.

AMURAT II. the 10th emperor of the Turks, was the eldeſt ſon of Mahomet I. and ſucceeded his father in 1421. He beſieged Conſtantinople and Belgrade without ſucceſs; but he took Theſſalonica from the Venetians, and compelled the prince of Boſnia and John Caſtriot prince of Albany to pay him tribute. He obliged the latter to ſend his three ſons as hoſtages; among whom was George, celebrated in hiſtory by the name of *Scanderbeg*. John Hunniades defeated Amurat's troops, and obliged him to make peace with the Chriſtian princes, in 1442. Theſe princes afterwards breaking the peace, Amurat defeated them in the famous battle of Varna, November 10th 1444, which proved ſo fatal to the Chriſtians, and in which Ladiſlaus king of Hungary was killed. He afterwards defeated Hunniades, and killed above 20,000 of his men; but George Caſtriot, more known by the name of *Scanderbeg*, being re-eſtabliſhed in the eſtates of his father, defeated the Turks ſeveral times, and obliged Amurat to raiſe the ſiege of Croia, the capital of Albany. Amurat died, chagrined with his ill ſucceſs, and infirm with age, February 11th 1451, at Adrianople. It is obſerved to this prince's honour, that he always kept his treaties with the greateſt fidelity.

AMURCA, the name of an antiquated medicine, prepared by boiling the recrement or dregs of oil of olives to the conſiſtence of honey, and uſed as an aſtringent.

AMYCLÆ, a city of Laconia, diſtant about 18 miles from the metropolis, founded by Amyclas the ſon of Lacedæmon, and famed afterwards for the birth of Caſtor and Pollux the ſons of Tyndareus, eighth king of Sparta. It was afterwards famed for ſending a conſiderable colony of its own inhabitants into Upper Calabria, who built there a city which they called by the ſame name. This laſt city was ſituated between Caieta and Terracina, and gave its name to the neighbouring ſea. According to Pliny and Solinus, the territory of Amyclæ was ſo infeſted with vipers and other ſerpents, that the inhabitants were obliged to abandon their dwellings and ſettle elſewhere.—Among the ancient poets, the Amycli, or inhabitants of this city, obtained the epithet of *taciti* or *ſilent*. The reaſon of this was, either becauſe it was built by the Lacedæmonians, who, as they followed the doctrine of Pythagoras, were always inculcating the precept of ſilence, and thence called *taciti*; or becauſe of a law which obtained in this place, forbidding any one, under ſevere penalties, to mention the approach of an enemy. Before this law was made, the city was daily alarmed by falſe reports, as the enemy had been already at the gates. From terrors of this kind the abovementioned law indeed delivered them; but in the end it proved the ruin of the city: for the Dorians appearing unexpectedly under the walls, no one ventured to tranſgreſs the law; ſo that the city was eaſily taken. They reduced it to an inconſiderable hamlet; in which, however, were ſeen ſome of the remains of its ancient grandeur. One of the fineſt buildings that eſcaped the common ruin, was the temple and ſtatue of Alexandra, whom the inhabitants pretended to be the ſame with Caſſandra the daughter of Priam.

AMYGDALUS, the almond-tree; a genus of the monogynia order, belonging to the icoſandria claſs of plants.—Linnæus claſſes the perſica or peach-tree along with the amygdalus; but for this, on account of the univerſally received diſtinction, we refer to the article PERSICA.

Species. 1. The communis, or common almond. This is cultivated more for the beauty of its flowers, than for its fruit. There are two varieties of this, one with ſweet, the other with bitter kernels, which often ariſe from the fruit of the ſame tree. 2. The dulcis, or jordan-almond, has a tender ſhell, and a large ſweet kernel. The leaves are broader, ſhorter, and grow much cloſer, than thoſe of the common ſort. The flowers are very ſmall, and of a pale colour inclining to white. 3. The ſativus, with narrow ſpear-ſhaped leaves. The flowers of this ſpecies are white, and much ſmaller than thoſe of the common almond; its ſhoots are alſo ſmaller, and its joints cloſer; nor is the tree ſo hardy, and therefore it ſhould have the advantage of a warm ſituation, otherwiſe it will not thrive. This ſort flowers early in the ſpring,

‡ See *Agnus Dei*.

ſpring, but rarely bears fruit in Britain. 4. The orientalis, with ſpear-ſhaped ſilvery leaves, was found growing near Aleppo, from whence the fruit was ſent to France, and thence into Britain. The leaves of the orientalis very much reſemble ſea-purſlane. The flowers are very ſmall, and are not ſucceeded by fruit in Britain. 5. The nana, or dwarf-almond, ſeldom riſes more than three feet high, and ſends out many ſide branches. The roots are very much ſubject to put out ſuckers, by which it may be increaſed in plenty; but if theſe are not annually taken away, they will ſtarve the old plants. This ſpecies flowers in April, and makes a fine appearance.

Culture. See PERSICA.

Medicinal Uſes. Sweet almonds are of greater uſe in food than as medicines: but they are reckoned to afford little nouriſhment; and, when eaten in ſuſtance, are not eaſy of digeſtion, unleſs thoroughly comminuted. They are ſuppoſed, on account of their ſoft unctuous quality, to obtund acrimonious juices in the primæ viæ: peeled ſweet almonds, eaten ſix or eight at a time, ſometimes give preſent relief in the heart-burn.

Bitter almonds have been found poiſonous to dogs and ſundry other animals; and a water diſtilled from them, when made of a certain degree of ſtrength, has had like effects. Nevertheleſs, when eaten, they appear innocent to men, and have been not unfrequently uſed as medicines: Boerhaave recommends them, in ſubſtance, as diuretics which heat but moderately, and which may therefore be ventured upon in acute diſeaſes.

The oils obtained by expreſſion from both ſorts of almonds are in their ſenſible qualities the ſame. The general virtues of theſe oils are, to blunt acrimonious humours, and to ſoften and relax the ſolids: hence their uſe, internally, in tickling coughs, heat of urine, pains, and inflammations; and, externally, in tenſion and rigidity of particular parts.

The milky ſolutions of almonds in watery liquors, commonly called *emulſions*, contain the oil of the ſubject, and participate in ſome degree of the emollient virtue thereof: but have this advantage above the pure oil, that they may be given in acute or inflammatory diſorders, without danger of the ill effects which the oil might ſometimes produce; ſince emulſions do not turn rancid or acrimonious by heat, as all the oils of this kind in a little time do. Several unctuous and reſinous ſubſtances, of themſelves not miſcible with water, may by trituration with almonds be eaſily mixed with it into the form of an emulſion; and are thus excellently fitted for medicinal uſe. In this form, camphor and the reſinous purgatives may be commodiouſly taken. See MATERIA MEDICA, [99.]

AMYRAULT (Moſes), an eminent French Proteſtant divine, born at Bourgueil in Touraine in 1596. He ſtudied at Saumur, where he was choſen profeſſor of theology; and his learned works gained him the eſteem of Catholics as well as Proteſtants, particularly of cardinal Richelieu, who conſulted him on a plan of reuniting their churches, which, however, as may well be ſuppoſed, came to nothing. He publiſhed a piece in which he attempted to explain the myſtery of predeſtination and grace, which occaſioned a controverſy between him and ſome other divines. He alſo wrote, An Apology for the Proteſtants; a Paraphraſe on the New Teſtament; and ſeveral other books. This eminent divine died in 1664.

AMYRBERIS in botany. See BERBERIS.

AMYRIS, a genus of the monogynia order, belonging to the decandria claſs of plants.—The moſt remarkable ſpecies are, 1. The elemifera, or ſhrub which bears the gum elemi, a native of America. It grows to the height of about ſix feet, producing trifoliated ſtiff ſhining leaves, growing oppoſite to one another on footſtalks two inches long. At the ends of the branches grow four or five ſlender ſtalks ſet with many very ſmall white flowers. 2. The opobalſamum is an ever-green ſhrub, growing ſpontaneouſly in Arabia, from whence the opobalſam, or balm of gilead, is procured. 3. Toxifera, or poiſon-wood, is a ſmall tree, with a ſmooth light-coloured bark. Its leaves are winged; the middle rib is ſeven or eight inches long, with pairs of pinnæ one againſt another on inch-long footſtalks. The fruit hangs in bunches, is ſhaped like a pear, and is of a purple colour, covering an oblong hard ſtone. From the trunk of this tree diſtils a liquid as black as ink. Birds feed on the fruit; particularly one, called the *purple groſs-beak*, on the mucilage that covers the ſtone. It grows uſually on rocks, in Providence, Ilathera, and others of the Bahama iſlands. The other ſpecies of this plant mentioned by Linnæus are, the ſilvatica, the maritima, gileadenſis, protium, and balſamifera.

ANA, among phyſicians, denotes a quantity equal to that of the preceding ingredient. It is abbreviated thus, āā, or ā.

ANABOA, a ſmall iſland ſituated near the coaſt of Loango in Africa, in E. Long. 9°. N. Lat. 1°. Here are ſeveral fertile valleys, which produce plenty of bananas, oranges, pine-apples, lemons, citrons, tamarinds, cocoa nuts, &c. together with vaſt quantities of cotton.—In this iſland are two high mountains, which, being continually covered with clouds, occaſion frequent rains.

ANABAPTISTON, the ſame with ABAPTISTON.

ANABAPTISTS, a Proteſtant ſect which ſprung up in Germany immediately after the Reformation. It was founded in the year 1521, by Nicholas Storck, Mark Stubner, and Thomas Muncer; who had been followers of Luther, but abandoned him on pretence that his doctrine was imperfect. Storck being a man of no learning, boaſted of inſpirations; Stubner, who had wit and ſome learning, applied himſelf to find out ſuitable explications of the word of God; and Muncer, who was bold and zealous, played the enthuſiaſt in the moſt extravagant manner.

The moſt remarkable of their religious tenets related to the ſacrament of baptiſm; which, as they contended, ought to be adminiſtered only to perſons grown up to years of underſtanding, and ſhould be performed not by ſprinkling them with water, but by dipping them in it: for this reaſon they condemned the baptiſm of infants; and, re-baptizing all whom they admitted into their ſociety, the ſect came to be diſtinguiſhed by the name of *Anabaptiſts*. To this peculiar notion concerning baptiſm, which has the appearance of being founded on the practice of the church in the apoſtolic age, and contains nothing inconſiſtent with the peace and order of human ſociety, they added other principles of a moſt enthuſiaſtic as well as dangerous nature. They maintained, that among Chriſtians, who had the precepts of the goſpel to direct and the ſpirit of God to guide them, the office of magiſtracy was not only unneceſſary, but an unlawful encroachment on their ſpiritual liberty; that the diſtinctons occaſioned by birth, or rank, or wealth, being contrary to the ſpirit of the goſpel, which conſiders all men as equal, ſhould be entirely aboliſhed; that all Chriſtians, throwing their poſſeſſions into one common ſtock, ſhould live together in that ſtate of equality which becomes members of the ſame family; that as neither the laws of nature, nor the precepts of the New Teſtament, had placed any reſtraints upon men with regard to the number of wives which they might marry, they ſhould uſe that liberty which God himſelf had granted to the patriarchs.

By theſe doctrines they ſoon drew over vaſt numbers to their ſide; in ſo much that Muncer ventured openly to exhort the people to reſiſt the magiſtrates, and conſtrain princes to diveſt themſelves of their authority. Accordingly the peaſants of Germany, to whom the idea of unlimited independence was peculiarly flattering, roſe in many places, and committed a thouſand acts of violence. But they were defeated by the troops of the empire, with great ſlaughter; and Muncer, who had deluded them, was taken, and beheaded in the year 1525.

But though the inſurrection excited by that fanatic was ſo ſoon ſuppreſſed, ſeveral of his followers lurked in different places, and endeavoured privately to propagate his opinions.

In thoſe provinces of Upper Germany which ha dalready been ſo cruelly waſted by their enthuſiaſtic rage, the magiſtrates watched their motions with ſuch ſevere attention, that many of them found it neceſſary to retire into other countries; ſome were puniſhed, others driven into exile, and their errors were entirely rooted out. But in the Netherlands and Weſtphalia, where the pernicious tendency of their opinions was more unknown, and guarded againſt with leſs care, they got admittance into ſeveral towns, and ſpread the infection of their principles.

In particular, two Anabaptiſt prophets, John Matthias, a baker of Haerlem, and John Boccold, or Beukels, a journeyman taylor of Leyden, poſſeſſed with the rage of making proſelytes, fixed their reſidence at Munſter, an imperial city in Weſtphalia, of the firſt rank, under the ſovereignty of its biſhop, but governed by its own ſenate and conſuls. As neither of theſe fanatics wanted the talents neceſſary for ſuch an undertaking, great reſolution, the appearance of ſanctity, bold pretenſions to inſpiration, and a confident and plauſible manner of diſcourſing, they ſoon gained many converts. Among theſe were Rothman, who had firſt preached the Proteſtant doctrine in Munſter, and Cnipperdoling, a citizen of good birth and conſiderable eminence. Emboldened by the countenance of ſuch diſciples, they openly taught their opinions; and not ſatisfied with that liberty, they made ſeveral attempts, tho' without ſucceſs, to ſeize the town, in order to get their tenets eſtabliſhed by public authority. At laſt, having ſecretly called in their aſſociates from the neighbouring country, they ſuddenly took poſſeſſion of the arſenal and ſenate-houſe in the night-time; and running through the ſteets with drawn ſwords, and horrible howlings, cried out alternately, "Repent, and be "baptized," and "Depart ye ungodly." The ſenators, the canons, the nobility, together with the more ſober citizens, whether Papiſts or Proteſtants, terrified at their threats and outcries, fled in confuſion; and left the city under the dominion of a frantic multitude, conſiſting chiefly of ſtrangers. Nothing now remaining to overawe or controul them, they ſet about modelling the government according to their own wild ideas: and though at firſt they ſhowed ſo much reverence for the ancient conſtitution, as to elect ſenators of their own ſect, and to appoint Cnipperdoling and another proſelyte conſuls, this was nothing more than form; for all their proceedings were directed by Matthias, who in the ſtyle and with the authority of a prophet uttered his commands, which it was inſtant death to diſobey. Having begun with encouraging the multitude to pillage the churches, and deface their ornaments; he enjoined them to deſtroy all books, except the bible, as uſeleſs or impious; he appointed the eſtates of ſuch as fled to be confiſcated, and ſold to the inhabitants of the adjacent country; he ordered every man to bring forth his gold, ſilver, and precious effects, and to lay them at his feet: the wealth amaſſed by theſe means, he depoſited in a public treaſury, and named deacons to diſpenſe it for the common uſe of all. The members of his commonwealth being thus brought to a perfect equality, he commanded all of them to eat at tables prepared in public, and even preſcribed the diſhes which were to be ſerved up each day. Having finiſhed his plan of reformation, his next care was to provide for the defence of the city; and he took meaſures for that purpoſe with a prudence which ſavoured nothing of fanaticiſm. He collected vaſt magazines of every kind; he repaired and extended the fortifications, obliging every perſon to work in his turn; he formed ſuch as were capable of bearing arms into regular bodies, and endeavoured to add the vigour of diſcipline to the impetuoſity of enthuſiaſm. He ſent emiſſaries to the Anabaptiſts in the Low Countries, inviting them to aſſemble at Munſter, which he dignified with the name of *Mount Sion*, that from thence they might ſet out to reduce all the nations of the earth under their dominion. He himſelf was unwearied in attending to every thing neceſſary for the ſecurity or increaſe of the ſect; animating his diſciples by his own example to refuſe no labour, as well as to repine at no hardſhip; and their enthuſiaſtic paſſions being kept from ſubſiding by a perpetual ſucceſſion of exhortations, revelations, and prophecies, they ſeemed ready to undertake or to ſuffer any thing in maintenance of their opinions.

Meanwhile, the biſhop of Munſter having aſſembled a conſiderable army, advanced to beſiege the town. On his approach, Matthias ſallied out at the head of ſome choſen troops; attacked one quarter of his camp; forced it; and, after great ſlaughter, returned to the city, loaded with glory and ſpoil. Intoxicated with this ſucceſs, he appeared next day brandiſhing a ſpear; and declared, that, in imitation of Gideon, he would go forth with a handful of men and ſmite the hoſt of the ungodly. Thirty perſons, whom he named, followed him without heſitation in this wild enterprize, and ruſhing on the enemy with a frantic courage were cut off to a man. The death of their prophet occaſioned at firſt great conſternation among his diſciples; but Boccold, by the ſame gifts and pretenſions which had gained Matthias credit, ſoon revived their ſpirits and hopes to ſuch a degree, that he ſucceeded him in the ſame abſolute direction of all their affairs. As he did not poſſeſs that enterpriſing courage which diſtinguiſhed his predeceſſor, he ſatisfied himſelf with carrying on a defenſive war; and, without attempting to annoy the enemy by ſallies, he waited for the ſuccours he expected from the Low Countries, the arrival of which was often foretold and promiſed by their prophets. But though leſs daring in action than Matthias, he was a wilder enthuſiaſt, and of more unbounded ambition. Soon after the death of his predeceſſor, having by obſcure viſions and prophecies prepared the multitude for ſome extraordinary event, he ſtripped himſelf naked, and, marching through the ſtreets, proclaimed with a loud voice, "That the kingdom of Zion was at hand; that whatever was higheſt on earth ſhould be brought low, and whatever was loweſt ſhould be exalted." In order to fulfil this, he commanded the churches, as the moſt lofty buildings in the city, to be levelled with the ground; he degraded the ſenators choſen by Matthias; and depriving Cnipperdoling of the conſulſhip, the higheſt office in the commonwealth, he appointed him to execute the loweſt and moſt infamous, that of common hangman; to which ſtrange tranſition the other agreed, not only without murmuring, but with the utmoſt joy; and ſuch was the deſpotiſm and rigour of Boccold's adminiſtration, that he was called almoſt every day to perform ſome duty or other of his wretched function. In place of the depoſed ſenators, he named twelve judges, according to the number of tribes in Iſrael, to preſide in all affairs; retaining to himſelf the ſame authority which Moſes anciently poſſeſſed as legiſlator of that people.

Not ſatisfied, however, with power or titles which were not ſupreme, a prophet, whom he had gained and tutored, having called the multitude together, declared it to be the will of God, that John Boccold ſhould be King of Sion, and ſit on the throne of David. John kneeling down, accepted of the heavenly call, which he ſolemnly proteſted had been revealed likewiſe to himſelf; and was immediately acknowledged as a monarch by the deluded multitude. From that moment he aſſumed all the ſtate and pomp of royalty. He wore a crown of gold, and the richeſt and moſt ſumptuous garments. A bible was carried on his one hand, a naked ſword on the other. A great body of guards accompanied him when he appeared in public. He coined money ſtamped with his own image, and appointed the great officers of his houſehold and kingdom, among whom Cnipperdoling was nominated governor of the city, as a reward for his former ſubmiſſion.

Having now attained the height of power, Boccold began to diſcover paſſions, which he had hitherto reſtrained, or indulged only in ſecret. As the exceſſes of enthuſiaſm have been obſerved in every age to lead to ſenſual gratifications, the ſame conſtitution that is ſuſceptible of the former being remarkably prone to the latter, he inſtructed the prophets and teachers to harangue the people for ſeveral days concerning the lawfulneſs and even neceſſity of taking more wives than one, which they aſſerted to be one of the privileges granted by God to the ſaints. When their ears were once accuſtomed to this licentious doctrine, and their paſſions inflamed with the proſpect of ſuch unbounded indulgence, he himſelf ſet them an example of uſing what he called their Chriſtian liberty, by marrying at once three wives, among which the widow of Matthias, a woman of ſingular beauty, was one. As he was allured by beauty, or the love of variety, he gradually added to the number of his wives, until they amounted to fourteen, though the widow of Matthias was the only one dignified with the title of *queen*, or who ſhared with him the ſplendor and ornaments of royalty. After the example of their prophet, the multitude gave themſelves up to the moſt licentious and uncontrouled gratification of their deſires. No man remained ſatiſfied with a ſingle wife. Not to uſe their Chriſtian liberty was deemed a crime. Perſons were appointed to ſearch the houſes for young women grown up to maturity, whom they inſtantly compelled to marry. Together with polygamy, freedom of divorce, its inſeparable attendant, was introduced, and became a new ſource of corruption. Every exceſs was committed of which the paſſions of men are capable, when reſtrained neither by the authority of laws nor the ſenſe of decency; and by a monſtrous and almoſt incredible conjunction, voluptuouſneſs was engrafted on religion, and diſſolute riot accompanied the auſterities of fanatical devotion.

Meanwhile, the German princes were highly offended at the inſult offered to their dignity by Boccold's preſumptuous uſurpation of royal honours; and the profligate manners of his followers, which were a reproach to the Chriſtian name, filled men of all profeſſions with horror. Luther, who had teſtified againſt this fanatical ſpirit on its firſt appearance, now deeply lamented its progreſs; and, expoſing the deluſion with great ſtrength of argument, as well as acrimony of ſtyle, called loudly on all the ſtates of Germany to put a ſtop to a phrenzy no leſs pernicious to ſociety than fatal to religion. The emperor, occupied with other cares and projects, had no leiſure to attend to ſuch a diſtant object. But the princes of the empire, aſſembled by the king of the Romans, voted a ſupply of men and money to the biſhop of Munſter, who, being unable to keep a ſufficient army on foot, had converted the ſiege of the town into a blockade. The forces raiſed in conſequence of this reſolution were put under the command of an officer of experience; who, approaching the town towards the end of ſpring in the year 1535, preſſed it more cloſely than formerly; but found the fortifications ſo ſtrong, and ſo diligently guarded, that he durſt not attempt an aſſault. It was now above fifteen months ſince the Anabaptiſts had eſtabliſhed their dominion in Munſter; they had during that time undergone prodigious fatigue in working on the fortifications, and performing military duty. Notwithſtanding the prudent attention of their king to provide for their ſubſiſtence, and his frugal and regular œconomy in their public meals, they began to feel the approach of famine. Several ſmall bodies of their brethren, who were advancing to their aſſiſtance from the Low-Countries, had been intercepted, and cut to pieces; and while all Germany was ready to combine againſt them, they had no proſpect of ſuccour. But ſuch was the aſcendant which Boccold had acquired over the multitude, and ſo powerful the faſcination of enthuſiaſm, that their hopes were as ſanguine as ever; and they hearkened with implicit credulity to the viſions and predictions of their prophets, which aſſured them, that the Almighty would ſpeedily interpoſe, in order to deliver the city. The faith, however, of ſome few, ſhaken by the violence and length of their ſufferings, began to fail; but being ſuſpected of an inclination to ſurrender to the enemy, they were puniſhed with immediate death, as guilty of impiety in diſtruſting the power of God. One of the king's wives, having uttered certain words that implied ſome doubt concerning his divine miſſion, he inſtantly called the whole number together; and commanding the blaſphemer, as he called her, to kneel down, cut off her head with his own hands; and ſo far were the reſt from expreſſing any horror at this cruel deed, that they joined him in dancing with a frantic joy around the bleeding body of their companion.

By this time, the beſieged endured the utmoſt rigour of famine; but they choſe rather to ſuffer hardſhips, the recital of which is ſhocking to humanity, than to liſten to the terms of capitulation offered them by the biſhop. At laſt, a deſerter, whom they had taken into their ſervice, being either leſs intoxicated with the fumes of enthuſiaſm, or unable any longer to bear ſuch diſtreſs, made his eſcape to the enemy. He informed their general of a weak part in the fortifications which he had obſerved; and aſſuring him that the beſieged, exhauſted with hunger and fatigue, kept watch there with little care, he offered to lead a party thither in the night. The propoſal was accepted, and a choſen body of troops appointed for the ſervice; who, ſcaling the walls unperceived, ſeized one of the gates, and admitted the reſt of the army. The Anabaptiſts, tho' ſurpriſed, defended themſelves in the market-place with valour, heightened by deſpair; but, being overpowered by numbers, and ſurrounded on every hand, moſt of them were ſlain, and the remainder taken priſoners. Among the laſt were the king and Cnipperdoling. The king, loaded with chains, was carried from city to city as a ſpectacle to gratify the curioſity of the people, and was expoſed to all their inſults. His ſpirit, however, was not broken or humbled by this ſad reverſe of his condition; and he adhered with unſhaken firmneſs to the diſtinguiſhing tenets of his ſect. After this, he was brought back to Munſter, the ſcene of his royalty and crimes, and put to death with the moſt exquiſite and lingering tortures, all which he bore with aſtoniſhing fortitude. This extraordinary man, who had been able to acquire ſuch amazing dominion over the minds of his followers, and to excite commotions ſo dangerous to ſociety, was only 26 years of age.

Together with its monarch, the kingdom of the Anabaptiſts came to an end. Their principles having taken deep root in the Low-Countries, the party ſtill ſubſiſts there, under the name of *Mennonites*; but by a very ſingular revolution, this ſect, ſo mutinous and ſanguinary at its firſt origin, hath become altogether innocent and pacific. Holding it unlawful to wage war, or to accept of civil offices, they devote themſelves entirely to the duties of private citizens, and by their induſtry and charity endeavour to make reparation to human ſociety for the violence committed by their founders. A ſmall number of this ſect, which is ſettled in England, retain its peculiar tenets concerning baptiſm, but without any dangerous mixture of enthuſiaſm.

Within theſe 12 years, the Anabaptiſts have formed a congregation in Edinburgh, (which is the firſt appearance they ever made in Scotland.) They pray for the king and all inferior magiſtrates; and ſubject themſelves (in civil matters) to every ordinance of man, for the Lord's ſake. They conſider the kingdom of Chriſt to be ſpiritual, and not of this world; and are ſtrictly upon the congregational or independent plan, admitting of no juriſdiction or authority (in matters of religion) but that of the Great Lawgiver. Their church-officers are biſhops (or elders) and deacons, and theſe they generally chuſe from among themſelves. They make the reading of the ſcriptures a part of their public ſervice, and eat the Lord's ſupper every ſabbath-day. Their diſciples, before they are admitted into communion, are firſt baptized in the Water of Leith, which they do at all ſeaſons of the year; and, on theſe occaſions, they are generally attended by a great number of ſpectators.

ANABASCII, in antiquity, were courriers who were ſent on horſeback, or in chariots, with diſpatches of importance.

ANABLEPS, in ichthyology, the trivial name of a ſpecies of cobitis. See Cobitis.

ANABOA, a ſmall iſland ſituated near the coaſt of Loango in Africa, in E. Long. 9°. N. Lat. 1°. Here are ſeveral fertile valleys, which produce plenty of bananas, oranges, pine-apples, lemons, citrons, tamarinds, cocoa nuts, &c. together with vaſt quantities of cotton. In this iſland are two high mountains, which, being continually covered with clouds, occaſion frequent rains.

ANABOLÆUM, or Anabole, in antiquity, a kind of great or upper coat, worn over the tunica.

ANABOLEUS, in antiquity, an appellation given to grooms of the ſtable, or equerries, who aſſiſted their maſters in mounting their horſes. As the ancients had no ſtirrups, or inſtruments that are now in uſe for mounting a horſe, they either jumped upon his back, or were aided in mounting by anabolei.

ANACALYPTERIA, according to Suidas, were preſents made to the bride by her huſband's relations and friends when ſhe firſt uncovered her face and ſhewed herſelf to men. Theſe preſents were alſo called επαυλαια: for, among the Greeks, virgins before marriage were under ſtrict confinement, being rarely permitted to appear in public, or converſe with the other ſex; and when allowed that liberty, wore a veil over their faces, termed Καλυπτρον, or Καλυπτρα, which was not left off in the preſence of men till the third day after marriage; whence, according to Heſychius, this day was alſo called *anacalypterion*.

ANACAMPSEROS, in botany, a ſynonyme of the portulaca, and ſeveral other plants.

ANACAMPTERIA, in eccleſiaſtical antiquity, a kind of little edifices adjacent to the churches, deſigned for the entertainment of ſtrangers and poor perſons.

ANACAMPTIC, a name applied by the ancients to that part of optics which treats of reflection, being the ſame with what is now called Catoptrics.

ANACARDIUM, or cashew-nut tree, a genus of the monogynia order, belonging to the decandria claſs of plants.—Of this only one ſpecies is as yet known to the botaniſts, *viz.* the occidentale. It grows naturally in the Weſt-Indies, and arrives at the height of 20 feet in thoſe places of which it is a native, but cannot be preſerved in Britain without the greateſt difficulty. The fruit of this tree is as large as an orange; and is full of an acid juice, which is frequently made uſe of in making punch. To the apex of this fruit grows a nut, of the ſize and ſhape of a hare's kidney, but much larger at the end which is next the fruit than at the other. The ſhell contains an inflammable oil, which is very cauſtic, ſo that it will raiſe bliſters on the ſkin, and has often been very troubleſome to thoſe who put the nuts into their mouth to break the ſhell. The milky juice of this tree will ſtain linen of a deep black, which cannot be waſhed out; but it is not known whether the tree which produces the Eaſt India nuts called likewiſe *anacardium*, is of the ſame ſpecies with this or not. In 1770, Mr Banks and Dr Solander found ſeveral of theſe nuts lying on the ground in a deep valley in New Holland; upon which they made a moſt diligent ſearch for the tree which bore them, (and which no European botaniſt ever ſaw), without being able to find it.

Culture. This plant is eaſily raiſed from the nuts, which ſhould be planted each in a ſeparate pot filled with light ſandy earth, and plunged into a good hot-bed of tanners bark; they muſt alſo be kept from moiſture till the plants come up, otherwiſe the nuts are apt to rot. If the nuts are freſh, the plants will come up in about a month; and in two months more, they will be four or five inches high, with large leaves: from which quick progreſs many people have been deceived, imagining they would continue the like quick growth afterwards; but with all the care that can be taken, they never exceed the height of two feet and an half, and for the moſt part ſcarce half as much.

Medicinal Uſes. The medical virtues of anacardia have been greatly diſputed: many have attributed to them the faculty of comforting the brain and nerves, fortifying the memory, and quickening the intellect; and hence a confection made from them has been dignified with the title of *confectio ſapientum:* others think it better deſerves the name of *confectio ſtultorum*, and mention inſtances of its continued uſe having rendered people maniacal. But the kernel of anacardium is not different in quality from that of almonds. The ill effects attributed to this fruit belong only to the juice contained betwixt the kernels; whoſe acrimony is ſo great, that it is ſaid to be employed by the Indians as a cauſtic. This juice is recommended externally for tetters, freckles, and other cutaneous deformities; which it removes only by exulcerating or excoriating the part, ſo that a new ſkin comes underneath.

ANACATHARSIS, ſignifies a ſalivation, or diſcharge of noxious humours by ſpitting.

ANACATHARTICS, properly ſignify ſuch medicines as promote the diſcharge of ſaliva.

ANACEPHALÆOSIS, in rhetoric, the ſame with recapitulation. See RECAPITULATION.

ANACHARSIS, a famous Scythian philoſopher, converſed with Solon, and lived an auſtere life. Upon his return from his travels through Greece, he attempted to change the ancient cuſtoms of Scythia, and to eſtabliſh thoſe of Greece; which proved fatal to him. The king ſhot him dead in a wood with an arrow. A great many ſtatues were erected to him after his death. He is ſaid to have invented tinder, the anchor, and the potter's wheel; but the latter is mentioned by Homer, who lived long before him. Anacharſis flouriſhed in the time of Crœſus. Diogenes Laertius made an epigram upon his attempt to introduce the Grecian manners into his country, and his fate on that account.

ANACHORET, in church-hiſtory, denotes a hermit, or ſolitary monk, who retires from the ſociety of mankind into ſome deſart, with a view to avoid the temptations of the world, and to be more at leiſure for meditation and prayer.

Such were Paul, Anthony, and Hilarion, the firſt founders of monaſtic life, in Egypt and Paleſtine.

Anachorets, among the Greeks, conſiſt principally of monks, who retire to caves or cells, with the leave of the abbot, and an allowance from the monaſtery; or who, weary of the fatigues of the monaſtery, purchaſe a ſpot of ground, to which they retreat, never appearing again in the monaſtery, unleſs on ſolemn occaſions.

ANACHRONISM, in matters of literature, an error with reſpect to chronology, whereby an event is placed earlier than it really happened *.

ANACLASTICS, that part of optics which conſiders the refraction of light, and is commonly called *Dioptrics*. See DIOPTRICS.

ANACLASTIC *Glaſſes*, a kind of ſonorous phials, or glaſſes, chiefly made in Germany, which have the property of being flexible; and emitting a vehement noiſe by the human breath.—They are alſo called *vexing glaſſes* by the Germans *(vexier glaſer)*, on account of the fright and diſturbance they occaſion by their reſilition.—The anaclaſtic glaſſes are a low kind of phials with flat bellies, reſembling inverted funnels, whoſe bottoms are very thin, ſcarce ſurpaſſing the thickneſs of an onion peel: this bottom is not quite flat, but a little convex. But upon applying the mouth to the orifice, and gently inſpiring, or as it were ſucking out the air, the bottom gives way with a prodigious crack, and of convex becomes concave. On the contrary, upon exſpiring or breathing gently into the orifice of the ſame glaſs, the bottom with no leſs noiſe bounds back to its former place, and becomes gibbous as before.—The anaclaſtic glaſſes firſt taken notice of were in the caſtle of Goldbach; where one of the academiſts *Naturæ Curioſorum*, having ſeen and made experiments on them, publiſhed a piece expreſs on their hiſtory and phenomena. They are all made of a fine white glaſs. It is to be obſerved in theſe, 1. That if the bottom be concave at the time of inſpiration, it will burſt; and the like will happen if it be convex at the time of exſpiration. 2. A ſtrong breath will have the ſame effect even under the contrary circumſtances.

ANACLETERIA, in antiquity, a ſolemn feſtival celebrated by the ancients when their kings or princes came of age, and aſſumed the reins of government. It is ſo called, becauſe proclamation being made of this event to the people, they went to ſalute their prince during the anacleteria, and to congratulate him upon his new dignity.

ANACLINOPALE, Ανακλινοπαλη, in antiquity, a kind of wreſtling, wherein the champions threw themſelves voluntarily on the ground, and continued the combat by pinching, biting, ſcratching, and other methods of offence. The *Anaclinopale* was contradiſtinguiſhed from the *Orthopale*, wherein the champions ſtood erect. In the *Anaclinopale*, the weaker combatants ſometimes gained the victory.

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* See *Chronology.*

ANACLINTERIA, in antiquity, a kind of pillows on the dining-bed, whereon the gueſts uſed to lean. The ancient tricliniary beds had four ενηλατα, one at the head, another at the feet, a third at the back, and a fourth at the breaſt. That on which the head lay, was properly called by the Greeks ανακλιντηριον, or ανακλιντρον; by the Romans *fulcrum*, ſometimes *pluteus*.

ANACOLLEMA, a compoſition of aſtringent powders, applied by the ancients to the head, to prevent defluxions on the eyes.

ANACREON, a Greek poet, born at Teos, a city of Ionia, flouriſhed about 532 years before the Chriſtian æra. Polycrates, tyrant of Samos, invited him to his court, and made him ſhare with him in his buſineſs and his pleaſures. He had a delicate wit, as may be judged from the inexpreſſible beauties and graces that ſhine in his works: but he was fond of pleaſure, was of an amorous diſpoſition, and addicted to drunkenneſs: yet, notwithſtanding his debaucheries, he lived to the age of 85; when, we are told, he was choaked by a grape-ſtone which ſtuck in his throat as he was regaling on ſome new wine.

There is but a ſmall part of Anacreon's works that remain; for, beſides his odes and epigrams, he compoſed elegies, hymns, and iambics. His poems which are extant were reſcued from oblivion by Henry Stephens, and are univerſally admired. The verſes of Anacreon are ſweeter, ſays Scaliger, than Indian ſugar. His beauty and chief excellence, ſays Madam Dacier, lay in imitating nature, and in following reaſon, ſo that he preſented to the mind no images but what were noble and natural. The odes of Anacreon, ſays Rapin, are flowers, beauties, and perpetual graces; it is familiar to him to write what is natural and to the life, he having an air ſo delicate, ſo eaſy, and graceful, that among all the ancients there is nothing comparable to the method he took, nor to that kind of writing he followed. He flows ſoft and eaſy, every where diffuſing the joy and indolence of his mind thro' his verſe, and tuning his harp to the ſmooth and pleaſant temper of his ſoul. But none has given a juſter character of his writings than the God of Love, as taught to ſpeak by Mr Cowley:

All thy verſe is ſofter far
Than the downy feathers are,
Of my wings, or of my arrows,
Of my mother's doves and ſparrows:
Graceful, cleanly, ſmooth, or round,
All with Venus' girdle bound.

ANACREONTIC VERSE, in ancient poetry, a kind of verſe, ſo called from its being much uſed by the poet Anacreon. It conſiſts of three feet and an half, uſually ſpondees and iambuſes, and ſometimes anapeſts: Such is that of Horace, *Lydia, dic per omnes.*

ANACRISIS, among the ancient Greeks, is uſed for a kind of trial, or examination, which the archons, or chief magiſtrates of Athens, were to undergo before their admiſſion into that office. The *anacriſis* ſtands diſtinguiſhed from the *docimaſia*, which was a ſecond examination, in the forum. The Anacriſis was performed in the ſenate-houſe. The queſtion here propoſed to them were concerning their family, kindred, behaviour, eſtate, &c. Some will have it that all magiſtrates underwent the anacriſis.

ANACRISIS, among civilians, an inveſtigation of truth, interrogation of witneſſes, and inquiry made into any fact, eſpecially by torture.

ANACYCLUS, in botany, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. It has neither beauty nor uſe, and therefore merits no deſcription.

ANADAVADÆA, in ornithology, a barbarous name of a ſpecies of alauda. See ALAUDA.

ANADEMA, among the ancients, denotes an ornament of the head, wherewith victors at the ſacred games had their temples bound.

ANADIPLOSIS, in rhetoric and poetry, a repetition of the laſt word of a line, or clauſe of a ſentence, in the beginning of the next: Thus,

Pierides, vos hæc facietis maxima Gallo:
Gallo, cujus amor, &c.
Et matutinis accredula vocibus inſtat,
Vocibus inſtat, & aſſiduas jacit ore querelas.

ANADOSIS, among phyſicians, the diſtribution of the aliment over the body.

ANADROMOUS, among ichthyologiſts, a name given to ſuch fiſhes as go from the ſea to the freſh waters at ſtated ſeaſons, and return back again; ſuch as the ſalmon, &c. See SALMO.

ANÆDEIA, in antiquity, a denomination given to a ſilver ſtool placed in the Areopagus, on which the defendent, or perſon accuſed, was ſeated for examination. The word is Greek, Αναιδεια, which imports impudence; but, according to Junius's correction, it ſhould rather be Αναιτια, q. d. *innocence*. The plaintiff, or accuſer, was placed on an oppoſite ſtool called *hybris*, or injury; here he propoſed three queſtions to the party accuſed, to which poſitive anſwers were to be given. The firſt, Are you guilty of this fact? The ſecond, How did you commit the fact? The third, Who were your accomplices?

ANÆSTHESIA, ſignifies a privation of the ſenſes.

ANAGALLIS, PIMPERNEL; a genus of the monogynia order, belonging to the pentandria claſs of plants. Of this there are four

Species. 1. The arvenſis, or common pimpernel, with a red flower. 2. The fæmina, with a blue flower. 3. The monelli, or narrow-leaved pimpernel. 4. The latifolia, or Spaniſh pimpernel.—The firſt ſort is very common in corn-fields, and other cultivated places in Britain. The ſecond is ſometimes found wild in the fields, but is not ſo common as the firſt. The third is a beautiful ſmall perennial plant, and produces numbers of fine blue flowers. The fourth is a native of Spain, and likewiſe produces blue flowers. All the ſpecies are eat by cows and goats, but refuſed by ſheep; ſmall birds are greatly delighted with the ſeeds.

Theſe plants are very eaſily propagated by ſeeds; and if ſuffered to remain till their ſeeds ſcatter, they become troubleſome weeds.—Great medicinal virtues were formerly expected from the firſt two ſpecies; but they are now juſtly diſregarded, though they ſtill retain a place in the materia medica.

ANAGNIA, a town of Latium, capital of the Hernici, (Livy, Pliny, Virgil); which, after a faint reſiſtance, ſubmitting to the Romans, was admitted to the freedom of the city, yet without the right of ſuffrage, (Livy.) It was afterwards a colony of Druſus Cæſar, and walled round, and its territory aſſigned to the veterans, (Frontinus.) Here Antony married Cleopatra, and divorced Octavia. Now *Anagni*, 36 miles to the eaſt of Rome. Long. 13. 45. Lat. 42. 48.

ANAGNOSTA, or Anagnostes, in antiquity, a kind of literary ſervant, retained in the families of perſons of diſtinction, whoſe chief buſineſs was to read to them during meals, or at any other time when they were at leiſure. Cornelius Nepos relates of Atticus, that he had always an agnoſtes at his meals. He never ſupped without reading; ſo that the minds of his gueſts were no leſs agreeably entertained than their appetites. The ſame cuſtom, Eginhard obſerves, was kept up by Charlemagne, who at table had the hiſtories and acts of ancient kings read to him. This cuſtom ſeems to have been a relic of that of the ancient Greeks, who had the praiſes of great men and heroes ſung to them while at table. The ancient monks and clergy kept up the like uſage, as we are informed by St Auguſtin.

ANAGOGICAL, ſignifies myſterious, tranſporting; and is uſed to expreſs whatever elevates the mind, not only to the knowledge of divine things, but of divine things in the next life. This word is ſeldom uſed, but with regard to the different ſenſes of Scripture. The analogical ſenſe is, when the ſacred text is explained with a regard to eternal life, the point which Chriſtians ſhould have in view: for example, the reſt of the ſabbath, in the anagogical ſenſe, ſignifies the repoſe of everlaſting happineſs.

ANAGOGY, or Anagoge, among eccleſiaſtical writers, the elevation of the mind to things celeſtial and eternal.—It is particularly uſed, where words, in their natural or primary meaning, denote ſomething ſenſible, but have a further view to ſomething ſpiritual or inviſible.

Anagogy, in a more particular ſenſe, denotes the application of the types and allegories of the Old Teſtament to ſubjects of the New; thus called, becauſe the veil being here drawn, what before was hidden, is expoſed to open ſight.

ANAGRAM, (from the Greek ανα *backwards*, and γραμμα *letter*), in matters of literature, a tranſpoſition of the letters of ſome name, whereby a new word is formed, either to the advantage or diſadvantage of the perſon or thing to which the name belongs. Thus, the anagram of Galenus is *angelus;* that of Logica, *caligo;* that of Alſtedius, *ſedulitas;* that of Loraine is *alerion*, on which account it was that the family of Loraine took *alerions* for their armoury.—Calvin, in the title of his *Inſtitutions*, printed at Straſburg in 1539, calls himſelf *Alcuinus*, which is the anagram of Calvinus, and the name of an eminently learned perſon in the time of Charlemagne, who contributed greatly to the reſtoration of learning in that age.

Thoſe who adhere ſtrictly to the definition of an anagram, take no other liberty than that of omitting or retaining the letter h, at pleaſure; whereas others make no ſcruple to uſe e for æ, v for w, s for z, and c for k; and *vice verſa*.

Beſides anagrams formed as above, we meet with another kind in ancient writers, made by dividing a ſingle word into ſeveral; thus, *ſus tinea mus*, are formed out of the word *ſuſtineamus*.

Anagrams are ſometimes alſo made out of ſeveral words: ſuch is that on the queſtion put by Pilate to our Saviour, *Quid eſt veritas?* whereof we have this admirable anagram, *viz. eſt vir qui adeſt*.

The Cabbaliſts among the Jews are profeſſed anagrammatiſts; the third part of their art, which they call *themuru, i. e.* changing, being nothing but the art of making anagrams, or of finding hidden and myſtical meanings in names; which they do by changing, tranſpoſing, and differently combining, the letters of thoſe names.—Thus, of נח the letters of Noah's name, they make חן *grace;* of משיח *the Meſſiah*, they make ישמח *he ſhall rejoice.*

ANAGRAMMATIST, a maker or compoſer of anagrams. Thomas Billon, a provincial, was a celebrated anagrammatiſt, and retained by Lewis XIII. with a penſion of 1200 livres, in quality of anagrammatiſt to the king.

ANAGROS, in commerce, a meaſure for grain uſed in ſome cities of Spain, particularly at Seville; 46 anagros make about 10¼ quarters of London.

ANAGYRIS, stinking bean-trefoil; a genus of the monogynia order, belonging to the decandria claſs of plants.

Of this genus there is but one ſpecies, which grows naturally in the ſouthern parts of Europe. It is a ſhrub which uſually riſes to the height of eight or ten feet, and produces its flowers in April or May. Theſe are of a bright yellow colour, growing in ſpikes, ſomewhat like the laburnum.

Culture. This plant may be propagated either by ſeeds, or by laying down the tender branches in the ſpring; but the firſt method is preferable. The ſeeds ſhould be ſown toward the end of March in pots filled with light earth, and plunged in a gentle hot-bed. The plants uſually appear in a month, when they ſhould be gradually inured to the open air, that they may be hardened before winter. In the autumn and winter, they muſt be ſheltered under a hot-bed frame: the ſpring following, they muſt be tranſplanted, each into a ſeparate ſmall pot, placed in a ſheltered ſituation, and again removed into a frame to ſhelter them during the following winter. The ſecond ſpring after the plants come up, ſome of them may be taken out of the pots, and planted in a border near a ſouth-wall, where, if they are protected in winter, they may remain.

Anagyris, or anagyrus, the name of a place in Attica, of the tribe Erechtheis, where a fetid plant, called *Anagyris*, probably the ſame with the foregoing, grew in great plenty, (Dioſcorides, Pliny, Stephanus;) and the more it was handled, the ſtronger it ſmelled: hence *commovere anagyrin* (or *anagyrum)*, is to bring a misfortune on one's ſelf, (Ariſtophanes.)

ANALECTA, or Analectes, in antiquity, a ſervant whoſe employment it was to gather up the off-falls of tables.

Analecta, *Analects*, in a literary ſenſe, is uſed to denote a collection of ſmall pieces; as eſſays, remarks, &c.

ANALEMMA, in geometry, a projection of the ſphere on the plane of the meridian, orthographically made by ſtraight lines and ellipſes, the eye being ſuppoſed at an infinite diſtance, and in the eaſt or weſt points of the horizon.

Analemma, denotes likewiſe an inſtrument of braſs or wood, upon which this kind of projection is drawn, with an horizon and curſor fitted to it, wherein the ſolſtitial colure, and all circles parallel to it, will be concentric circles; all circles oblique to the eye, will be ellipſes; and all circles whoſe planes paſs through the eye, will be right lines. The uſe of this inſtrument is to ſhew the common aſtronomical problems; which it will do, though not very exactly, unleſs it be very large.

ANALEPSIS, the augmentation or nutrition of an emaciated body.

ANALEPTICS, reſtorative or nouriſhing medicines.

ANALOGY, in matters of literature, a certain relation and agreement between two or more things, which in other reſpects are entirely different.

There is likewiſe an analogy between beings that have ſome conformity or reſemblance to one another; for example, between animals and plants; but the analogy is ſtill ſtronger between two different ſpecies of certain animals.

Analogy enters much into all our reaſoning, and ſerves to explain and illuſtrate. A great part of our philoſophy has no other foundation than analogy, the utility of which conſiſts in ſuperſeding all neceſſity of examining minutely every particular body; for it ſuffices us to know that every thing is governed by general and immutable laws, in order to regulate our conduct with regard to all ſimilar bodies, as we may reaſonably believe that they are all endowed with the ſame properties: Thus, we never doubt that the fruit of the ſame tree has the ſame taſte.

Analogy, among grammarians, is the correſpondence which a word or phraſe bears to the genius and received forms of any language.

ANALYSIS, in a general ſenſe, implies the reſolution of ſomething compounded into its original and conſtituent parts. The word is Greek, and derived from αναλυω, to reſolve.

Analysis, in mathematics, is properly the method of reſolving problems by means of algebraical equations; whence we often find that theſe two words, *analyſis* and *algebra*, are uſed as ſynonymous.

Analyſis, under its preſent improvements, muſt be allowed the apex or height of all human learning: it is this method which furniſhes us with the moſt perfect examples of the art of reaſoning; gives the mind an uncommon readineſs at deducing and diſcovering, from a few data, things unknown; and, by uſing ſigns for ideas, preſents things to the imagination, which otherwiſe ſeemed out of its ſphere: by this, geometrical demonſtrations may be greatly abridged, and a long ſeries of argumentations, wherein the mind cannot without the utmoſt effort and attention diſcover the connection of ideas, are hereby converted into ſenſible ſigns, and the ſeveral operations required therein effected by the combination of thoſe ſigns. But, what is more extraordinary, by means of this art, a number of truths are frequently expreſſed by a ſingle line, which in the common way of explaining and demonſtrating things would fill whole volumes. Thus, by mere contemplation of one ſingle line, whole ſciences may be ſometimes learnt in a few minutes time, which otherwiſe could ſcarce be attained in many years.

Analysis is divided, with regard to its object, into that of *finites*, and *infinites*.

Analysis *of Finite Quantities*, is what we otherwiſe call ſpecious arithmetic or algebra. See Algebra.

Analysis *of Infinites*, called alſo the *New Analyſis*, is particularly uſed for the method of fluxions, or the differential calculus. See Fluxions.

Analysis, in logic, ſignifies the method of tracing things backwards to their ſource, and of reſolving knowledge into its original principles. This is alſo called the method of *reſolution*; and ſtands oppoſed to the ſynthetic method, or that of *compoſition*.—The art of logical analyſis conſiſts principally in combining our perceptions, claſſing them together with addreſs, and contriving proper expreſſions for conveying our thoughts, and repreſenting their ſeveral diviſions, claſſes, and relations.

Analysis, in chemiſtry, the reducing of an heterogeneous or mixed body, into its original principles or component parts. See Chemistry.

Analysis is alſo uſed for a brief but methodical illuſtration of the principles of a ſcience; in which ſenſe, it is nearly ſynonymous with what we otherwiſe call a *ſynopſis*.

ANALYTIC, or **Analytical**, ſomething that belongs to, or partakes of, the nature of analyſis.—Thus we ſay, an analytical demonſtration, analytical proceſs, analytical table or ſcheme, analytical method of inveſtigation, &c.

The analytic method ſtands oppoſed to the ſynthetic. In natural philoſophy, as in mathematics, the inveſtigation of difficult things by the analytic method ought to precede the method of compoſition. This analyſis conſiſts in making experiments and obſervations, and in drawing general concluſions therefrom by induction; and admitting of no objections againſt the concluſions, but ſuch as are drawn from experiments, and other certain truths; and though the reaſoning from experiments and obſervations by induction be no demonſtration of general concluſions, yet it is the beſt method of reaſoning which the nature of things admits of; and may be eſteemed ſo much the ſtronger, as the induction is more general; and, if no exception occur from phenomena, the concluſion may be pronounced general. By this way of analyſis, we may proceed from compounds to their ingredients; from motions to the forces producing them; and in general from effects to their cauſes, and from particular cauſes to more general ones, until we arrive at thoſe which are the moſt general. This is the analytic method, according to the illuſtrious Newton.

The ſynthetic method conſiſts in aſſuming the cauſes diſcovered and received as principles; and by them explaining the phenomena proceeding from them, and proving the explanations. See Synthesis.

ANALYTICS, *Analytica*, the ſcience and uſe of analyſis. The great advantage of the modern mathematics above the ancient is in point of analytics.

Pappus, in the preface to his ſeventh book of Mathematical Collections, enumerates the authors on the ancient analytics; being Euclid, in his *Data* and *Poriſmata*; Apollonius, *de Sectione Rationis*, and in his *Conics*; Ariſtæus, *de Locis Solidis*; and Eratoſthenes, *de Mediis Proportionalibus*. But the ancient analytics were very different from the modern.

To the modern analytics principally belong algebra;

an hiſtorical account of which, with the ſeveral authors thereon, ſee under the article Algebra.

ANAMABOA, a populous town in the kingdom of Fantin, in Guinea. The natives are generally great cheats, and muſt be carefully looked after in dealing with them, and their gold well examined, for it is commonly adulterated. It lies under the cannon of the Engliſh caſtle. The landing is pretty difficult, on account of the rocks; and therefore thoſe that come here to trade are forced to go aſhore in canoes. The earth here is very proper to make bricks; the oyſters, when burnt, afford good lime; and there is timber in great abundance; ſo that here are all the materials for building. The country at Anamaboa is full of hills, beginning at a good diſtance from the town, and affording a very pleaſant proſpect. Indian corn and palm-wine are in great plenty. They have a green fruit called *papas*, as big as a ſmall melon, and which has a taſte like cauliflower. Anamaboa is much frequented by the Engliſh ſhips and others for corn and ſlaves, which laſt are ſometimes to be had in great numbers. The Engliſh fort is built on the foundation of a large old houſe, which ſubſiſted entire in 1679. It is a large edifice, flanked by two towers, and fortified towards the ſea with two baſtions: the whole of brick and ſtone cemented with lime. It ſtands upon a rock at the diſtance of 30 paces from the ſea. It is mounted with 12 pieces of canon and 12 patereroes; and defended by a garriſon of 12 whites and 18 blacks, under the command of the chief factor.

The natives treat the garriſon of this fort with great inſolence, inſomuch as often to block them up, and frequently, if they diſlike the governor, ſend him off in a canoe to Cape Coaſt with marks of the utmoſt contempt. Far from being able to oppoſe them, the Engliſh are glad to obtain their favour with preſents. In 1701, they declared war againſt the Engliſh; and having aſſembled in a tumultuous manner before the fort, they ſet fire to the exterior buildings, and went on with their outrages, till they were diſperſed by a diſcharge of the cannon from the batteries. The night following the Engliſh took their revenge, by ſetting fire to the town of Anamaboa; and thus hoſtilities continued for 20 days, till at laſt the natives were obliged to ſue for peace. This fort was abandoned in 1733; but has been reſumed by the Engliſh, who have continued in it ever ſince.

ANAMELECH, an idol of the Sepharvaites, who are ſaid in Scripture to have burned their children in honour of Adrammelech and Anamelech.—Theſe idols probably ſignified the ſun and moon. Some of the rabbins repreſent Anamelech under the figure of a mule; others under that of a quail or pheaſant.

ANAMORPHOSIS, in perſpective and painting, a monſtrous projection, or repreſentation of an image, on a plane or curve ſurface, which, beheld at a proper diſtance, ſhall appear regular and in proportion.

ANANAS, in botany, the trivial name of a ſpecies of bromelia. See Bromelia.

ANANCITIS, in antiquity, a kind of figured ſtone, otherwiſe called *ſynochitis*, celebrated for its magical virtue of raiſing the ſhadows of the infernal gods.

ANANIAS, a Sadducee, high-prieſt of the Jews, who put to death St James the brother of our Lord, and was depoſed by Agrippa.

ANANISABTA, or Ananisapta, a magical word frequently found inſcribed on coins and other amulets, ſuppoſed to have a virtue of preſerving the wearer from the plague.

ANAPEST, in ancient poetry, a foot conſiſting of two ſhort ſyllables, and one long: Such is the word ſcŏpŭlōs. It is juſt the reverſe of the dactyl.

ANAPESTIC verses, thoſe conſiſting wholly or chiefly of anapeſts.

ANAPHE, (anc. geogr.) an iſland ſpontaneouſly emerging out of the Cretan ſea, near Thera, (Pliny, Strabo.) Now called *Nanſio*. Its name is from the ſudden appearance of the new moon to the Argonauts in a ſtorm, (Apollonius.) *Anaphæus*, an epithet of Apollo, who was worſhipped there. *Anaphæi*, the people.

ANAPHORA, in rhetoric, the repetition of the ſame word or words in the beginning of a ſentence or verſe: Thus Virgil,

> *Pan etiam Arcadia mecum ſe judice certet,*
> *Pan etiam Arcadia dicat ſe judice victum.*

Anaphora, among phyſicians, the throwing off purulent matter by the mouth.

ANAPHRODISIA, ſignifies impotence, or want of power to procreate.

ANAPIS, a river of Sicily. See Sicily.

ANAPLASIS, ſignifies the replacing or ſetting a fractured bone.

ANAPLEROTICS, medicines that promote the growth or granulation of the fleſh, in wounds, ulcers, &c.

ANARCHI, Αναρχοι, in antiquity, a name given by the Athenians to four ſupernumerary days in their year, during which they had no magiſtrates. The Attic year was divided into ten parts, according to the number of tribes, to whom the precedency of the ſenate fell by turns. Each diviſion conſiſted of 35 days; what remained after the expiration of theſe, to make the lunar year complete, which according to their computation conſiſted of 354 days, were employed in the creation of magiſtrates, and called ανσρχοι ημεραι, and αρχαιρεσνοι.

ANARCHY, the want of government in a nation, where no ſupreme authority is lodged, either in the prince or other rulers; but the people live at large, and all things are in confuſion. The word is derived from the Greek privative α, and αρχη, *command, principality*. Anarchy is ſuppoſed to have reigned after the deluge, before the foundation of monarchies. We ſtill find it obtain in ſeveral parts, particularly of Africa and America.

Anarchy is alſo applied to certain troubleſome and diſorderly periods, even in governments otherwiſe regular. In England, the period between the death of Cromwell and King Charles's reſtoration is commonly repreſented as an *anarchy*. Every month produced a new ſcheme or form of government. Enthuſiaſts talked of nothing but annulling all the laws, aboliſhing all writings, records, and regiſters, and bringing all men to the primitive level. No modern nation is more ſubject to *anarchies* than Poland; where every interval between the death of one king and the election of another is a perfect picture of confuſion, inſomuch that it is a proverb among that people, *Poland is governed by confuſion*. The Jewiſh hiſtory preſents numerous inſtances of *anarchies*,

anarchies in that ſtate, uſually denoted by this phraſe, that *in thoſe days there was no king in Iſrael, but every man did that which was right in his own eyes;* which is a juſt picture of an *anarchy*.

ANARRHICAS, in ichthyology, a genus of fiſhes of the order of apodes. There is but one ſpecies of this genus, *viz.* the anarrhicas lupus, or ſea-wolf; which ſeems to be confined to the northern parts of the globe. We find it in the ſeas of Greenland; in thoſe of Iceland and Norway; on the coaſts of Scotland, and of Yorkſhire; and laſtly, in that part of the German ocean which waſhes the ſhores of Holland, the moſt ſouthern of its haunts that we can with any certainty mention.

It is a moſt ravenous and fierce fiſh, and, when taken, faſtens on any thing within its reach: the fiſhermen dreading its bite, endeavour as ſoon as poſſible to beat out its fore-teeth, and then kill it by ſtriking it behind the head. Schonevelde relates, that its bite is ſo hard, that it will ſeize on an anchor, and leave the marks of its teeth in it; and the Daniſh and German names of *ſteenbider* and *ſteinbeiſſer*, expreſs the ſenſe of its great ſtrength, as if it was capable of cruſhing even ſtones with its jaws.

It feeds almoſt entirely on cruſtaceous animals and ſhell-fiſh, ſuch as crabs, lobſters, prawns, muſcles, ſcollops, large whelks, &c. theſe it grinds to pieces with its teeth, and ſwallows with the leſſer ſhells. It does not appear they are diſſolved in the ſtomach, but are voided with the fæces, for which purpoſe the aperture of the anus is wider than in other fiſh of the ſame ſize.

It is full of roe in February, March, and April, and ſpawns in May and June.

This fiſh has ſo diſagreeable and horrid an appearance, that nobody at Scarborough except the fiſhermen will eat it, and they prefer it to holibut. They always before dreſſing take off the head and ſkin.

The ſea-wolf grows to a large ſize: thoſe on the Yorkſhire coaſt are ſometimes found of the length of four feet; acccording to Dr Gronovius, they have been taken near Shetland ſeven feet long, and even more.

The head is a little flatted on the top; the noſe blunt; the noſtrils are very ſmall; the eyes ſmall, and placed near the end of the noſe.

The teeth are very remarkable, and finely adapted to its way of life. The fore-teeth are ſtrong, conical, diverging a little from each other, ſtand far out of the jaws, and are commonly ſix above and the ſame below, tho' ſometimes there are only five in each jaw: theſe are ſupported within-ſide by a row of leſſer teeth, which makes the number in the upper jaw 17 or 18, in the lower 11 or 12. The ſides of the under jaw are convex inwards, which greatly adds to their ſtrength, and at the ſame time allows room for the large muſcles with which the head of this fiſh is furniſhed. The *dentes molares*, or grinding teeth of the under jaw, are higher on the outer than the inner edges, which inclines their ſurfaces inward: they join to the canine teeth in that jaw, but in the upper are ſeparate from them. In the centre are two rows of flat ſtrong teeth, fixed on an oblong baſis upon the bones of the palate and noſe.

The teeth of the anarrhicas are often found foſſil; and in that ſtate called *buſonites*, or *toad-ſtones:* theſe were formerly much eſteemed for their imaginary virtues, and were ſet in gold, and worn as rings.

The two bones that form the under jaw are united before by a looſe cartilage; which mechaniſm admitting of a motion from ſide to ſide, moſt evidently contributes to the deſign of the whole, *viz.* a facility of breaking, grinding, and comminuting, its teſtaceous and cruſtaceous food. At the entrance of the gullet, above and below, are two echinated bones: theſe are very ſmall, being the leſs neceſſary, as the food is in a great meaſure comminuted in the mouth by aid of the grinders.

The body is long, and a little compreſſed ſidewiſe; the ſkin ſmooth and ſlippery: it wants the lateral line. The pectoral fins conſiſt of 18 rays. The dorſal fin extends from the hind-part of the head almoſt to the tail; the rays in the freſh fiſh are not viſible. The anal fin extends as far as the dorſal fin. The tail is round at its end, and conſiſts of 13 rays. The ſides, back, and fins, are of a livid lead colour; the two firſt marked downwards with irregular obſcure duſky lines: theſe in different fiſh have different appearances. The young are of a greeniſh caſt, reſembling the ſea-wrack, amongſt which they reſide for ſome time after their birth.

ANARROPIA, among phyſicians, a tendency of the humours to the head or ſuperior parts.

ANAS, in ornithology, a genus of birds belonging to the order of anſeres. The beak of this genus is a little obtuſe, covered with an epidermis or ſkin, gibbous at the baſe, and broad at the apex; the tongue is obtuſe and fleſhy; the feet are webbed and fitted for ſwimming. The ſpecies are,

1. The cygnus, *ferus* & *manſuetus*.

α, The ferus, with a ſemicylindrical black bill, yellow wax, and a white body, is the wild ſwan of Engliſh authors, and a native of Europe and North America. Linnæus ſays, they frequently viſit Sweden after a thaw, and are caught with apples in which a hook is concealed. The wild ſwan frequents our coaſts in hard winters in large flocks, but as far as we can inform ourſelves does not breed in Great Britain. Martin * acquaints us, that ſwans come in October in great numbers to Lingey, one of the Weſtern Iſles; and continue there till March, when they retire northward to breed. A few continue in Mainland, one of the Orkneys, and breed in the little iſles of the freſh-water lochs; but the multitude retires at the approach of ſpring. On that account, ſwans are there the country-man's almanack: on their quitting the iſle, they preſage good weather; on their arrival, they announce bad. Theſe, as well as moſt other water-fowl, prefer, for the purpoſe of incubation, thoſe places that are leaſt frequented by mankind: accordingly we find that the lakes and foreſts of the diſtant Lapland are filled during ſummer with myriads of water-fowl; and there ſwans, geeſe, the duck-tribe, gooſanders, divers, &c. paſs that ſeaſon; but in autumn return to us, and to other more hoſpitable ſhores. This ſpecies is leſs than the tame ſwan: length, five feet to the end of the feet; to that of the tail, four feet ten inches: extent of wing, ſeven feet three inches: weight, from thirteen to ſixteen pounds. The cry of this kind is very loud, and may be heard at a great diſtance, from which it is ſometimes called the *Hooper*.

β, The manſuetus, or tame-ſwan. This is the largeſt of the Britiſh birds. It is diſtinguiſhed externally from the wild ſwan; firſt, by its ſize, being much larger; ſecondly, by its bill, which in this is red, and the tip and

Plate X fig. 1.

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* Deſcri Weſt. Iſ 71.

and ſides black, and the ſkin between the eyes and bill is of the ſame colour. Over the baſe of the upper mandible, projects a black callous knob: the whole plumage, in old birds, is white; in young ones, aſh-coloured till the ſecond year: the legs are duſky; but Dr Plott mentions a variety found on the Trent near Rugely, with red legs. The ſwan lays ſeven or eight eggs, and is near two months in hatching: it feeds on water-plants, inſects, and ſhells. No bird, perhaps, makes ſo inelegant a figure out of the water, or has the command of ſuch beautiful attitudes in that element, as the ſwan: almoſt every poet has taken notice of it; but none with that juſtneſs of deſcription, and in ſo picturesque a manner, as our Milton:

> The ſwan, with arched neck
> Between her white wings mantling, proudly rows
> Her ſtate with oary feet. *Par. Loſt.* B. vii.

In former times, it was ſerved up at every great feaſt, when the elegance of the table was meaſured by the ſize and quantity of the good cheer. Cygnets are to this day fattened at Norwich, about Chriſtmas; and are ſold for a guinea a-piece.

Swans were formerly held in ſuch great eſteem in England, that by an act of Edward IV. c. 6. "no one that poſſeſſed a freehold of leſs clear yearly value than five marks, was permitted to keep any, *other than the ſon of our ſovereign lord the* king." And by the eleventh of Henry VII. c. 17. the puniſhment for taking their eggs was impriſonment for a year and a day, and a fine at the king's will. Though at preſent they are not ſo highly valued as a delicacy, yet great numbers are preſerved for their beauty; we ſee multitudes on the Thames and Trent, but no where greater numbers than on the ſalt-water inlet of the ſea near Abbotſbury in Dorſetſhire.

Theſe birds were by the ancients conſecrated to Apollo and the Muſes;

> —— ενθα κυκνος μελωδος
> Μουσας θεραπευει. *Eurip. Iphig. in Taur.* 1104.

And Callimachus, in his hymn upon the iſland of Delos, is ſtill more particular:

> —— When from Pactolus' golden banks
> *Apollo*'s tuneful ſongſters, ſnowy ſwans,
> Steering their flight, ſeven times their circling courſe
> Wheel round the iſland, caroling mean time
> Soft melody, the favourites of the Nine,
> Thus uſhering to birth with dulcet ſounds
> The God of harmony: and hence ſev'n ſtrings
> Hereafter to his golden lyre he gave;
> For ere the eighth ſoft concert was begun,
> He ſprung to birth. *Dodd's Callimachus, p.* 115.

Upon this idea of their being peculiarly conſecrated to Apollo and the Muſes (the deities of harmony,) ſeems to have been ingrafted the notion the ancients had of ſwans being endowed with a muſical voice. Though this might be one reaſon for the fable; yet there appears another ſtronger, which aroſe from the Pythagorean doctrine of the tranſmigration of the ſoul into the bodies of animals; from the belief, that the body of the ſwan was allotted for the manſion of departed poets. Thus Plato makes his prophet ſay, ιδειν μεν γαρ ψυχην εφη την ποτε Ορφεως γενομενην κυκνȣ βιον αιρȣμενην; "I ſaw the ſoul of Orpheus prefer the life of a ſwan."

After the ancients had thus furniſhed theſe birds with ſuch agreeable inmates, it is not to be doubted but they would attribute to them the ſame powers of harmony that poets poſſeſſed previous to their tranſmigration: but the vulgar, not diſtinguiſhing between the ſweetneſs of numbers and that of voice, ignorantly believed that to be real, which philoſophers and poets only meant metaphorically.

In time, a ſwan became a common trope for a *bard*. Horace calls Pindar, *Dircæum Cygnum;* and in one ode, even ſuppoſes himſelf changed into a ſwan. Virgil ſpeaks of his poetical brethren in the ſame manner,

> *Vare*, tuum nomen
> Cantantes ſublime ferent ad ſydera cygni. *Eclog.* ix.

When he ſpeaks of them figuratively, he aſcribes to them melody, or the power of muſic; but when he talks of them as birds, he lays aſide fiction, and, like a true naturaliſt, gives them their real note:

> Dant ſonitum *rauci* per ſtagna loquacia cygni.
> *Æneid.* Lib. X. 50.

Thus he, as well as Pliny, in fact, gave no credit to the muſic of ſwans. Ariſtotle ſpeaks of it only by hearſay. But, when once an error is ſtarted, it is not ſurpriſing that it is adopted; eſpecially by poets, genuiſes of all others of the moſt unbounded imaginations. For this reaſon, poets were ſaid to animate ſwans, from the notion that they flew higher than any other birds; and Heſiod diſtinguiſhes them by the epithet of κυκνοι αερσιποται, "the lofty flying ſwans."

Beſides theſe opinions, the ancients held another ſtill more ſingular, imagining that the ſwan foretold its own end. To explain this, we muſt conſider the twofold character of the poet, *vates* and *poeta*, which the fable of the tranſmigration continues to the bird; or they might be ſuppoſed to derive that faculty from Apollo their patron deity, the god of prophecy and divination.

As to their being ſuppoſed to ſing more ſweetly at the approach of death, the cauſe is beautifully explained by Plato, who attributes that unuſual melody to the ſame ſort of ecſtacy that good men are ſometimes ſaid to enjoy at that awful hour, foreſeeing the joys that are preparing for them on putting off mortality: Μαντικοι τε εισι, και προειδοτες τα εν Αδȣ αγαθα, αδȣσι τε, και τερπονται εκεινην την ημεραν διαφεροντως η, εν τω προσθεν χρονω: "They become prophetic; and, foreſeeing the happineſs which they ſhall enjoy in another ſtate, are in greater ecſtacy than they have before experienced."

2. The cygnoides, with a ſemicylindrical bill, gibbous wax, and tumid eye-brows: It is the ſwan-gooſe of Ray, from Guinea. There is likewiſe a variety of this ſpecies, of a leſs ſize, called the *gooſe of Muſcovy.*

3. The tadorna, or ſheildrake, has a flat bill, a compreſſed forehead, a greeniſh black head, and the body is variegated with white. This ſpecies frequents the ſea-coaſts of Europe, and breed in rabbit holes. When a perſon attempts to take their young, the old birds ſhew great addreſs in diverting his attention from the brood; they will fly along the ground as if wounded, till the former are got into a place of ſecurity, and then return and collect them together. From this inſtinctive cunning, Turner, with good reaſon, imagines them to be the *chenalopex*, or *fox-gooſe*, of the ancients: the natives of the Orkneys to this day call them the *ſly-gooſe*, from an attribute of that quadruped. They lay 15 or 16 eggs, white, and of a roundiſh ſhape. In winter they collect in great flocks. Their fleſh is very rank and bad.

4. The ſpectabilis, has a compreſſed bill, gibbous at

the baſe, a black feathery carina, and a hoary head. It is the grey-headed duck of Edwards, and is a native of Sweden and Canada.

5. The fuſca, or velvet duck, is of a blackiſh colour, has a white ſpot behind the eyes, and a white line on the wings. The male of this ſpecies is diſtinguiſhed by a gibboſity at the baſe of the bill. It is the black duck of Ray, and a native of the European ſeas.

6. The nigra, or ſcoter, is totally black, and has a gibboſity at the baſe of the bill; the tail reſembles a wedge; the female is browniſh. It is the leſſer black diver of Ray, and a native of Britain and Lapland. This bird is allowed in the Romiſh church to be eaten in Lent; and is the macreuſe of the French. It is a great diver, ſaid to live almoſt conſtantly at ſea, and to be taken in nets placed under water.

7. The anſer, *ferus* & *manſuetus;* or grey lag, and bean-gooſe. The *grey lag* is two feet nine inches in length, and five feet in extent. The bill is large and elevated; of a fleſh colour, tinged with yellow; the head and neck cinereous; breaſt and belly whitiſh, clouded with grey or aſh colour; back, grey; the legs of a fleſh colour. This ſpecies reſides in the fens the whole year; breeds there, and hatches about eight or nine young, which are often taken, eaſily tamed, and eſteemed moſt excellent meat, ſuperior to the domeſtic gooſe. The old geeſe which are ſhot, are plucked, and ſold in the market as fine tame ones; and readily bought, the purchaſer being deceived by the ſize, but their fleſh is coarſe. Towards winter they collect in great flocks, but in all ſeaſons live and feed in the fens. The grey lag is the origin of the domeſtic gooſe; it is the only ſpecies that the Britons could take young, and familiarize: the other two never breed here, and migrate during ſummer. The mallard comes within the ſame deſcription, and is the ſpecies to which we owe our tame breed of ducks: both preſerve ſome of the marks of their wild ſtate; the gooſe, the whiteneſs of the coverts of the tail and vent feathers; the drake, its curled feathers.—Tame geeſe are of vaſt longevity. Mr Willughby gives an example of one that attained to 80 years. They are kept in great multitudes in the fens of Lincolnſhire: a ſingle perſon will have 1000 old geeſe, each of which will rear ſeven; ſo that towards the end of the ſeaſon he will become maſter of 8000. During the breeding ſeaſon theſe birds are lodged in the ſame houſes with the inhabitants, and even in their very bed-chambers: in every apartment are three rows of coarſe wicker pens, placed one above another; each bird has its ſeparate lodge divided from the other, which it keeps poſſeſſion of during the time of ſitting. A perſon, called a *gozzard*, i. e. *gooſe-herd*, attends the flock, and twice a-day drives the whole to water; then brings them back to their habitations, helping thoſe that live in the upper ſtories to their neſts, without ever miſplacing a ſingle bird. The geeſe are plucked five times in the year: the firſt plucking is at Lady-day, for feathers and quills; and the ſame is renewed, for feathers only, four times more between that and Michaelmas. The old geeſe ſubmit quietly to the operation, but the young ones are very noiſy and unruly. If the ſeaſon proves cold, numbers of them die by this barbarous cuſtom. Vaſt numbers of geeſe are driven annually to London to ſupply the markets; among them, all the ſuperannuated geeſe and ganders, which, by a long courſe of plucking, prove uncommonly tough and dry.

Plate XII. fig. 1.

The *bean-gooſe* is two feet ſeven inches in length; in extent, four feet eleven. The bill, which is the chief diſtinction between this and the former, is ſmall, much compreſſed near the end, whitiſh, and ſometimes pale red in the middle, and black at the baſe and nail: the head and neck are cinereous brown, tinged with ferruginous; breaſt and belly, dirty white, clouded with cinereous; the back of a plain aſh colour; feet and legs of a ſaffron colour; claws black. This ſpecies arrives in Lincolnſhire in autumn; and is called the *bean-gooſe*, from the likeneſs of the nail of the bill to a horſe-bean. They always light on corn-fields, and feed much on the green wheat.

They never breed in the fens; but all diſappear in May. They retreat to the ſequeſtered wilds of the north of Europe; in their migration they fly a great height, cackling as they go. They preſerve a great regularity in their motions; ſometimes forming a ſtraight line; at others, aſſuming the ſhape of a wedge, which facilitates their progreſs, for they cut the air readier in that form than if they flew pell-mell.

8. The erythropus, or laughing-gooſe of Edwards, is a native of Europe and America. The length of this ſpecies is about two feet four; the extent four feet ſix; the bill elevated, of a pale yellow colour, with a white ring at the baſe; the forehead is white; the breaſt and belly are of a dirty white, marked with great ſpots of black; and the legs yellow.

Theſe viſit the fens and other parts of England during winter, in ſmall flocks; they keep always in marſhy places, and never frequent the corn-lands. They diſappear in the earlieſt ſpring, and none are ſeen after the middle of March. Linnæus makes this gooſe the female of the *bernacle;* but Mr Pennant thinks his opinion not well founded.

The *bernacle* (erythropus *mas*, Lin.) is two feet one inch in length; the breadth four feet five inches; the bill is black; the forehead and cheeks are white; from the bill to the eyes, there is a black line; the hind part of the head, the whole neck, and upper part of the breaſt and back, are of a deep black; the tail is black, the legs of the ſame colour, and ſmall.

Theſe birds appear in vaſt flocks during winter, on the north-weſt coaſts of this kingdom: they are very ſhy and wild; but on being taken, grow in a few days as familiar as our tame geeſe. In February they quit our ſhores, and retire as far as Lapland, Greenland, and even Spitzbergen, to breed.

They live to a great age: the Rev. Dr Buckworth of Spalding, had one which was kept in the family above 32 years, but was blind during the two laſt; what its age was when firſt taken, was unknown.

Theſe are the birds that about 200 years ago were believed to be generated out of wood, or rather a ſpecies of ſhell that is often found ſticking to the bottoms of ſhips, or fragments of them; and were called *tree-geeſe* *. Theſe were alſo thought by ſome writers to have been the *chenalopeces* of Pliny; they ſhould have ſaid *chenerotes*, for thoſe were the birds which that naturaliſt ſaid were found in Britain: but as he has ſcarce left us any deſcription of them, it is difficult to ſay which ſpecies he intended. Mr Pennant imagines it to be the following; which is far inferior in ſize to the wild-

* See Lepa

3 MA 55

Plate XII.

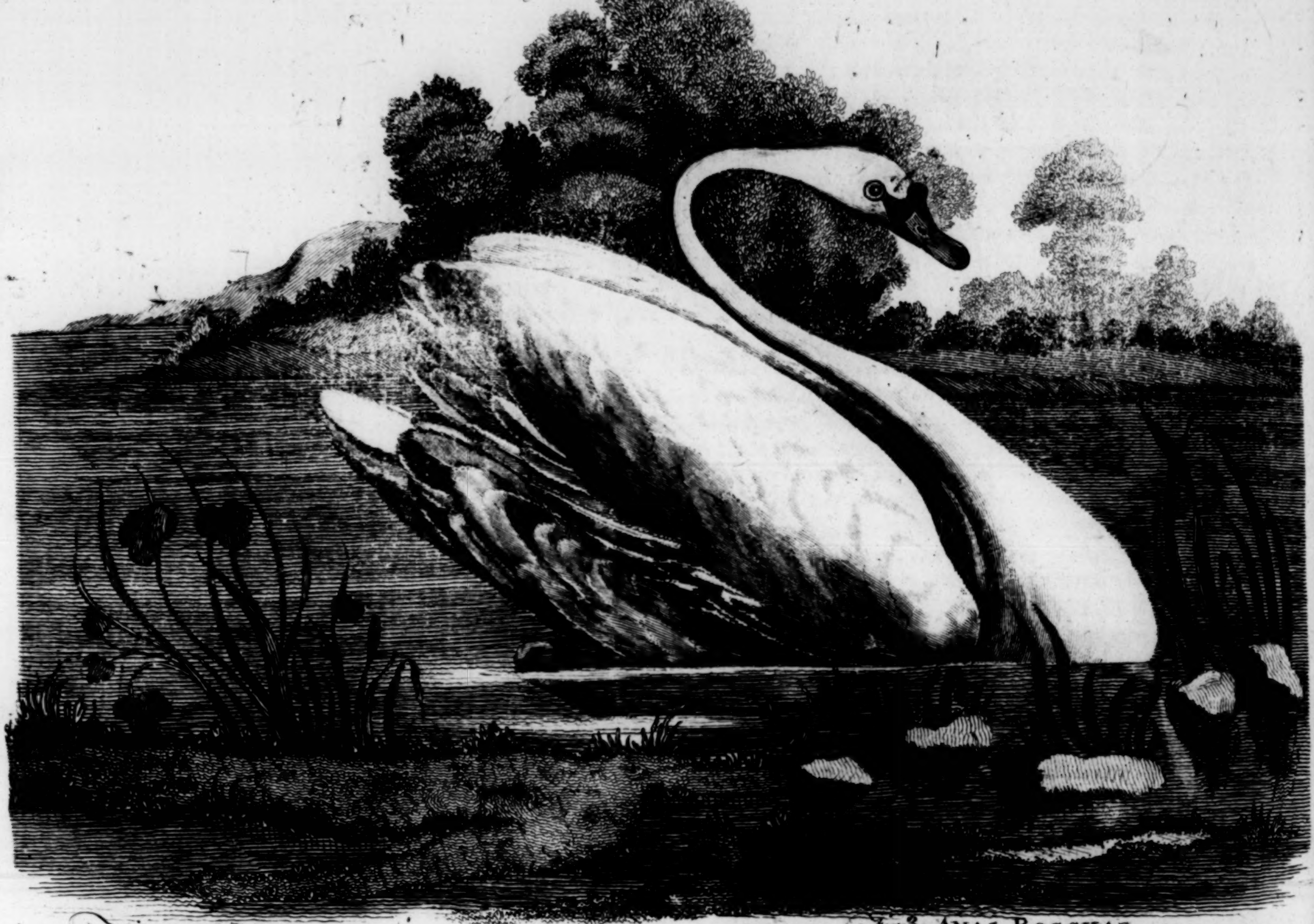

Fig. 1. ANAS CYGNUS, or Swan.

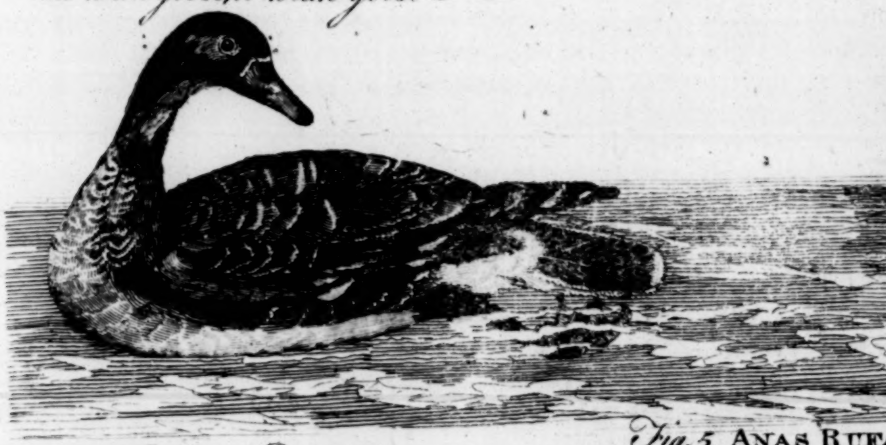

Fig. 2. ANAS ANSER, the Wild goose, or Bean-goose —

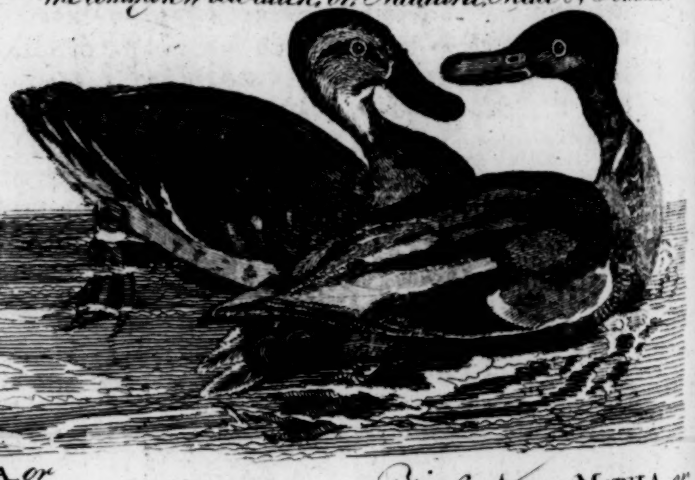

Fig. 3. ANAS BOSCHAS, the common Wild-duck, or Mallard, Male & Female ♀.

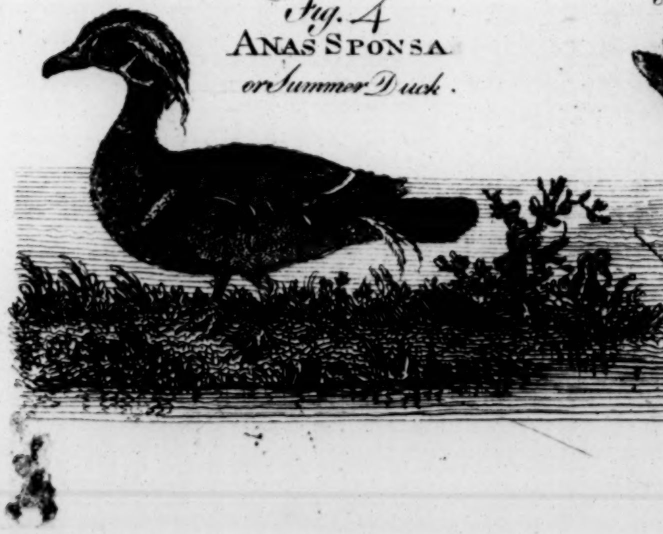

Fig. 4 ANAS SPONSA or Summer Duck.

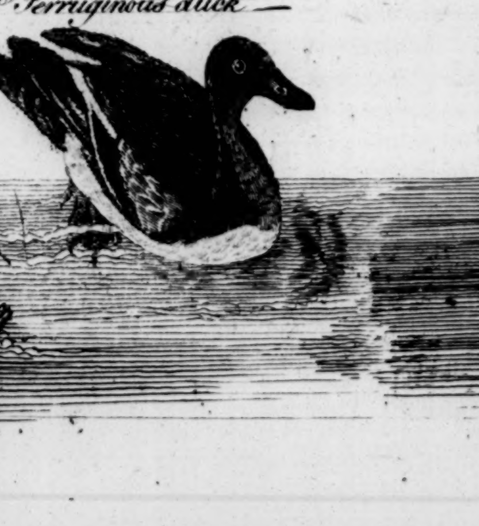

Fig. 5. ANAS RUFA, or Ferruginous duck —

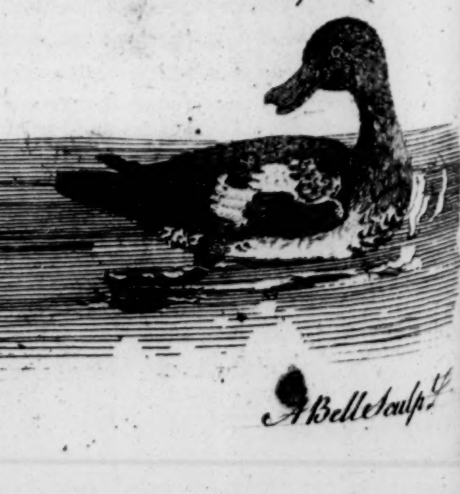

Fig. 6. ANAS MARILA, or Scaup duck.

A Bell Sculpt.

Anas; or ſwan, gooſe, and duck.

gooſe, and very delicate food; in both reſpects ſuiting his account of the *cheneros*.

9. The bernicla, is of a brown colour; with the head, neck, and breaſt, black; and a white collar. The birds of this ſpecies frequent our coaſts in the winter; in Ireland they are called *bernacles*, and appear in great quantities in Auguſt, and leave it in March. They feed on a ſort of long graſs growing in the water; preferring the root and ſome part above it, which they dive for, bite off, and leave the upper part to drive on ſhore. They abound near Londonderry, Belfaſt, and Wexford; are taken in flight-time, in nets placed acroſs the rivers; and are much eſteemed for their delicacy. Mr Willughby, Mr Ray, and Mr Briſſon, very properly deſcribe the bernacle and brent as different ſpecies; but Linnæus makes theſe ſynonymous, and deſcribes the true bernacle as the female of the white-fronted wild-gooſe.

10. The canadenſis is brown; its neck and head are black, and the throat is white. It is a native of Canada.

11. The cœruleſcens, is greyiſh above, and white underneath; the covert-feathers of the wings and back are bluiſh. It is the blue-winged gooſe of Edwards, and a native of Canada.

12. The moliſſima, or eider-duck, is double the ſize of the common duck, has a cylindrical bill, and the wax is divided behind, and wrinkled. The feathers, which are very ſoft and valuable, fall off during incubation. The male is white above, but black below and behind: the female is greeniſh. This ſpecies is found in the Weſtern Iſles of Scotland, particularly on Oranſa, Barra, Rona, and Heiſker, and on the Farn iſles; but in greater numbers in Norway, Iceland, and Greenland; from whence a vaſt quantity of the down, known by the name of *eider* or *edder*, which theſe birds furniſh, is annually imported: its remarkably light, elaſtic, and warm qualities, make it highly eſteemed as a ſtuffing for coverlets, by ſuch whom age or infirmities render unable to ſupport the weight of common blankets. This down is produced from the breaſt of the birds in the breeding ſeaſon. It lays its eggs among the ſtones or plants, near the ſhore; and prepares a ſoft bed for them, by plucking the down from its own breaſt: the natives watch the opportunity, and take away both eggs and neſt: the duck lays again, and repeats the plucking of its breaſt: if ſhe is robbed after that, ſhe will ſtill lay; but the drakes muſt ſupply the down, as her ſtock is now exhauſted: but if her eggs are taken a third time, ſhe wholly deſerts the place.

Mr Pennant, when on the Farn iſles, found the ducks ſitting; and took ſome of the neſts, the baſe of which were formed of ſea-plants, and covered with the down. After ſeparating it carefully from the plants, it weighed only three quarters of an ounce; yet was ſo elaſtic as to fill a larger ſpace than the crown of the greateſt hat. Theſe birds are not numerous on the iſles; and it is obſerved that the drakes keep on thoſe moſt remote from the ſitting places. The ducks continue on their neſts till you come almoſt cloſe to them; and when they riſe, are very ſlow fliers. The number of eggs in each neſt are from three to five, warmly bedded in the down; of a pale olive colour; and very large, gloſſy, and ſmooth.

13. The marila, or ſcaup-duck, is leſs than the common duck. The bill is broad, flat, and of a greyiſh blue colour; the head and neck are black, gloſſed with green; the breaſt is black; the back, the coverts of the wings, and the ſcapulars, are finely marked with numerous narrow tranſverſe bars of black and grey; the legs are duſky. Mr Willughby acquaints us, that theſe birds take their name from feeding on ſcaup, or broken ſhell-fiſh; they differ infinitely in colours, ſo that in a flock of 40 or 50 there are not two alike.

Anas; or ſwan, gooſe, and duck.

14. The moſchata, or Muſcovy duck of Ray, has a naked papillous face, and is a native of India.

15. The bahamenſis, or Bahama duck, is grey, with a lead-coloured bill. It has a tawny ſpot on the ſides, and a green yellowiſh ſpot on the wings. It is a native of Bahama.

16. The albeola, or little black and white duck, has a black back and wings; the head is bluiſh, and white on the hinder part. It is a native of America.

17. The clypeata, or ſhoveler of Ray, has the end of its bill broad, rounded, and furniſhed with a ſmall hook. It is found near the European ſhores.

18. The ſtrepera, or gad-wall, has the wings variegated with black, white, and red. It frequents the freſh waters of Europe.

19. The bucephala, or leſſer duck of Cateſby, has the back and wings black; and the head, both above and below, is interſperſed with ſhining ſilky feathers. It frequents the freſh waters of North America.

20. The clangula, or golden-eye of Ray, is variegated with black and white, and the head is interſperſed with blackiſh green feathers; it has a white ſpot near the mouth; and the eyes are of a ſhining gold colour. It dives much in queſt of ſhell-fiſh. It frequents freſh water as well as the ſea, being found on the Shropſhire meres during winter.

21. The ruſtica, is browniſh, or aſh-coloured, with a white ſpot on the ears and wings. It is a native of North America.

22. The perſpicillata, or great black duck, is white on the top of the head and of the neck; and has a black ſpot on the bill, immediately behind the noſtrils. It is a native of Canada.

23. The glaucion, or greater wild-duck of Ray, has the iris of the eyes yellow, a grey head, and white collar. It frequents the northern ſhores of Europe.

24. The penelops, or widgeon of Ray, has a ſharpiſh tail, black below; the head is brown, and the forehead white. It inhabits the marſhy parts of Europe.

25. The acuta, pin-tail, or ſea-pheaſant of Ray, has a long acuminated tail, black below, with a white line on each ſide of the back part of the head. It is a native of Europe. Mr Hartlib, in the appendix to his *legacy*, tells us, that theſe birds are found in great abundance in Connaught in Ireland, in the month of February only; and that they are much eſteemed for their delicacy.

26. The glacialis, or long-tailed duck, is inferior in ſize to the former. The bill is ſhort, black at the tip and baſe, orange-coloured in the middle; the cheeks are of a pale brown; the hind-part of the head, and the neck both before and behind, are white; the breaſt and back are of a deep chocolate colour; the four middle feathers of the tail are black, and two of them near four inches longer than the others, which are white: the legs duſky. Theſe birds breed in the moſt north-

ern parts of the world; and only viſit our coaſts in the ſevereſt winters.

27. The ferina, pochard, or red-headed widgeon of Ray, has a lead-coloured bill: the head and neck are of a bright gay colour: the breaſt and part of the back where it joins the neck, are black: the coverts of the wings, the ſcapulars, back and ſides under the wings are of a pale grey, elegantly marked with narrow lines of black: the tail conſiſts of twelve ſhort feathers, of a deep grey colour: the legs are lead coloured: and the irides of a bright yellow, tinged with red. The head of the female is of a pale reddiſh brown: Theſe birds frequent freſh water as well as the ſea; and being very delicate eating, are much ſought for in the London markets, where they are known by the name of *duu birds*.

28. The querquedula, garganty, or firſt teal of Aldrovandus, has a green ſpot on the wings, and a white line above the eyes. It frequents the freſh waters of Europe. In many places it is called the *ſummer-teal*.

29. The creca, or common teal, has a green ſpot on the wings, and a white line both above and below the eyes. It frequents the freſh waters of Europe. This ſpecies is to be met with in Duddingſton-loch, a freſh-water lake, within a mile of Edinburgh.

30. The hiſtrionica, or duſky-ſpotted duck of Edwards, is of a brown colour, variegated with white and blue; has a double line on the ears and temples; the collar is white, and there is a white ſtreak on the neck. It is a native of America.

31. The minuta, or little white and brown duck of Edwards, is of a greyiſh colour, with white ears, and the prime feathers of the wings blackiſh. It is a native of Canada.

32. The circia, or ſummer-teal of Ray, with the wings variegated with white ſpots, a white line above the eyes, and the beak and feet of an aſh-colour. It frequents the lakes of Europe.

33. The autumnalis, or red-billed whiſtling duck of Edwards, is of a grey colour, with the prime feathers of the wings, the tail, and belly black; and the area of the wings yellow and white. It is a native of America.

Plate XII. fig. 3.

34. The boſchas, or common wild-duck of Ray; the intermediate tail-feathers of the drake are turned backward, and the bill is ſtrait. It frequents the lakes of Europe. This duck feeds upon frogs and ſeveral ſorts of inſects.—The wild ducks pair in the ſpring; build their neſts among ruſhes or helth, near the water; and lay from 10 to 16 eggs. At mounting-time, when they cannot fly, they are caught in great numbers. They abound particularly in Lincolnſhire, the great magazine of wild-fowl in this kingdom; where prodigious numbers are taken annually in the decoys *. Birds with flat bills, that find their food by groping, have three pair of nerves that extend to the end of their bills: theſe nerves are remarkably conſpicuous in the head and bill of the wild-duck, and are larger than thoſe of a gooſe, or any other bird yet known: This is the reaſon they grope for food more than any other bird whatever.—The common tame ſpecies of ducks take their origin from theſe, and may be traced to it by unerring characters. The drakes, howſoever they vary in colours, always retain the curled feathers of the tail, and both ſexes the form of the bill, of the wild kind. Nature ſports in the colours of all domeſtic animals; and for a wiſe and uſeful end, That mankind may the more readily diſtinguiſh and claim their reſpective property.

35. The adunca, or hook-billed domeſtic duck of Ray, has the ſame characters with the boſchas, excepting that the bill is crooked.

36. The galericulata, or Chineſe teal of Edwards, has a hanging creſt; and on the hinder part of the back, on both ſides, there is a crooked, flat, elevated feather; the creſt is green and red; and the back is brown, and ſpotted with blue; and erect feathers on the back are red and blunt; one edge of the inmoſt wing-feather, when the wings are ſhut, is raiſed over the back, and is red, and like a ſickle before. It is a native of China.

Plate XII. fig. 4.

37. The ſponſa, or ſummer-duck of Cateſby, has a depending green creſt, variegated with blue and white; the back is likewiſe variegated with blue and white; the breaſt is grey, and ſpotted with white; and the throat is white. It is a native of North America.

Plate XI. fig. 3.

38. The arborea, or black-billed whiſtling-duck of Edwards, is of a reddiſh brown colour, with a ſort of creſt on the head; the belly is ſpotted with black and white. It is a native of America. Sloane informs us, that this duck perches on trees; that it is about 20 inches long, from the end of the bill to the point of the tail; and that it makes a kind of whiſtling noiſe, from which circumſtance it has received its name.

39. The fuligula, or tufted duck of Ray, has a hanging creſt, a black body, and the wings and belly ſpotted with white. It is a native of Europe. The male of this ſpecies diſappears during the incubation of the female.

Plate XII. fig. 5.

40. The ruſa, or ferruginous duck, deſcribed by Mr Pennant from one which was killed in Lincolnſhire. The bill is long and flatted, rounded a little at the baſe, ſerrated along the edges of each mandible, and furniſhed with a nail at the end of the upper. The colour, a pale blue. The head, neck, and whole upper part of the bird, are of an agreeable reddiſh brown; the throat, breaſt, and belly, of the ſame colour, but paler, the legs of a pale blue, but the webs of the feet black.—This ſpecies is not mentioned by any other writer, except Linnæus, who took his deſcription from Rudbeck's paintings; and adds, that it is found, tho' rarely, in the Swediſh rivers.

ANASARCA, a ſpecies of dropſy. See MEDICINE, n° 760, 761.

ANASTASIS, a term among ancient phyſicians, for a riſing up to go to ſtool. It alſo ſignifies the paſſage of any humour, when expelled from one part, and obliged to remove to another.

ANASTASIUS, ſurnamed BIBLIOTHECARIUS, a Roman abbot, library-keeper of the Vatican, and one of the moſt learned men of the ninth century, aſſiſted in 869 at the fourth general council, the acts and canons of which he tranſlated from the Greek into Latin. He alſo compoſed the lives of ſeveral popes, and other works; the beſt edition of which is that of the Vatican.

ANASTATICA, the ROSE OF JERICHO; a genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants.—Of this genus there are two

Species. 1. The ſyriaca, a native of Syria, is not cultiva-

* See *Decoy*.

cultivated or known in Britain. 2. The hierochuntica is a native of the ſandy parts of Paleſtine and the Red ſea. It is a low annual plant, dividing into many irregular woody branches near the root. At each joint is placed a ſingle, oblong, hairy leaf; and at the ſame places come out ſmall ſingle flowers, of a whitiſh green colour, compoſed of four leaves placed in the form of a croſs. Theſe are ſucceeded by ſhort wrinkled pods, having four ſmall horns; theſe open into four cells, in each of which is lodged a ſingle brown ſeed.—When the ſeeds of this plant are ripe, the branches will draw up and contract; ſo that the whole plant forms a kind of ball or globular body, which will expand on laying it a ſhort time in warm water. This property it retains for many years, on which account it is preſerved as a curioſity by ſome people. From this property the monks have given it the name of *Roſa Mariæ*, pretending that the flowers open on the night in which our Saviour was born.

Culture. This plant is propagated by ſeeds, which ſhould be ſown in the beginning of March, in a moderate hot-bed in pots, in which the plants are deſigned to remain. When they come up, the plants ſhould be thinned, leaving them about ſix inches aſunder, and obſerving to keep them clear of weeds, which is all the care they require. If the ſeaſon proves favourable, they will flower in Auguſt; but unleſs the autumn proves warm and dry, they will not perfect their ſeeds in Britain.

ANASTOMOSIS, in anatomy, the opening of the mouths of veſſels, in order to diſcharge their contained fluids. It is likewiſe uſed for the communication of two veſſels at their extremities; as the inoſculation of a vein with a vein, of an artery with an artery, or of an artery with a vein.

ANASTOMATICS, medicines ſuppoſed to have the power of opening the mouths of the veſſels, and promoting the circulation; ſuch as deobſtruent, cathartic, and ſudorific medicines.

ANASTROPHE, in rhetoric and grammar, denotes the inverſion of the natural order of the words: ſuch is, *ſaxa per et ſcopulos*, for *per ſaxa et ſcopulos*.

ANATHEMA, among eccleſiaſtical writers, imports whatever is ſet apart, ſeparated, or divided; but is moſt uſually meant to expreſs the cutting off a perſon from the privileges of ſociety, and communion with the faithful.

The anathema differs from excommunication in the circumſtances of being attended with curſes and execrations. It was practiſed in the primitive church againſt notorious offenders; and the form of that pronounced by Syneſius againſt one Andronicus, is as follows: "Let no church of God be open to Andro-"nicus, but let every ſanctuary be ſhut againſt him. "I admoniſh both private men and magiſtrates, to "receive him neither under their roof, nor to their "table; and prieſts more eſpecially, that they neither "converſe with him living, nor attend his funeral "when dead."

Several councils alſo have pronounced anathemas againſt ſuch as they thought corrupted the purity of the faith, and their deciſions have been conceived in the following form: *Si quis dixerit*, &c. *anathema ſit*.

There are two kinds of anathemas, the one judiciary, and the other abjuratory. The former can only be denounced by a council, a pope, or a biſhop; the latter makes a part of the ceremony of abjuration, the convert being obliged to anathematize the hereſy he abjures.

ANATHEMA, in heathen antiquity, was an offering or preſent made to ſome deity, and hung up in the temple. Whenever a perſon left off his employment, it was uſual to dedicate the tools to the patron-deity of the trade. Perſons too who had eſcaped from imminent danger, as ſhipwreck and the like, or had met with any other remarkable inſtance of good fortune, ſeldom failed to teſtify their gratitude by ſome preſent of this kind.

ANATHEMA likewiſe denotes Chriſtian offerings, otherwiſe called donations. See DONATIONS.

ANATHOTH, a hamlet of Paleſtine, very near Jeruſalem, (Joſephus;) about three miles and a half to the north; the ruins of which are ſtill to be ſeen. It was the birth-place of the prophet Jeremiah, and one of the Levitical towns in the tribe of Benjamin.

ANATIFERA CONCHA, the trivial name of a ſpecies of the lepas, a teſtaceous animal. See LEPAS.

ANATOLIA. See NATOLIA.

ANATOMY,

THE art of diſſecting, or artificially ſeparating and taking to pieces, the different parts of the human body, in order to an exact diſcovery of their ſituation, ſtructure, and œconomy.—The word is Greek, ανατομη; derived from ανατεμνω, to diſſect, or ſeparate by cutting.

INTRODUCTION.

§. 1. *Hiſtory of Anatomy.*

THIS art ſeems to have been very ancient; though, for a long time, known only in an imperfect manner.—It probably firſt took its origin from the cuſtom of ſacrificing animals to the Deity; and as ſome parts only were appointed for ſacrifice, and others for the uſe of the prieſts, thoſe who were concerned in performing this religious ceremony behoved to be as much maſters of anatomy as to diſtinguiſh the one part from the other. It was indeed impoſſible that any number of animals could be ſlaughtered, either for ſacrifice or food, but thoſe who performed the butcher's part behoved to be acquainted with the general ſituation of the viſcera; and accordingly we find, by the directions given to the Jews concerning their ſacrifices, that theſe things were well known in the time of Moſes. It is alſo probable, that as for a long time every man was butcher for himſelf, the ſlight knowledge of anatomy which butchers can acquire was pretty general in every nation.

By viewing the bodies of ſlaughtered animals, however, only a knowledge of *Comparative Anatomy*, as it is called, could be acquired. The knowledge of the internal parts of the human body might poſſibly originate from the barbarous cuſtom of human ſacrifices on certain occaſions. This made it neceſſary for the prieſts to acquire ſome knowledge of the internal ſtructure of the human body, and they would not want opportunities from thoſe ſlain in battle, or torn by wild beaſts: accordingly we find in Homer's Iliad ſome degree of anatomical knowledge diſplayed, by his accurate details of ſome of the viſcera wounded by weapons paſſing from certain external parts of the body.

The firſt hints we have of anatomy being adopted as a ſcience or part of natural philoſophy, are, That Thales of Miletum, and Pythagoras, about 700 years before Chriſt, made it a part of their ſtudies.—An hundred years after this, Empedocles, in a little fragment preſerved by Galen, diſcovers conſiderable anatomical knowledge, and is thought to have prevented Fallopius in the diſcovery of the cochlea and tube of the ear.

Alcmaon of Crotona, a diſciple of Pythagoras, is thought to have been the firſt who diſſected animals with a view to learn their internal ſtructure. This was done by Democrates of Abdera, with a philoſophical, and by Hippocrates with a medical view, about 500 years before Chriſt.—Diocles the Caryſithian is ſaid to have been the firſt who wrote the method and order of diſſecting the parts of animals; but his works are now loſt.—The next who had any reputation in atomy was Praxagoras the Coan; of whom all we know is, that he diſtinguiſhed the veins from the arteries, and believed that the latter became nerves as they grew ſmaller.

It is probable that the Greeks learned their knowledge of the arts from the eaſtern nations, as all the Grecian worthies eſteemed it one of the beſt parts of their education to travel into thoſe parts.—Egypt ſeems to have been originally a great ſeminary of learning. Under the firſt Ptolemies, Soter and Philadelphus, a ſchool was erected at Alexandria, where, among other ſciences, anatomy was publicly taught: the kings were ſometimes preſent at the diſſections of human bodies, and brutes were furniſhed by their command. Herophilus and Eraſiſtratus were the ſucceſſors of two of the firſt maſters in this ſchool, and each of them is ſaid to have diſſected ſeveral hundred bodies, from which probably the report aroſe of their having diſſected living men. Eraſiſtratus deſcribed the lacteal veſſels of a kid, and the true origin and uſe of the nerves, in which laſt diſcovery Herophilus of Carthage has ſhared with him. By ſome he has been ſuppoſed to have known the circulation of the blood; and we are certain that he accounted for digeſtion by the mechanical action and preſſure of the ſtomach, as ſome moderns have done. The works of theſe great men are loſt, and all we know of them is from little ſcraps of improvements interſperſed in the works of Galen.

Among the Romans, though it is probable they had phyſicians and ſurgeons from the foundation of the city, yet we have no account of any of theſe applying themſelves to anatomy for a very long time. Archagathus was the firſt Greek phyſician eſtabliſhed in Rome, and he was baniſhed the city on account of the ſeverity of his operations.—Aſclepiades, who flouriſhed in Rome 101 years after Archagathus, in the time of Pompey, attained ſuch a high reputation as to be ranked in the ſame claſs with Hippocrates. He ſeemed to have ſome notion of the air in reſpiration acting by its weight; and in accounting for digeſtion, he ſuppoſed the food to be no farther changed than by a comminution into extremely ſmall parts, which being diſtributed to the ſeveral parts of the body, is aſſimilated to the nature of each. One Caſſius, commonly thought to be a diſciple of Aſclepiades, accounted for the right ſide of the body becoming paralytic on hurting the left ſide of the brain, in the ſame manner as has been done by the moderns, viz. from the croſſing of the nerves from the right to the left ſide of the brain.

From the time of Aſclepiades to the ſecond century, phyſicians ſeem to have been greatly encouraged at Rome; and in the writings of Celſus, Rufus, Pliny, Cœlius Aurelianus, and Aretæus, we find ſeveral anatomical obſervations, but moſtly very ſuperficial and inaccurate. Towards the end of the ſecond century lived Claudius Gallenus Pergamus, whoſe name is ſo well known in the medical world. He applied himſelf particularly to the ſtudy of anatomy, and did more in that way than all that went before him. He ſeems, however, to have been at a great loſs for human ſubjects to operate upon; and therefore his deſcriptions of the parts are moſtly taken from brute animals. His works contain the fulleſt hiſtory of anatomiſts, and the moſt complete ſyſtem of the ſcience, to be met with any where before him, or for ſeveral centuries after; ſo that a number of paſſages in them were reckoned abſolutely unintelligible for many ages, until explained by the diſcoveries of ſucceeding anatomiſts.

About the end of the fourth century, Nemeſius biſhop of Emiſſa wrote a treatiſe on the nature of man, in which it is ſaid were contained two celebrated modern diſcoveries; the one, the uſes of the bile, boaſted of by Sylvius de la Boe; and the other, the circulation of the blood. This laſt, however, is proved by Dr Friend, in his Hiſtory of Phyſic, p. 229. to be falſely aſcribed to this author.

The Roman empire beginning now to be oppreſſed by the barbarians, and ſunk in groſs ſuperſtition, learning of all kinds decreaſed; and when the empire was totally overwhelmed by thoſe barbarous nations, every appearance of learning was almoſt extinguiſhed in Europe. The only remains of it were among the Arabians in Spain and in Aſia. They applied themſelves chiefly to the ſtudy of phyſic; but as the Mahometan law, like that of the Jews, forbad its ſubjects to touch dead bodies, anatomy could be but little improved by them. Avicenna, however, applied himſelf to read and underſtand the works of Galen. By diſſection, he found out what is commonly aſcribed to Fallopius, namely, the muſcles attollens palpebram ſuperiorem.

By the intercourſe of the Europeans next to Spain with the Arabians, learning began to be again introduced; and in the eleventh century, the ſchool of Salernum in Sicily made a conſiderable figure in medicine. The groſs ignorance and ſuperſtition of thoſe days, however, prevented for a long time any improvements, and nothing was taught for two centuries afterwards but to underſtand the Arabian doctors. Anatomical improvements were particularly retarded by its being imagined a crime to diſſect a human body; and this opinion prevailed till the 16th century. The emperor Charles V. ordered a conſultation to be held by the divines of Salamanca, in order to determine whether or not it was lawful in point of conſcience to diſſect a dead body. In Muſcovy, till very lately, both anatomy, and the uſe of ſkeletons were forbidden, the firſt as inhuman, and the latter as ſubſervient to witchcraft.

Mundinus was the firſt European author who joined diſſections to the authority of Galen and the Arabs. He flouriſhed in the beginning of the 14th century, and his ſyſtem was in ſuch high reputation as to be the only one taught in the ſchools for a good number of years. In the univerſity of Padua particularly, the profeſſors were tied down by an expreſs order of the academy to teach this book and no other.

In the beginning of the 15th century, learning revived conſiderably in Europe, and particularly phyſic, by means of copies of the Greek authors brought from the ſack of Conſtantinople; after which the number of anatomiſts and anatomical books increaſed to a prodigious degree.—The Europeans becoming thus poſſeſſed of the ancient Greek fathers of medicine, were for a long time ſo much occupied in correcting the copies they could obtain, ſtudying the meaning, and commenting upon them, that they attempted nothing of their own, eſpecially in anatomy.

Towards the end of this century, Jacobus Berengarius Carpus, became the reſtorer of anatomy and ſurgery at Bononia in Italy. He ſays that he had diſſected above an hundred dead bodies; which procured him the ſame character that had formerly been given to Herophilus and Eraſiſtratus, namely, that of diſſecting living men.—He publiſhed two anatomical works; the one intituled *Iſagogæ;* and the other, commentaries on *Mundinus*, in which he corrected ſome erroneous deſcriptions, and added ſeveral diſcoveries of his own.

For ſome time the ſtudy of anatomy ſeems to have been peculiar to Italy, and ſeveral treatiſes were publiſhed on this ſubject by the Italians before any thing of a ſimilar kind was produced in any other nation; but about the year 1536, Johannes Guinterius of Anderon, who had taught anatomy for ſome years at Paris, publiſhed his Anatomical Inſtitutions. He was the firſt anatomiſt who gave a full and exact deſcription of the muſcles: he affirmed, that the muſcles which ſurround the neck of the bladder conſiſted of tranſverſe fibres; that they had ſeveral functions, ſuch as ſhutting the bladder, and, after the emiſſion of the urine, evacuating what is left in the paſſage.

In 1543, Andreas Veſalius of Bruſſels publiſhed his anatomy; which was of the utmoſt ſervice, not only by the many important diſcoveries he made, but by his daring to correct Hippocrates, Galen, and the Arabians; which paved the way for others to rid themſelves of the ſlavery to theſe authors, which univerſal cuſtom had impoſed upon them. His deſcriptions are minute, eſpecially of the bones and muſcles; in which he not only outdid all that went before him, but is ſcarce to be equalled by any modern author. His figures were alſo eſteemed maſter-pieces of painting; though they would probably have been more ſerviceable to young anatomiſts, had they been repreſented in a flaccid ſtate, as they are by Euſtachius, and as they are to be ſeen in a dead body, than when repreſented in a ſtrong ſtate of action. He was the firſt anatomiſt that profeſſed for a ſalary.

The criticiſms on Galen and the ancients publiſhed by Veſalius when only 28 years of age, could not fail of procuring him a number of enemies; which, however, increaſed, inſtead of diminiſhing, his reputation. Among the reſt, Jacobus Sylvius of Amiens who had been Veſalius's inſtructor, endeavoured to decry him; and beſides thundering againſt him in his colleges, he wrote a ſcurrilous treatiſe againſt Veſalius, and in defence of Galen, which he entitled *Calumniatorum Veſalii repulſio*. Beſides this he publiſhed ſeveral other anatomical treatiſes. He has been particularly ſerviceable by impoſing names on the muſcles, moſt of which are retained to this day. Formerly they were diſtinguiſhed by numbers, which were differently applied by almoſt every author.

In 1561, Gabriel Fallopius, profeſſor of anatomy at Padua, publiſhed a treatiſe of anatomy under the title of *Obſervationes Anatomicæ*. This was deſigned as a ſupplement to Veſalius; many of whoſe deſcriptions he corrects, though he always makes mention of him in an honourable manner. Theſe criticiſms, however, were not well reliſhed by Veſalius, though he was obliged to own himſelf handſomely dealt by. He publiſhed an anſwer, under the title of *Obſervationum Fallopii Examen*. Fallopius made many great diſcoveries, and his book is well worth the peruſal of every anatomiſt.

In 1563, Bartholomæus Euſtachius publiſhed his *Opuſcula Anatomica* at Venice which have ever ſince, been juſtly admired for the exactneſs of the deſcriptions, and the diſcoveries contained in them. He publiſhed afterwards ſome other pieces, in which there is little of anatomy; but never publiſhed the great work he had promiſed, which was to be adorned with copper-plates repreſenting all the parts of the human body. Theſe plates, after lying buried in an old cabinet for upwards of 150 years, were at laſt diſcovered, and publiſhed, in the year 1714, by Lanciſi the pope's phyſician; who added a ſhort explicatory text, becauſe Euſtachius's own writing could not be found.

From this time to the year 1628, though the number of anatomical authors was very much increaſed, there ſeems to have been no remarkable diſcovery made: only Andreas Libavius, tho' not properly an anatomiſt, ought not to be paſſed over in ſilence; becauſe in 1616, from ſome unknown Paracelſian, he deſcribes a method of tranſfuſing the blood of one animal into another, as a cure for various diſeaſes. But this year (1628) was rendered remarkable by the diſcovery of the circulation of the blood. This important phenomenon was firſt obſerved and demonſtrated by Dr William Harvey, who now publiſhed his obſervations. Numbers of opponents immediately appeared; but he had the happineſs in his own life to ſee them all give up their cauſe, and the whole medical world embrace his doctrine. Some, indeed have endeavoured to rob him of the honour of this important diſcovery, by pretending that he received it from ſome cotemporary who durſt not publiſh it himſelf, as it would have been reckoned a mortal hereſy in ſome countries. This, however, was never proved.

We now conſider anatomical knowledge as approaching to its *ne plus ultra*.—So many and ſo great diſcoveries were already made, that only the *minutiæ* remained to be diſcuſſed by ſucceeding anatomiſts. Improvements, however, were ſtill going on. In 1642, Wirtſungus, or Virtſungus, diſcovered the pancreatic duct; but he did not live to publiſh any treatiſe on this diſcovery, being killed by a bravo at his own door in Padua.—In 1651, or 1652, the lymphatic veſſels were diſcovered by Thomas Bartholine; but this honour was alſo claimed by Olaus Rubick the Swede, and by the cotemporary Engliſh writers aſcribed to their countryman Jolivius.

Numberleſs other diſcoveries, though of the leſs important kind, continued to be made.—In 1660, or ſoon after, Marcellus Malphigius began to outdo all his predeceſſors in the exactneſs of his deſcriptions, and the new diſcoveries he made in the ſtructure of the parts. What gave him ſo much the advantage over others was his extreme patience, and his methods of preparing the parts, particularly by long maceration. He had alſo the advantage of microſcopes, which before his time were either never uſed, or in a very inaccurate manner. At the ſame time flouriſhed Laurentius Bellinus at Florence, and was the firſt who introduced mathematical reaſoning in phyſic. In 1662, Simon Pauli publiſhed a treatiſe *de Albandis Oſſibus*. He had long been admired for the white ſkeletons he prepared; and at laſt diſcovered his method, which was by expoſing the bones all winter to the weather.

Johannes Swammerdam of Amſterdam alſo publiſhed ſome anatomical treatiſes; but was moſt remarkable for his knowledge of preſerving the parts of bodies entire for many years, by injecting their veſſels. He alſo publiſhed a treatiſe on reſpiration; wherein he mentioned his having figures of all the parts of the body, as big as the life, cut in copper, which he deſigned to publiſh, with a complete ſyſtem of anatomy. Theſe, however, were never made public by Swammerdam; but, in 1683, Gothofridus Bidloo, profeſſor of anatomy at Leyden, publiſhed a work intitled *Anatomia Corporis Humani*, where all the parts were delineated in very large plates almoſt as big as the life. Mr Cowper, an Engliſh ſurgeon, bought 300 copies of theſe figures; and in 1698, publiſhed them, with an Engliſh text, quite different from Bidloo's Latin one; to which were added letters in Bidloo's figures, and ſome few figures of Mr Cowper's own. To this work Cowper's name was prefixed, without the leaſt mention of Bidloo, except on purpoſe to confute him. Bidloo immediately publiſhed a very ill-natured pamphlet, called *Gulielmus Cowperus citatus coram tribunali*; appealing to the royal ſociety, how far Cowper ought to be puniſhed as a plagiary of the worſt kind, and endeavouring to prove him an ignorant deceitful fellow. Cowper anſwered him in his own ſtyle, in a pamphlet called his *Vindiciæ*; endeavouring to prove, either that Bidloo did not underſtand his own tables, or that they were none of his. This laſt is moſt probable; and many people believe that theſe are the tables promiſed by Swammerdam, and which Bidloo had got from his widow.

Soon after, Iſbrandus Diembroeck, profeſſor of anatomy at Utrecht, began to appear as an author. His work contained very little original; but he was at great pains to collect from others whatever was valuable in their writings, and his ſyſtem was the common ſtandard among anatomical ſtudents for many years.

About the ſame time, Antonius Liewenhoeck of Delft improved conſiderably on Malphigius's uſe of microſcopes, and ſupplied what was wanting in Harvey's demonſtration of the true circular motion of the blood. He was alſo the author of an hypotheſis concerning the different texture of the blood and ſerum; but herein he is found to have been miſtaken.

Frederic Ruyſch firſt appeared in print in 1665, and died only in 1730, occaſionally publiſhing anatomical pieces during a courſe of 65 years. He was for a great many years famous for his method of injecting the moſt ſubtile veſſels of the body, and for preſerving all the parts in their natural colour and texture; both of which arts he is ſaid to have received from Swammerdam, tho' he himſelf proteſts ſolemnly that he found them out by his own induſtry.

It would be in a manner impoſſible to give an account of all the authors that have contributed ſince the beginning of the preſent century to bring the ſcience of anatomy to that ſtate of perfection in which it now is. The writings of Keil, Douglas, Cheſſelden, Winſlow, &c. are too well known to need deſcription. The latter is generally recommended as a ſtandard for the ſtudents of anatomy. It is alſo ſuperfluous to mention the reputation which Dr Monro at Edinburgh, and Dr Hunter at London, have deſervedly acquired, on account of their anatomical knowledge. We ſhall only take notice of two remarkable improvements, not in the ſcience itſelf, but in the method of teaching it, that have been made ſince the commencement of this century. The one is, by Joannes Baptiſta Bianchi, profeſſor firſt at Bononia, and afterwards at Turin. He ſhewed his ſcholars a body entire, ſo prepared that he took off one part from another, and finiſhed a complete ſyſtem of anatomy before he had done: then he artificially joined all the parts together for a new demonſtration, ſo that it could not be known they were ever ſeparated. The other is the art of imitating all the parts of the body in wax; which was brought to the utmoſt perfection by Georgius des Noves, vel Noveſias, profeſſor of anatomy at Bononia; and figures of this kind were publicly ſhewn at London and Paris.

§. 2. *Plan of the following Treatiſe.*

THE etymology of the word *anatomy*, as above given, implies ſimply *diſſection;* but by this term ſomething more is uſually underſtood.

It is every day made uſe of to expreſs a knowledge of the human body; and a perſon who is ſaid to underſtand anatomy, is ſuppoſed to be converſant with the ſtructure and arrangement of the different ſolid parts of the body.

It is commonly divided into Anatomy, properly ſo called; and Comparative Anatomy: the firſt of theſe is confined ſolely to the human body; the latter includes all animals, ſo far as a knowledge of their ſtructure may tend to perfect our ideas of the human body[*].

The term *anatomy* may alſo have another and more extenſive ſignification: it may be employed to expreſs, not only a knowledge of the ſtructure and diſpoſition of the parts, but likewiſe of their œconomy and uſe. Conſidered in this light, it will ſeldom fail to excite the curioſity of people of taſte, as a branch of philoſophy; ſince, if it is pleaſing to be acquainted with the ſtructure of the body, it is certainly more ſo to diſcover all the ſprings which give life and motion to the machine, and to obſerve the admirable mechaniſm by which ſo many different functions are executed.

The human body is compoſed of ſolid and fluid parts. We ſhall not ſatisfy ourſelves with giving a deſcription of the former alone; but we ſhall likewiſe ſpeak of the nature of the fluids, and of the reciprocal action of both upon each other.

[*] See parati natomy

PART I. OSTEOLOGY.

CHAP. I.

Of the BONES in General.

WE begin with the bones, which may be conſidered as the great ſupport of the body, tending to give it ſhape and firmneſs. But before entering into the detail of each particular bone, it will be neceſſary to deſcribe their compoſition and connections, and to explain the nature of the different parts which have an immediate relation to them; as the cartilages, ligaments, perioſteum, marrow, and ſynovial glands.

1
f the com-
ſition of
e bones.

a, The bones are of a firm and hard ſubſtance, of a white colour, and perfectly inſenſible. They are the moſt compact and ſolid parts of the body; and ſerve for the attachment or ſupport of all the other parts.

b, Three different ſubſtances are uſually diſtinguiſhed in them; their exterior or *bony* part, properly ſo called; their *ſpongy cells;* and their *reticular ſubſtance.* The *firſt* of theſe, is formed of many laminæ, or plates, compoſing a firm, hard, ſubſtance. The *ſpongy*, or *cellular* part, is ſo called, on account of its reſemblance to a ſponge, from the little cells which compoſe it. This ſubſtance forms almoſt the whole of the extremities of cylindrical bones. The *reticular* part is compoſed of fibres, which croſs each other in different directions: this net-work forms the internal ſurface of thoſe bones which have cavities.

c, The flat bones, as thoſe of the head, are compoſed only of the laminæ and the cellular ſubſtance: this laſt is uſually found in the middle of the bone, dividing it into two plates; and is there called *diplöe*.

d, Gagliardi, who pretended to have diſcovered an infinite number of claviculi, or bony proceſſes, which he deſcribes as traverſing the laminæ to unite them together, has endeavoured to ſupport this pretended diſcovery by the analogy of bones to the bark of trees, in which certain woody nails have been remarked: but this opinion has not been confirmed by any certain obſervation. The reſemblance of bones to trees has, with more probability, been obſerved in their formation. In bones it is by many ſuppoſed to ariſe from layers of the perioſteum, which gradually oſſify; and it is by the hardening of the alburnum (A) in trees that the timber is formed. M. Duhamel, the celebrated academician, has endeavoured to prove the truth of this obſervation by a great number of facts (B).

e, We uſually conſider in a bone, its *body* and its *extremities*. The ancients diſtinguiſhed the body or middle part, by the name of *diaphyſis;* and divided the extremities into *apophyſis* and *epiphyſis;* an *apophyſis*, or, as it is more uſually termed, proceſs, is an eminence or continuation of the body of the bone; whereas an *epiphyſis*, is a part attached to the bone by means of an intervening cartilage. A great number of epiphyſes, which in young ſubjects appear as ſeparate bones, become, in proceſs of time, ſo perfectly united to the body of the bone, by the oſſification of the cartilage, as not to be diſtinguiſhed from it in the adult ſtate.

f, Different names are given to the proceſſes of bones, varying according to their figure and ſize. If a proceſs is large, and of a ſpherical ſhape, it is called *caput*, or head; if the head is flatted, it takes the name of *condyle*. Other proceſſes are called *maſtoid*, *ſtyloid*, *coracoid*, from their reſemblance to a breaſt, a ſtiletto, or the beak of a crow. Some are ſtyled *ridges* or *ſpines*. All theſe terms are eaſily underſtood; we ſhall however ſpeak of them again, when we conſider the bones which have apophyſes.

g, There are, in bones, cavities as well as proceſſes: theſe cavities either extend quite through the bones, or appear only as depreſſions. The firſt of theſe receive the name of *foramina*, or *holes;* and theſe foramina are ſometimes called *canals*, or *conduits*, according to their form and extent. Of the cavities which do not penetrate through the bones, ſome are formed for the articulations; when theſe are deep, they are called *cotyloid;* as the great articulating cavity of the thigh, with the os innominatum; *glenæ*, or *glenoid*, when they are ſuperficial; as the cavity of the ſcapula, which receives the head of the os humeri.

h, Of the depreſſions which are not uſeful in articulation, the largeſt, and thoſe which are not equally ſurrounded by high brims, are called *foſſæ*. On the contrary, cavities with ſmall apertures, are termed *ſinuſes:* other depreſſions take the name of *furrows* and *ſinuoſities*, when they are long and narrow; and there are ſome called *digital impreſſions*, from their reſemblance to the traces of a finger on ſoft bodies.

2
Of the connection of the bones.

a, We ſhall abridge this article, which is exceedingly diffuſe in the generality of anatomical books; and will endeavour to deſcribe it with all the clearneſs it will allow.

b, The ſkeleton is compoſed of a great number of bones, which are all ſo admirably conſtructed, and with ſo much affinity to each other, that the extremity of every bone is perfectly adjuſted to the end of the bone with which it is connected; and this connection is termed their *articulation*.

c, Articulation is divided into moveable and immoveable. The firſt of theſe is named *diarthroſis*, and the ſecond *ſynarthroſis*.

When a large head is received into a deep cavity, as is the head of the os femoris, it is called *enarthroſis; anthrodia*, when a round head is admitted into a ſuperficial cavity; as the articulation of the arm bone, with the ſcapula. Both theſe allow motion to all ſides.

d, If the articulation permits only flexion and extenſion, as the articulation of the tibia with the os femoris, it is called *ginglimus;* which properly ſignifies the hinge of a door, or window. In this the parts of the bones mutually receive and are received.

(A) The alburnum is the ſoft, white ſubſtance, which in trees is found between the liber, or inner bark, and the wood.

(B) M. Duhamel, with a view to ſupport his ſyſtem of oſſification, fed different animals with madder and their ordinary food, alternately, during a certain time; and conſtantly obſerved, in diſſecting their bones, diſtinct layers of red and white, which correſponded with the length of time they had lived on madder, or their uſual aliment. The ſame trials, however, have been ſince made with the madder in England, and were found not to correſpond with Duhamel's account of its effects.

e, The ſynarthroſis, or immoveable articulation of bones, is divided into the *ſuture* and *gomphoſis*. In the *ſuture*, the two bones are mutually indented into each other: and of this, the junction of the parietal bones is an example. When the marks of this articulation were more minute, the ancients gave it the name of *harmonia;* but this variety of names ſeems to be uſeleſs. *Gomphoſis*, is the fixing one bone into another, as a nail is fixed into a board; and thus the teeth are ſecured in their ſockets. The perfect union or concretion of two bones, is called *ſymphaſis;* as the lower jaw, which in infancy is compoſed of two diſtinct bones; but becomes one in a more advanced age, by the oſſification of the uniting cartilage.

f, When bones are thus joined by the means of cartilages, the union is ſtiled *ſyncondroſis;* if by ligaments, *ſyneuroſis*.

3 Of the cartilages.

a, Cartilages are white, ſolid, ſmooth, and elaſtic ſubſtances, between the hardneſs of bones and ligaments; and are uſually placed at the extremities of bones.

b, Many of them oſſifying in proceſs of time, a greater number are obſerved in the fœtus, than in the adult ſtate: from the ſame cauſe the number of bones is greater in young than in old people; becauſe it ſometimes happens that a cartilage placed between two bones oſſifies; and the three parts, which were before diſtinct, are united together. This takes place in the ſternum.

c, The great uſe of the cartilages is in the articulations; where, by their ſmoothneſs, they facilitate motions which the bones alone could not execute with ſo much freedom. They are likewiſe uſeful in the formation of the voice, and for the attachment of muſcles. The cartilages, as well as the bones, are inſenſible (c), not becauſe they are deſtitute of nerves, (being formed, according to M. Duhamel's obſervations, from the perioſteum); but becauſe the cloſeneſs of their texture prevents their nerves from receiving, or tranſmitting any impreſſions. The ſoft parts, which become callous or ſcirrhous, loſe (D) their ſenſibility from a ſimilar cauſe.

4 Of the perioſteum.

a, The perioſteum is a fine (E) membrane, which covers almoſt all the bones. This membrane, though of a very thin texture, is compoſed of a great number of layers, which uſually oſſify one after the other, as the body advances in age.

b, Havers pretended to have diſcovered, that the perioſteum is compoſed of two ſorts of fibres; one of which are placed cloſe to the bone, longitudinally from one end to the other, deriving their origin from the dura mater, which paſſes out of the cranium in different places; and goes to diſtribute itſelf to all the bones in the body. The other order of fibres he ſuppoſed to ariſe from the tendons and muſcles. He aſſerts that they are not longitudinal like the firſt, but that they follow the ſame direction as the parts from which they are produced.

c, The perioſteum has ſanguiferous and lymphatic veſſels, and is ſaid to be ſupplied with nerves (F) from the neighbouring parts: it ſupports the veſſels which go to diſtribute themſelves through the ſubſtance of the bones, the perioſteum internum, and the marrow.

d, In

(C) In the courſe of this treatiſe mention is often made of the ſenſibility or inſenſibility of different parts, and it will perhaps not be amiſs to give the outlines of a ſyſtem, which cannot but be intereſting to all anatomical readers.—Baron Haller was the firſt who publickly aſſerted, that living animals, whoſe cartilages, ligaments, capſulæ of the joints, tendons or perioſteum were cut, burnt or torn, ſhewed no ſigns of uneaſineſs; and that the wounds of all theſe parts were cured without any bad ſymptoms.—In his publication on this ſubject, he allows feeling to the teeth; but not to the other bones; becauſe they are deſtitute of nerves.—He ventures to deny ſenſibility to the marrow, not from any experiments of his own on living animals, but becauſe it is a fatty ſubſtance without nerves.—He tells us, that when the dura mater was torn or burnt, with oil of vitriol, the animal ſeemed inſenſible of the injury; that with the pia mater it was the ſame; but that the moment the brain itſelf was wounded, the body of the animal was exceedingly convulſed—he makes the ſame concluſions from ſimilar experiments on the peritoneum, pleura, and pericardium, and concerning the mediaſtinum, from its analogy to them as a membrane. He deſcribes the cornea as inſenſible, becauſe it nerves cannot be demonſtrated, and it is often pierced with a needle without pain.—From a variety of intereſting experiments, which he has fully related, he concludes, that all theſe parts are perfectly inſenſible; that they have been unjuſtly accuſed by phyſicians as the ſeat of many painful diſeaſes; and that their inſenſibility argues their being deſtitute of nerves—he will not allow the pain and inflammation of the arm, which ſometimes are the conſequences of bleeding, to proceed from the tendon or aponeuroſis in that part; but attributes them to an injury done to the median nerve; or to ſome branch of the muſculo-cutaneous nerve.—He aſſerts, that the phrenitis has not its ſeat in the dura mater, or the pleuriſy in the pleura.—That in the gout, the ſkin and ſubcutaneous nerves, and not the ligaments or capſulæ of the joints, are the ſeat of pain.—Theſe are the moſt important points of the Baron's ſyſtem, but his opinions have been much controverted; and the late Dr Whytt, in particular, favoured the public with many ſenſible arguments in refutation of this doctrine, which, however, if not thoroughly received in its full extent, is now in a great meaſure admitted.—The ingenious Dr Hunter, who appears to have remarked the inſenſibility of ſome of theſe parts before the Baron's publication of his ſyſtem, ſuſpects that the Baron has gone too far in aſſerting, that they have abſolutely no ſenſe of feeling He thinks that experiments on brutes are not ſufficient to aſcertain the more exquiſite ſenſations of the human body; and is of opinion, that the Baron has been led into an error in ſurgery, in ſuppoſing that the effects of wounds of the tendons, ligaments, &c. are ſo very ſimple as to heal without any bad ſymptoms.—Before concluding this note, however, it is proper to obſerve, that ſome of the parts ſuppoſed by Baron Haller and others to be wholly inſenſible, and which really appear to be ſo in a ſound ſtate, have been found to acquire conſiderable ſenſibility by diſeaſe; an inattention to which circumſtance has been the principal cauſe of that apparent contrariety of facts with which this ſubject has been perplexed.

(D) The growth of a new nail is a familiar inſtance of what is here advanced.—At its firſt formation it is ſoft, and of exquiſite ſenſibility; but as it approaches to a harder texture, its ſenſibility gradually decreaſes, and it becomes at length capable of being cut or pared, without any appearance of pain or feeling.

(E) It is common with the generality of anatomical authors, to aſcribe great ſenſibility to the perioſteum. But this opinion is repugnant to the ſyſtem mentioned in a former note; and it appears to be very probable, that this membrane, if not quite inſenſible, poſſeſſes, however, but a very obſcure degree of feeling.

(F) Authors, who allow great ſenſibility to a part, conſequently ſuppoſe it to be plentifully ſupplied with nerves.—But the nerves of the perioſteum, if it contains any, have never yet been demonſtrated.

d, In all parts of the bones which are expoſed to friction, the perioſteum is wanting; as at the joints, and in the parts of the teeth which are above the ſockets: it is likewiſe deficient where-ever tendons or muſcles are attached to bones; the tendons in theſe places performing the office of the perioſteum.

e, Cartilages are covered with a membrane, called *perichondrium*, which, in its uſe and ſtructure, reſembles the perioſteum.

5 Of the marrow. a, The marrow is a fat, oily ſubſtance, filling the cavities of bones. That which is found in the great cavities of long bones, is of a much firmer conſiſtence, than that which is found in the cells of their ſpongy part. The firſt of theſe only is known by the name of *marrow*, the latter being uſually called the *medullary ſubſtance*.

b, The marrow is incloſed by a very fine and tranſparent membrane; in ſome places it is of a reddiſh colour, where it is ſupplied with a great number of blood-veſſels, which it receives from thoſe of the perioſteum. Anatomiſts ſtile this membrane, *membrana medullaris*, or *perioſteum internum;* from its lining the cavities of bones. It furniſhes an infinite number of veſicular proceſſes (G) which incloſe the marrow. The medullary ſubſtance is likewiſe ſurrounded by a very delicate membrane; ſo that neither the marrow, nor the medullary ſubſtance, are in immediate contact with the bones.

c, There are, in the perioſteum internum, veſſels deſtined for the ſecretion of the marrow; and likewiſe abſorbents which take up the oil and return it again to the circulation.

d, It is probable that the marrow is renewed by a kind of circulation. When the abſorbents take up more of it than the ſecretory veſſels are able to ſeparate, it gradually decreaſes. It is for this reaſon, that ſo little is found in the bones of people who die of lingering diſeaſes.

e, The marrow was formerly ſuppoſed to be intended for the nouriſhment and renewal of the bones; but its oily conſiſtence ſeems ſufficiently to contradict this opinion. Its principal uſe is, probably that of preſerving the bones moiſt (H), the natural heat of the body keeping it conſtantly ſufficiently liquid to be inſinuated between the bony fibres, which it may ſoften and render leſs brittle.

f, The ancients were of opinion, that the bones were more filled with marrow at the new than at the full moon. The claws of craw-fiſh too, which are not filled with marrow, but with actual muſcles, were likewiſe conſidered as being more or leſs filled according to the ſtate of the moon: but a thouſand obſervations have convinced us of the abſurdity of this and many other opinions; and we are in theſe days thoroughly perſuaded, that the moon has no more power over the marrow of the bones, or the claws of craw-fiſh; than it has over an infinite number of other things which it was ſuppoſed to influence, before a taſte for true philoſophy took place amongſt us.

6 Of the ſynovial glands. a, The ſynovial glands are ſmall ſpherical bodies (I), and exceedingly vaſcular, ſuppoſed to ſecrete a fluid of a white mucilaginous nature, which ſerves to lubricate the joints. They are placed in ſmall cavities in the articulations, ſo as to be capable of being gently compreſſed by the motion of the joint, which expreſſes their juice in proportion to the degree of friction. When the ſynovia is wanting, or is of too thick a conſiſtence, the joint becomes ſtiff and incapable of flexion or extenſion. This is what is termed *anchyloſis*. The ſynovia, become acrid and inſpiſſated, is uſually conſidered as the cauſe of the gout; which the Greeks have called *arthritis*, a word ſignifying a diſeaſe of the joints.

7 Of the ligaments. a, Ligaments are white, gliſtening, inelaſtic bands, of a compact ſubſtance, more or leſs broad or thick; and ſerving to connect the bones together. They are diſtinguiſhed by different names, adapted to their different forms and uſes. Thoſe of the joints are called either *round* or *burſal*. The round ligaments are white, tendinous, and inelaſtic. They are ſtrong and flexible, and are chiefly found in thoſe articulations which are capable of flexion and extenſion; as in the joints of the elbow and knee. The burſal or capſular ligaments, ſurround the whole joint like a purſe, and are to be found in the articulations which allow motion every way; as in the articulation of the arm with the ſcapula.

8 Of the ſkeleton. a, The word ſkeleton, which by its etymology implies ſimply a dry preparation, is uſually underſtood to ſignify an aſſemblage of all the bones of an animal united together in their natural order. It is ſaid to be a natural ſkeleton, when the bones are connected together by their own proper ligaments; and an artificial one, when they are joined by means of wire.

b, The ſkeleton is generally divided into the head, trunk and extremities. The firſt diviſion includes the bones of the cranium and face. The bones of the trunk, are the ſpine, ribs, ſternum, and bones of the pelvis.

c, The upper extremities on each ſide, contain the two bones of the ſhoulder, *viz.* the ſcapula, and clavicle; the bone of the arm or os humeri; the bones of the fore arm; and thoſe of the hand.

d, The lower extremities, on each ſide of the trunk; conſiſt of the thigh-bone, and the bones of the leg and foot.

CHAP. II.

Of the BONES of the Head (K). 9

a, THE head is of a roundiſh figure, and ſomewhat

(G) The marrow is likewiſe ſupported in theſe cavities by the bony filaments of the reticular ſubſtance of the bones.

(H) Havers, who has written profeſſedly on the bones, deſcribes the canals by which the marrow is conveyed thro' every part of their ſubſtance; and divides them into longitudinal and tranſverſe ones.---He ſpeaks of the firſt as extending through the whole length of the bone; and of the latter, as the paſſages by which the longitudinal ones communicate with each other. The tranſudation of the oil through the bones of the ſkeleton, ſeems to prove that ſome ſuch paſſages do actually exiſt; but it is very difficult, if not impoſſible, to demonſtrate them ſatisfactorily.

(I) It is now much doubted, however, whether the appearances in the joints, which are generally called *glands*, are any thing more than aſſemblages of fat.

(K) The deſcription of the bones will be, to many readers perhaps, dry, tedious, and difficult to be underſtood.---It is a ſubject which ſeems to preclude all attempts at variety or elegance of ſtyle.---All the bones have one great uſe, that of incloſing and ſupporting the other parts of the body: and the reader may defer the reading this part of the oval (L). Its greateſt diameter is from the forehead to the occiput; its upper part is called *ſinciput*, or the crown of the head; its anterior or fore part, is called the *face;* and the upper part of this is called the *forehead;* its poſterior or hind part, is called the *occiput;* its ſides are called the *temples;* and its inferior part, the *baſis*.

b, The bones of the head may be divided into thoſe of the cranium, and face.

Sect. i. *Of the* Bones *of the Cranium.*

10 a, There are eight bones of the cranium, *viz.* the coronal bone or os frontis; the two parietal bones or oſſa bregmatis; the os occipitis; the two temporal bones; the ſphenoid bone; and the os ethmoides or cribriforme.

b, The ſix firſt are conſidered as proper to the cranium, and the two latter as common both to the cranium and face.

c, Theſe bones are all harder at their ſurface than in their middle; and on this account they are divided into two tables, and a middle ſpongy ſubſtance called *diploe*.

11 Of the os frontis. a, In this, as in all the other bones, we ſhall conſider its figure, ſtructure, proceſſes, depreſſions, and cavities; and the manner in which it is articulated with the other bones.

b, The os frontis has ſome reſemblance in ſhape to the ſhell of the cockle. Externally it is convex, its concave ſide being turned towards the brain. This bone, in the places where it is united to the temporal bones, is very thin; and has there no diploe. It is likewiſe exceedingly thin in that part of the orbit of the eye which is neareſt to the noſe. Hence it is that a wound in the eye, by a ſword, or any other pointed inſtrument, is ſometimes productive of immediate death. In theſe caſes, the ſword paſſing through the weak part of the bone, penetrates the brain, and divides the nerves at their origin; or perhaps, opens ſome blood-veſſel, the conſequences of which are ſoon fatal.

c, We obſerve, on the exterior ſurface of this bone, five apophyſes or proceſſes; which are eaſily to be diſtinguiſhed. One of theſe is placed at the bottom and narroweſt part of the bone, and is called the *naſal proceſs*, from its ſupporting the upper end of the bones of the noſe. The four others are called *orbitar proceſſes*. They ſerve to form the orbits, which are the cavities in which the eyes are placed. In each of theſe orbits there are two proceſſes, one at the interior or great angle, and the other at the exterior, or little angle of the orbit. They are called the *angular proceſſes*. Between theſe a ridge is extended in form of an arch, and on this the eyebrows are placed. It is called the *orbitar* or *ſuperciliary ridge;* and in ſome meaſure covers and defends the globe of the eye. This arch is interrupted near the noſe by a ſmall pit, in which the tendon of the muſculus obliquus major of the eye is fixed. In each orbit, under the external proceſs, a conſiderable depreſſion is obſerved, in which the lachrymal gland is lodged.

d, In the anterior part of the os frontis, there is a conſiderable diſcontinuation of it, which is filled up by the cribriform part of the os ethmoides.

e, The internal view of this bone affords us an elevation in form of a ridge, which has been called the *ſpinous proceſs:* it paſſes from the anterior to the poſterior part of the bone, dividing it into two conſiderable foſſæ, in which the anterior lobes of the brain are placed. To this ridge is attached the extremity of the *falx*, as the membrane is called which divides the brain into two hemiſpheres. Beſides theſe two foſſæ, there are many depreſſions which appear like digital impreſſions, and owe there formation to the prominent circumvolutions of the brain.

f, In young ſubjects the forehead is formed of two diſtinct bones; ſo that in them the ſagittal ſuture extends from the os occipitis to the noſe. This bone is almoſt every where compoſed of two tables and a diplöe. Theſe two tables ſeparating from each other under the eyes, form two cavities, one on each ſide of the face, called the *frontal ſinuſes*. Theſe ſinuſes are lined with a ſoft membrane, called *membrana pituitaria*. In theſe ſinuſes a mucus is ſecreted, which is conſtantly paſſing, through two ſmall holes, into the noſtrils which it ſerves to moiſten.

g, The os frontis is joined by ſuture to many of the bones of the head, *viz.* to the parietal, maxillary, and temporal bones; to the os ethmoides; os ſphenoides; os unguis; and oſſa naſi. The ſuture which connects it with the parietal bones, is called the *coronal ſuture*.

12 Of the p tal bone a, The parietal bones are two in number; they are very thin, and even tranſparent in ſome places. The particular figure of each of theſe bones, is that of an irregular ſquare, bordered with indentations thro' its whole circumference, except at its lower part. It will be eaſily conceived that theſe bones, which compoſe the ſuperior and lateral parts of the cranium, and cover the greateſt part of the brain, form a kind of vault. On their inner ſurface we obſerve the marks of the veſſels of the dura mater.

b, The oſſa parietalia, are joined to each other by the ſagittal ſuture; to the os ſphenoides, and oſſa temporum, by the ſquamous ſuture; to the os occipitis, by the lambdoidal ſuture (M); ſo called from its reſemblance to the Greek letter *lambda;* and to the os frontis, by the coronal ſuture.

c, In new-born infants, the oſſa parietalia are ſeparated from the middle of the divided os frontis, by a portion of the cranium then unoſſified. When the finger is applied to this part, which is called the *fontanelle*, the dilatation of the brain, and of the veſſels of the dura mater, may be eaſily felt. And in midwifery, the feel of this part, which, in natural labours, is

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work till he meets with a ſkeleton.---That part, however, which relates to the teeth is excepted, as being a branch which ought to be underſtood by every body, independent of the ſkeleton.

(L) The bones of the fœtus being perfectly diſtinct, and the muſcles in young perſons not acting much, the ſhape of the head is ſuppoſed to depend much on the management of children, when very young. Veſalius, who has remarked the difference in people of different nations, obſerves for inſtance, that the head of a Turk is conical, from the early uſe of the turban; whilſt that of an Engliſhman is flattened by the chin-ſtay.

(M) The lambdoidal ſuture is ſometimes very irregular; being compoſed of many ſmall ſutures, which ſurround ſo many little bones called *oſſa triquetra*, tho' ſometimes improperly, as they are not always triangular.

is the firſt to preſent itſelf, is an indication of the ſtate of the fœtus, whether it be living or dead. Every blow on this part, in children, is liable to be attended with the moſt fatal conſequences; and it is not without reaſon, that experienced nurſes cautiouſly defend it from injury, by applying a linen cloth to it ſeveral times doubled.

13 Of the occipital bone.

a, The occipital bone forms the poſterior and inferior parts of the ſkull: it approaches near to the ſhape of a lozenge, and is indented throughout three parts of its circumference.

b, There is a conſiderable hole in the inferior portion of this bone, called the *foramen magnum;* thro' which the medulla oblongata paſſes into the ſpine. The nervi acceſſorii, and vertebral arteries, likewiſe paſs thro' it. Beſides this, there are uſually four other holes peculiar to this bone, and two which are common to it and the oſſa temporum; theſe foramina ſerve for the paſſage of the blood-veſſels and nerves. At the ſides, and a little on the anterior part of the foramen magnum, are two proceſſes called the *condyles,* one on each ſide; they are of an oval figure, and are covered with cartilage.

c, The external ſurface of this bone, which is very irregular, affords attachment to ſeveral muſcles. On looking over its internal ſurface, we perceive the appearance of a croſs, formed by a very prominent ridge; which riſes upwards from near the foramen magnum, and by two tranſverſe ſinuoſities, one on each ſide of the ridge. This croſs occaſions the formation of four foſſæ, two above and two below the ſinuoſities. In the latter are placed the lobes of the cerebellum; and in the former, the poſterior lobes of the brain. The two ſinuoſities ſerve to receive the lateral ſinuſes.

d, In the upper part of this bone is ſeen a continuation of the ſinuoſity of the longitudinal ſinus. The cuneiform proceſs (which is the name given to the great apophyſis at the fore part of this bone) is made concave for the reception of the medulla oblongata.

e, The occipital bone is thicker and ſtronger than either of the other bones of the head, tho' irregularly ſo; at its inferior part where it is thinneſt, it is covered by a great number of muſcles.

f, The reaſons for ſo much thickneſs and ſtrength in this bone ſeem to be, that it covers the cerebellum, in which the leaſt wound is of the utmoſt conſequence; and, that it is by its ſituation more liable to be fractured by falls than any other bone of the cranium. For if we fall forwards, the hands are naturally put out to prevent the forehead's touching the ground; and if to one ſide, the ſhoulders in a great meaſure protect the ſides of the head; but if a perſon falls backwards, the hind part of the head conſequently ſtrikes againſt the earth, and that too with conſiderable violence. Nature then has wiſely conſtructed this bone ſo as to be capable of the greateſt reſiſtance.

g, The os occipitis, is joined by means of the cuneiform proceſs to the ſphenoid bone, with which it often oſſifies and makes but one bone in thoſe who are advanced in life. It is connected to the parietal bones by the lambdoidal ſuture; and to the temporal bones, by the additamenta of the ſame ſuture. This head is likewiſe united to the trunk by means of this bone. The two condyles of the occipital bone, are received into the ſuperior oblique proceſſes of the firſt vertebræ of the neck; and it is by means of this articulation that a certain degree of flexion and extenſion, or rather of motion of the head forwards and backwards, is performed. We ſay a certain degree of motion, becauſe that which is performed on the firſt vertebra alone, and independent of the other vertebræ, is very inconſiderable.

h, In flexion, the vertebræ form a kind of bow, and ſtreighten themſelves again in extenſion.

14 Of the temporal bones

a, There are two temporal bones, one on each ſide. They are uſually divided into two parts, one of which is called the *ſquamous,* or *ſcaly part;* and the other *os petroſum,* from its inequality and hardneſs. This laſt is ſhaped like a pyramid.

b, In both theſe parts there are proceſſes and cavities to be deſcribed; externally there are three proceſſes, one anterior, called the *zygomatic proceſs;* one poſterior, called the *maſtoid* or *mamillary proceſs,* from its reſemblance to a nipple; and one inferior, called the *ſtyloid proceſs,* becauſe it is ſhaped like a ſtiletto, or dagger.

c, The cavities are, 1. The meatus auditorius externus. 2. A large foſſa which ſerves for the articulation of the lower jaw; it is before the meatus auditorius, and immediately under the zygomatic proceſs. 3. The ſtylo-maſtoid hole, ſo called from its ſituation between the ſtyloid and maſtoid proceſſes; it is likewiſe ſtyled the *aquæduct of Fallopius,* and affords a paſſage to the portio dura of the auditory, or ſeventh pair of nerves. 4. Below, and on the fore part of the laſt foramen, we obſerve part of the jugular foſſa; a thimble-like cavity, in which the beginning of the internal jugular vein is lodged. Anterior and ſuperior to this foſſa, is the orifice of a foramen through which the carotid artery paſſes. This conduit runs firſt upwards and then forwards, forming a kind of elbow, and terminates at the end of the os petroſum: at this part of each of the oſſa temporum we obſerve the opening of the Euſtachian tube, a canal which paſſes from the ear to the mouth.

d, In examining the internal ſurface of theſe bones, we remark the triangular figure of their petrous part which ſeparates two foſſæ; one ſuperior and anterior, the other inferior and poſterior; the latter of theſe compoſes part of the foſſa, in which the cerebellum is placed; and the former, a portion of the leaſt foſſa for the baſis of the brain; on the poſterior ſide of the os petroſum, we obſerve the meatus auditorius internus, into which enters the double nerve of the ſeventh pair, *viz.* the portio dura, and portio mollis of that pair.

e, The os petroſum contains ſeveral little bones called the *bones of the ear;* which, as they do not enter into the formation of the cranium, ſhall be deſcribed when we are treating of the organs of hearing.

f, The oſſa temporum are joined to the oſſa malarum by the zygomatic ſutures; to the parietal bones by the ſquamous ſuture; to the os occipitis by the lambdoidal ſuture; and, to the ſphenoid bone by the ſuture of that name.

15 Of the os ſphenoides.

a, The os ſphenoides, or cuneiforme as it is ſometimes called from its wedge-like ſituation amidſt the other bones of the head, is of a more irregular figure than any other bone. It has been compared to a bat with its wings extended. This reſemblance is but faint, but it would be difficult perhaps to find any thing it reſembles more.

b, We diſtinguiſh in this bone its body or middle part, and its wings or ſides, which are much more extenſive than its body.

c, On whatever ſide we view it, we diſcover only proceſſes and cavities. The proceſſes, both external and internal, are ſo very numerous, that it will be ſufficient for us to deſcribe the principal ones, of which there are three on the outſide: one of theſe is in the middle, and is ſhaped like a creſt, making part of the ſeptum narium; the other two are the pterygoid or aliform proceſſes, one on each ſide of the body of the bone, and at no great diſtance from it; each of theſe proceſſes is divided into two wings; and of theſe the exterior one is the wideſt; the other terminates in a hook-like proceſs.

d, This bone on its inner ſurface affords three foſſæ, two of which are conſiderable ones; they are formed by the wings of the bone, and make part of the leſſer foſſæ of the baſis of the ſkull. The third, which is ſmaller, is on the top of the body of the bone, and is called *ſella turcica*; from its reſemblance to a Turkiſh ſaddle. This foſſa, in which the pituitary gland is placed, has poſteriorly and anteriorly proceſſes, called the *clinoid proceſſes*.

e, There are eight holes in this bone, *viz.* four on each ſide; ſeveral pair of nerves and ſome blood veſſels paſs through them.

f, Within the ſubſtance of the os ſphenoides, there are two ſinuſes ſeparated by a bony plate. They are lined with the pituitary membrane; and like the frontal ſinuſes, ſeparate a mucus which paſſes into the noſtrils.

g, The os ſphenoides is joined to all the bones of the cranium, and likewiſe to the oſſa maxillaria, oſſa malarum, oſſa palati, and vomer.

h, This bone makes part of the baſis of the ſcull, ſerves to form in ſome meaſure the orbits, and affords attachment to ſeveral muſcles.

16 Of the os ethmoides or cribriforme.

a, The os ethmoides, or ſieve-like bone, as it is called from the great number of ſmall holes with which it is pierced, is placed in the anterior part of the baſis of the ſcull, and is the laſt bone that enters into the compoſition of the cranium. It is nearly of a cubical figure.

b, There are three parts to be deſcribed in this bone, *viz.* one in the middle, and two at its ſides; the middle part, from which it derives its name, is a thin lamella, or bony table, pierced with an infinite number of holes, through which paſs as many filaments of the olfactory nerve. From the middle of this plate, both on the outſide and from within, there riſes up a proceſs which is eaſily obſerved. The inner one is called *criſta galli*, from its ſuppoſed reſemblance to a cock's comb; to this proceſs the falx is attached, which divides the brain into two hemiſpheres. The exterior proceſs, which has the ſame common baſis as the criſta galli, is a fine lamella, which is united to the vomer, and divides the cavity of the noſtrils, tho' unequally; it being uſually inclined to one ſide or other.

c, The lateral parts of this bone are compoſed of a cellular ſubſtance, and theſe cells are ſo very intricate, that their figure or number cannot be deſcribed. Many writers have on this account, called this part of the bone the *labyrinth*. Theſe cells are externally covered with bony lamina, thin like the cells themſelves, but very ſmooth and plain. This part of the bone is called *os planum*; and forms part of the orbit.

d, The different cells of this bone, which are ſo exceedingly numerous, and which are every where lined with the pituitary membrane, evidently ſerve to enlarge the cavity of the noſe in which the organ of ſmelling reſides.

e, This bone is joined to the os ſphenoides, os frontis, oſſa maxillaria, oſſa palati, oſſa naſi, oſſa unguis, and vomer.

f, The ancients, who conſidered the brain as the ſeat of all the humours, were of opinion, that this viſcus diſcharged its redundant moiſture through the holes of the ethmoid bone. But in theſe times they only can adopt ſo erroneous a notion, who have not exact ideas of the human anatomy. The vulgar ſtill think that abſceſſes of the brain diſcharge themſelves through the mouth and ears, and that ſnuff is liable to get into the head; but neither ſnuff, nor the matter of an abſceſs, are more capable of paſſing thro' the cribriform bone, than the ſeroſity which they ſuppoſed was diſcharged thro' it in a common cold; all the holes of the ethmoid bone are filled up with branches of the olfactory nerve. Its inner part is likewiſe covered with the dura mater, and its cells are every where lined with the pituitary membrane; ſo that neither matter, nor any other fluid can poſſibly paſs through this bone either externally, or internally. Matter is, indeed, ſometimes diſcharged through the noſtrils; but the ſeat of the diſeaſe is in the ſinuſes of the noſe, and not in the brain; and impoſthumations are obſerved to take place in the ear, which ſuppurate and diſcharge themſelves externally.

g, Before we leave the bones of the head, we wiſh to make ſome general obſervations on its ſtructure and figure. As the cranium might have been compoſed of a ſingle bone, the articulation of its ſeveral bones being abſolutely without motion, it may be aſked, perhaps, why ſuch a multiplicity of bones, and ſo great a number of ſutures? Many advantages may poſſibly ariſe from this plurality of bones and ſutures, which have not yet been obſerved. We are able, however, to point out many uſeful ends which could only be accompliſhed by this peculiarity of ſtructure: in this, as in all the other works of nature, the great wiſdom of the Creator is evinced, and cannot fail to excite our admiration and gratitude.

h, The cranium, by being divided into ſeveral bones, grows much faſter and with greater facility than if it was compoſed of one piece only. In the fœtus, the bones as we have before obſerved, are perfectly diſtinct from each other. The oſſification begins in the middle of each bone, and proceeds gradually to the circumference. Hence the oſſification, and of courſe the increaſe of the head, is carried on from an infinite number of points at the ſame time; and the bones conſequently approach each other in the ſame proportion. To illuſtrate this doctrine more clearly, if it can want further illuſtration; ſuppoſe it neceſſary for the parietal bones, which compoſe the upper part of the head, to extend their oſſification, and form the fore part of the head likewiſe; is it not evident, that this proceſs would be much more tedious than it is now, when the os frontis and the parietal bones are both growing at the ſame time? Hence it happens that the heads of young people, in which the bones begin to touch each other, increaſe,

creaſe ſlowly; and that the proportionate increaſe of the volume of the head is greater in three months in the fœtus, than it is perhaps in 24 months, at the age of 14 or 15 years.

i, The ſutures, excluſive of their advantages in ſuſpending the proceſſes of the dura mater, are evidently of great utility to prevent the too great extent of fractures of the ſkull. Suppoſe, for inſtance, that by a fall or blow, one of the bones of the cranium becomes fractured. The fiſſure which, in a head compoſed of only one bone would be liable to extend itſelf through the whole of it, is ſtopped by the firſt ſuture it meets, and the effects of the injury are confined to the bone on which the blow was received.

k, The ſpherical ſhape of the head ſeems likewiſe to render it more capable of reſiſting external violence than any other ſhape would do. In a vault the parts mutually ſupport and ſtrengthen each other; and this happens in the cranium.

Sect. ii. *Of the* Bones *of the Face.*

17 the bones the face.

a, The face, which conſiſts of a great number of bones, is uſually divided into the upper and lower jaws: of theſe the latter is capable of motion, but the former is immoveable. The bones of the upper jaw are thirteen in number, excluſive of the teeth, which we ſhall deſcribe ſeparately, after having finiſhed the other bones of the head. Of theſe thirteen bones, there are ſix on each ſide of the maxilla ſuperior, or upper jaw; and one in the middle.

b, The bones, which are in pairs, are the oſſa malarum; oſſa maxillaria; oſſa naſi; oſſa unguis; oſſa palati; and oſſa ſpongioſa inferiora. The ſingle bone is the vomer.

18 the oſſa larum.

a, The oſſa malarum are the prominent ſquare bones which form the upper part of the cheeks; they are ſituated cloſe under the eyes, and make part of the orbits. Each of theſe bones have three ſurfaces to be conſidered. One of theſe is exterior and ſomewhat convex; the ſecond is ſuperior and concave, ſerving to form the lower and lateral parts of the orbit. The third, which is poſterior, is very unequal, and concave for the lodgment of the lower part of the temporal muſcle.

b, Each of theſe bones may be deſcribed as having four proceſſes formed by their four angles. Two of theſe may be called orbitar proceſſes. The ſuperior one is united by ſuture to the os frontis, and that below, to the maxillary bone. The third is connected with the os ſphenoides by means of the tranſverſe ſuture; and the fourth is joined to the zygomatic proceſs of the temporal bone, with which it forms the zygoma.

19 the oſſa illaria riora.

a, Theſe bones are ſo called, becauſe they conſtitute the moſt conſiderable portion of the upper jaw. They are two in number, and generally remain diſtinct thro' life. Their figure is exceedingly irregular, and not eaſily to be deſcribed.

b, Of the many proceſſes which are to be ſeen on theſe bones, and which are connected with the bones of the face and ſcull, we ſhall deſcribe only the moſt remarkable.

c, One of theſe proceſſes is at the upper and fore-part of the bone, making part of the ſide of the noſe, and called the *naſal proceſs*. Another forms a kind of circular ſweep at the inferior part of the bone, in which are the alveoli, or ſockets for the teeth; this is called the alveolar proceſs. A third proceſs is united to the os malæ on each ſide. The *alveolar proceſs* has, poſteriorly, a conſiderable tuberoſity on its internal ſurface, called the *maxillary tuberoſity*.

d, There are two horizontal lamellæ behind the alveolar proceſs, which uniting together, form part of the roof of the mouth, and divide it from the noſe. This partition, being ſeated ſomewhat higher than the lower edge of the alveolar proceſs, gives the roof of the mouth a conſiderable hollowneſs.

e, In viewing theſe bones internally, we obſerve a foſſa in the inferior portion of the naſal proceſs; which with the os unguis, forms a paſſage for the lachrymal duct.

f, Where theſe two bones are united to each other, they project ſomewhat forwards, leaving between them a furrow which receives the inferior portion of the ſeptum naſi.

g, Each of theſe bones is hollow, and forms a conſiderable ſinus under its orbitar part. This ſinus, which is uſually called *antrum highmorianum* is lined with the pituitary membrane, it anſwers the ſame purpoſes as the other ſinuſes of the noſe; and communicates with the noſtrils, by an opening which appears to be a large one in the ſkeleton, but in the recent ſubject is much ſmaller.

h, The oſſa maxillaria, not only ſerve to form the cheeks, but likewiſe the palate, noſe, and orbits; and beſides their union with each other, they are connected with the greateſt part of the bones of the face and cranium, *viz.* with the oſſa naſi, oſſa malarum, oſſa unguis, oſſa palati, os frontis, os ſphenoides, and os ethmoides.

20 Of the oſſa naſi.

a, The oſſa naſi reſemble two irregular ſquares. They are narrower and thicker above than below; externally they are ſomewhat convex, and internally a little concave. Theſe bones conſtitute the upper part of the noſe; at their fore part they are united to each other; above to the os frontis; by their ſides to the oſſa maxillaria ſuperiora; poſteriorly and interiorly, to the ſeptum narium; and below to the cartilages which compoſe the reſt of the noſtrils.

21 Of the oſſa unguis.

a, Theſe bones derive their name from their tranſparency, and figure which reſembles that of a finger-nail; they are likewiſe ſtyled *oſſa lachrymalia*, becauſe they help to form, with the naſal proceſs of the os maxillare ſuperius on each ſide, an excavation for the lodgment of the lachrymal ſac; and to compoſe part of the lachrymal duct through which the tears paſs into the noſtrils.

b, Theſe bones, which are the ſmalleſt bones of the face, are of an irregular ſhape; and may be deſcribed as having two ſmooth parts, divided by a middle ridge on their external ſurface. One of theſe parts which is flat, forms a ſmall part of the orbit; the other, which is next to the noſe, is concave, and makes, as we have before obſerved, part of the lachrymal duct; by its union with the canal formed by the naſal proceſs of the ſuperior maxillary bone. That part of the bone which forms the duct is cribriform, being pierced with a great number of holes.

c, Each of theſe bones is joined to the os maxillare ſuperius, os frontis, and os ethmoides.

22 Of the oſſa palati.

a, Theſe bones are of a very irregular figure; they are placed at the back part of the roof of the mouth, and ſerve to form the naſal and maxillary foſſa, and a ſmall portion of the orbit. Where they are united to each other they riſe up into a ſpine on their internal ſurface; this ſpine appears to be a continuation of that of the ſuperior maxillary bones, and helps to form the ſeptum narium.

b, Theſe bones are joined to the oſſa maxillaria ſuperiora, os ſphenoides, os ethmoides, and vomer.

23 Of the vomer.

a, This bone derives its name from its reſemblance to a plough-ſhare. It is a long and flat bone, ſomewhat thicker at its back than at its fore part. At its upper part we obſerve a furrow extending through its whole length. The back of this furrow which is the largeſt, receives a proceſs of the ſphenoid bone; from this the furrow advances forwards, and becoming narrower and ſhallower, receives ſome part of the naſal lamella ethmoidea; the reſt ſerves to ſupport the middle cartilage of the noſe.

b, The inferior portion of this bone is placed on the naſal ſpine of the maxillary and palate bones, which we mentioned in our deſcription of the oſſa palati.

c, The vomer is united to the os ſphenoides, os ethmoides, oſſa maxillaria ſuperiora, and oſſa palati. It forms part of the ſeptum narium, by dividing the back part of the noſe into two noſtrils.

24 Of the oſſa ſpongioſa inferiora.

a, The parts which are uſually deſcribed by this name, do not ſeem to deſerve to be diſtinguiſhed as diſtinct bones. They conſiſt of a ſpongy lamella in each noſtril, which is united to the ſpongy lamina of the ethmoid bone, of which they are by ſome conſidered as a part.

b, Each of theſe lamellæ is longeſt from behind, forwards; with its convex ſurface turned towards the ſeptum narium, and its concave part towards the maxillary bone, covering the opening of the lachrymal duct into the noſe.

c, Theſe bones are covered with the pituitary membrane; and, beſides their connection with the ethmoid bone, are joined to the oſſa maxillaria ſuperiora; oſſa palati; and oſſa unguis.

25 Of the maxilla inferior.

a, The maxilla inferior, or lower jaw; which in its figure reſembles a bow with its end elevated; is at firſt compoſed of two diſtinct bones; but theſe ſoon after birth unite into one at the middle of the chin, ſo as to form only one bone. The ſuperior edge of this bone has, like the maxilla ſuperior, a proceſs called the alveolar proceſs. This as well as that of the upper jaw to which it is in other reſpects a good deal ſimilar, is likewiſe furniſhed with cavities for the reception of the teeth.

b, The poſterior part of the bone on each ſide riſes almoſt perpendicularly into two proceſſes, one of which is called the *coronoid*, and the other the *condyloid proceſs*. The firſt of theſe is the higheſt; it is thin and pointed, and the temporal muſcle which is attached to it, ſerves to elevate the jaw. The condyloid proceſs is narrower, thicker, and ſhorter than the other; terminating in an oblong rounded head, which is made for a moveable articulation with the cranium, and is received into a foſſa of the temporal bone. In this joint there is a moveable cartilage, which being more cloſely connected to the condyle than to the cavity, may be conſidered as belonging to the former. At the bottom of each coronoid proceſs, on its inner part, is a foramen or canal, which extends under the roots of all the teeth, and terminates at the outer ſurface of the bone near the chin. Each of theſe foramina affords a paſſage to an artery, vein, and nerve, which ſend off branches to the ſeveral teeth.

c, This bone is capable of a great many motions. The condyles, by ſliding from the cavity towards the eminences on each ſide, bring the jaw horizontally forwards, as in the action of biting: or the condyles only may be brought forwards while the reſt of the jaw is tilted backwards, as in the caſe when the mouth is open. The condyles may alſo ſlide alternately backwards and forwards, from the cavity to the eminence, and vice verſa; ſo that, while one condyle advances, the other moves backwards, turning the body of the jaw from ſide to ſide, as in grinding the teeth. The great uſe of the cartilages ſeems, to be that of ſecuring the articulation, by adapting themſelves to the different inequalities in theſe ſeveral motions of the jaw, and to prevent any injuries from friction. This laſt circumſtance is of great importance where there is ſo much motion; and Mr J. Hunter has accordingly found this cartilage in the different tribes of carnivorous animals where there is no eminence nor cavity, nor other apparatus for grinding.

d, The alveolar proceſſes are formed of an external and internal plate united together by thin bony partitions, which divide the proceſſes at the fore part of the jaw into as many ſockets as there are teeth; but at the poſterior part where the teeth have more than one root, each root has a diſtinct cell. Theſe proceſſes in both jaws begin to be formed with the teeth, accompany them in their growth, and diſappear when the teeth fall; ſo that the loſs of the one ſeems conſtantly to be attended with the loſs of the other.

26 Of thete

a, The teeth are bones of a particular ſtructure, formed for the purpoſes of maſtication, and the articulation of the voice.

b, Each tooth may be divided into its body, neck, and root, or fangs. The body of the tooth is that part which appears above the gums. The root is fixed into the ſocket, and the neck is the middle part between the two. The teeth are compoſed of two ſubſtances, *viz*, enamel, and bone. The enamel, or as it is ſometimes called, the vitreous, or cortical part of the tooth, is a very hard and compact ſubſtance, of a white colour, and peculiar to the teeth. When broken, it appears fibrous or ſtriated; and all the ſtriæ are directed from the circumference to the center of the tooth. This enamel is thickeſt on the grinding ſurface, becoming gradually thinner as it approaches the neck, where it terminates inſenſibly. Ruyſch affirmed, that he could trace the arteries into the hardeſt part of the teeth; Lewenhoeck ſuſpected the fibres of the enamel to be ſo many veſſels; and, Monro ſays, he has frequently injected the veſſels of the teeth in children ſo as to make the inſide of the cortex appear perfectly red. But Mr J. Hunter who has written profeſſedly on the teeth, ſays, that no injection will ever reach this ſubſtance; that it receives no tinge from madder; and that it has no marks of being vaſcular, or of having a circulation of fluids.

c, The bony part of a tooth reſembles other bones in its ſtructure, but is much harder than the moſt compact part of bones in general. It compoſes the inner part of the body, neck and root of the tooth. From certain circumſtances (N) this part of a tooth appears to be vaſcular, but there are many others which tend to prove that it is not.

d, Each tooth has an inner cavity, which beginning by a ſmall opening, becomes larger and terminates in the body of the tooth.

e, This cavity is ſupplied with an artery, vein, and nerve, which paſs through the ſmall hole in the root. In old people this hole ſometimes cloſes, and the tooth becomes then inſenſible.

f, The teeth are inveſted with a perioſteum from their fangs to a little beyond their bony ſockets, where it is attached to the gums. This membrane ſeems to be common to the tooth which it incloſes, and to the ſockets which it lines.

g, The teeth are likewiſe ſecured in their ſockets by a red ſubſtance called the *gums*, which every where covers the alveolar proceſſes, and has as many perforations as there are teeth. The gums are exceedingly vaſcular, and have ſomething like a cartilaginous hardneſs and elaſticity, but do not ſeem to have much ſenſibility. The gums of infants, which perform the offices of teeth, have a hard ridge extending through their whole length, but in old people who have loſt their teeth this ridge is wanting.

h, The number of the teeth in both jaws at full maturity, uſually varies from 28 to 32. They are commonly divided into three claſſes, *viz.* inciſores, canini, and grinders, or molares (O). The inciſores are the four teeth in the fore part of the jaws; they derive their name from their uſe in dividing and cutting the food, and have each of them two ſurfaces which meet in a ſharp edge. Of theſe ſurfaces, the anterior one is convex, and the poſterior one ſomewhat concave. In the upper jaw they are uſually broader and thicker, eſpecially the two firſt, than thoſe of the under jaw, over which they generally fall by being placed a little obliquely.

i, The canini are the longeſt of all the teeth, deriving their name from their reſemblance to a dog's tuſks (P.) There is one of theſe teeth on each ſide of the inciſores, ſo that there are two in each jaw. Their fang differs from that of the inciſores, only in being much larger; and their ſhape may be eaſily deſcribed to be that of an inciſor with its edge worn off ſo as to end in a narrow point inſtead of a thin edge.

k, Theſe teeth not being calculated for dividing like the inciſores, or for grinding, ſeem to be intended for laying hold of ſubſtances (Q).

l, The grinders, or molares, of which there are ten in each jaw, are ſo called, becauſe from their ſize and figure they are calculated for grinding the food. The canini and inciſores have only one fang, but the three laſt grinders in the under jaw have conſtantly two fangs; and the ſame teeth in the upper jaw three fangs. Sometimes theſe fangs are divided into two points near their baſe, and each of theſe points has, perhaps, been ſometimes conſidered as a diſtinct fang. The grinders likewiſe differ from each other in their appearance. The two firſt on each ſide, which Mr Hunter appears to have diſtinguiſhed very properly by the name of *bicuſpides*, ſeem to be of a middle nature, between the inciſores and grinders; and have ſometimes only one root. The two beyond theſe on each ſide are much larger. The laſt grinder is ſhorter and ſmaller than the reſt, and from its coming through the gums later than the reſt, and ſometimes not appearing till late in life, is called *dens ſapientiæ*. The variation in the number of teeth uſually depends on the dentes ſapientiæ.

m, There is in the ſtructure and arrangement of all theſe

(N) Theſe circumſtances are, that the teeth like other bones are liable to ſwellings; and that they are found anchyloſed with the ſocket. But Mr J. Hunter ſuppoſes that both theſe may be original formations. He never ſaw the veſſels of the teeth injected in any preparation, either of young or old ſubjects; and as the moſt convincing proof of their not being vaſcular, he reaſons from the analogy between them and other bones. He obſerves, for inſtance, that in a young animal that has been fed with madder, the parts of the teeth which were formed before it was put on the madder diet will appear of their natural colour, but that ſuch parts as were formed while the animal was taking the madder will be of a red colour, whereas in other bones, the hardeſt parts are ſuſceptible of the dye, tho' more ſlowly than the parts which are growing. Hence, he ſuppoſes, that the teeth when completely formed ceaſe to be vaſcular. Again, he tells us, that if you leave off feeding the animal with madder a conſiderable time before you kill it, you will find the above appearances ſtill ſubſiſting, with this addition, that all the parts of the teeth which were formed after leaving off the madder will be white. This experiment proves, that a tooth once ting'd does not loſe its colour, whereas other bones do (tho' very ſlowly) return again to their natural appearance: and as the dye in this caſe muſt be taken into the habit by the abſorbents, he is led to ſuſpect that the teeth are without abſorbents as well as other veſſels. Tho' from theſe and other reaſons, they ſeem to appear as extraneous bodies with reſpect to a circulation thro' their ſubſtance, yet they moſt certainly poſſeſs a living principle. They are not eaſily affected by the diſeaſes to which other bones are liable. They do not become ſoft in a mollities oſſium, nor is their growth evidently retarded in rickety children: but they are, as we often experience, exquiſitely ſenſible; and are capable of being tranſplanted into other ſockets when recently drawn. This ſenſibility evidently ariſes from the expoſure of the nerve in a caries of the tooth; and their diſpoſition to unite with the ſockets into which they are tranſplanted, tho' a proof of their living principle (for a tooth that has been long drawn before it is tranſplanted, and which of courſe has loſt this principle will never become fixed) does not abſolutely prove their having a circulation.

(O) Mr Hunter has thought proper to vary this diviſion. He retains the old name of *inciſores* to the four fore teeth, but he diſtinguiſhes the canine teeth by the name of the *cuſpidati*. The two teeth which are next to theſe, and which have been uſually ranked with the molares, he calls the *bicuſpides*; and he gives the name of *grinders* only, to the three laſt teeth on each ſide.

(P) The canine teeth of the upper jaw are likewiſe ſometimes called *eye teeth*, from their ſuppoſed connection with the eyes, and the great danger to which the eye-ſight is thought to be expoſed by their being drawn. Although theſe are vulgar notions, real evils are ſometimes occaſioned by extracting them. They are ſeparated from the maxillary ſinus, only by a very thin bony partition: this partition is liable to be injured in the operation, and the pituitary membrane being in this caſe torn, inflammation and the moſt diſagreeable conſequences have often enſued.

(Q) Mr Hunter remarks of theſe teeth, that we may trace in them a ſimilarity in ſhape, ſituation and uſe, from the moſt imperfectly carnivorous animal, which we believe to be the human ſpecies, to the lion, which is the moſt perfectly carnivorous.

theſe teeth an art which cannot be ſufficiently admired. To underſtand it properly, it will be neceſſary to conſider the under jaw as a kind of lever, with its fixed points at its articulations with the temporal bones: it will be right to obſerve too, that its powers ariſe from its different muſcles, but in elevation chiefly from the temporalis; and that the aliment conſtitutes the object of reſiſtance. It will appear then that the molares, by being placed neareſt the centre of motion, are calculated to preſs with a much greater force than the other teeth, independent of their grinding powers, and that it is for this reaſon we put between them any hard body we wiſh to break.

n, The canini and inciſores, are placed farther from this point, and of courſe cannot exert ſo much force; but they are made for cutting and tearing the food; and this form ſeems to make amends for their deficiency in ſtrength.

o, There are examples of children who have come into the world with two, three, and even four teeth; but theſe examples are very rare, and it is ſeldom before the ſeventh, eighth or ninth month after birth that the inciſores begin to paſs through the gum. The ſymptoms of dentition, however, in conſequence of irritation from the teeth, frequently take place in the fourth or fifth month. One of the inciſores uſually appears firſt in the lower jaw, and is followed by one in the upper jaw; and ſo on alternately, till theſe eight teeth are cut after this: the child continues eaſy during one, two, or three months, when the ſymptoms of irritation take place again; and continue till about the eleventh or twelfth month, when one and ſometimes two of the canini begin to appear at a time, but moſt uſually in ſucceſſion. Here then are twelve teeth in the firſt year.

p, About the ſeventeenth, eighteenth, or twentieth month, and ſometimes later, two of the molares appear in each jaw, and enable children to take ſolid nouriſhment.

q, We all know the danger to which children are expoſed during the time of dentition; and we ſhall not be ſurprized at it, if we conſider that every tooth before it makes its appearance muſt paſs through a bony lamella which covers the ſocket; and likewiſe thro' the perioſteum and gums.

r, The ſymptoms are more or leſs alarming, in proportion to the reſiſtance which theſe parts afford to the teeth; and, according to the number of teeth which may chance to ſeek a paſſage at the ſame time. Were they all to appear at once, children would fall victims to the pain and exceſſive irritation; but nature has ſo very wiſely diſpoſed them, that they uſually appear one after the other, with ſome diſtance of time between each.

ſ, About the age of two years, four other dentes molares uſually appear; four others in the fourth or fifth year, and four more about the ſeventh year. Theſe make up the twenty-eight teeth, which continue to be the number till the twentieth, twenty-ſecond, or twenty-fifth year; and ſometimes later, when four more grinders make their appearance, and theſe are the dentes ſapientiæ. Theſe teeth have been in ſome inſtances cut at the age of eighty years; and it ſometimes happens that they do not appear at all. This then is the number of teeth, and the order in which they appear; but it is to be obſerved, that about the ſeventh, eighth, ninth or tenth year; ſometimes a little ſooner, ſometimes later, the inciſores begin to fall out of their ſockets; and that, between the ſeventh and fourteenth year, not only the inciſores, but likewiſe the canini, and ſometimes the four firſt molares, making in all twenty teeth, are ſhed, and their place ſupplied by others of a firmer texture, with larger fangs, which remain till they become affected by diſeaſe, or fall out in old age. The firſt teeth are called the *temporary* or *milk teeth*, to diſtinguiſh them from the adult teeth. The rudiments of both theſe ſeries of teeth are originally formed together in the fœtus, and are to be ſeen in the jaws of very young ſubjects in two rows, and in a diſtinct ſet of alveoli; ſo that it is not by the growing of one tooth under another in the ſame ſocket, that the uppermoſt tooth is mechanically puſhed out, as is perhaps commonly imagined; but the temporary teeth, and thoſe which are to ſucceed them, being as we have juſt now obſerved, placed in ſeparate alveoli; the upper ſockets gradually diſappear, as the under ones increaſe in ſize, till at length the teeth they contain having no longer any ſupport, conſequently fall out.

Sect. iii. *Of the* Os Hyoides. (R).

a, The os hyoides which is placed at the root of the tongue, was ſo called by the ancients on account of its ſuppoſed reſemblance to the Greek letter υ. 27

b, It will be neceſſary to diſtinguiſh in it, its body, horns, and appendices.

c, The body is the middle and broadeſt part of the bone, ſo placed that it may be eaſily felt with the finger in the fore part of the throat. Its fore part is irregularly convex, and its inner ſurface unequally concave. The cornua or horns, which are flat and a little bent, are conſiderably longer than the body of the bone, and may be ſaid to form the ſides of the υ. The appendices, or little horns, as they are called by M. Winſlow and ſome other writers, are two proceſſes which riſe up from the articulations of the cornua with the body, and are uſually connected with the ſtyloid proceſs on each ſide by means of a ligament.

d, This bone ſerves to ſupport the tongue, and affords attachment to a variety of muſcles, ſome of which perform the motions of the tongue, and others act on the larynx and fauces.

Chap. III.

Of the Bones of the Trunk.

a, The trunk of the ſkeleton is compoſed of the ſpine, the thorax, and the pelvis. 28

Sect. i. *Of the Spine.*

a, The ſpine is a long bony column, in figure not much unlike the letter S, which extends from the head to the lower part of the trunk, and is the great ſupport of the whole body. 29

b, It

(R) This bone is very ſeldom preſerved with the ſkeleton, and cannot be included amongſt the bones of the head or in any other diviſion of the ſkeleton. Thomas Bartholin, has perhaps very properly deſcribed it among the parts contained in the mouth; but the generality of anatomical writers have placed it, as it is here, after the bones of the face.

b, It is made of a great number of bones called *vertebræ*.

c, It may be conſidered as being compoſed of two irregular pyramids, which are united to each other in that part of the loins where the laſt of the lumbar vertebræ is united to the os ſacrum.

d, The vertebræ which form the upper and longeſt pyramid, are called *true* vertebræ; and thoſe which compoſe the lower pyramid, are termed *falſe* vertebræ; becauſe they do not in every thing reſemble the others; and particularly, becauſe in the adult ſtate they become perfectly immoveable, whilſt the upper ones continue to be capable of motion; for it is upon the bones of the ſpine that the body turns, and their name has its derivation from the Latin verb *vertere*, which ſignifies *to turn*.

e, The vertebræ are likewiſe divided into five claſſes, *viz.* 1. The cervical or vertebræ of the neck; 2. the dorſal or vertebræ of the back; 3. the lumbar or vertebræ of the loins; 4. the os ſacrum; and, 5. the coccyx.

f, We will firſt point out what theſe bones, and eſpecially the true vertebræ, have in common with each other; and then ſeparately deſcribe theſe five claſſes.

g, In each vertebra, as in all other bones, it will be neceſſary to remark the body of the bone, its proceſſes, and cavities.

h, The body of one of the vertebræ may be compared to part of a cylinder cut off tranſverſely: convex before, and concave at its poſterior ſurface where it makes part of the cavity of the ſpine.

i, Each vertebra has commonly ſeven proceſſes.

k, The firſt of theſe is, the ſpinous proceſs, which is placed at the back part of the vertebra, and gives the name of ſpine to the whole of this bony canal; two others are called tranſverſe proceſſes, from their ſituation with reſpect to the figure of the ſpine; and are placed on each ſide of the ſpinous proceſs. The four others which are called *oblique* or *articular* proceſſes are much ſmaller than the other three; there are two of theſe on the upper, and two on the lower part of each vertebra, riſing from near the baſis of the tranſverſe proceſſes. They are called *articular proceſſes*, becauſe they are articulated with each other; that is, the two ſuperior proceſſes of one vertebra, are articulated with the two inferior proceſſes of the vertebra above it; and they are called *oblique proceſſes* from their ſituation with reſpect to the proceſſes with which they are united: theſe oblique proceſſes are articulated to each other by a ſpecies of ginglimus, and each proceſs is covered at its articulation with cartilage.

l, There is in every vertebra, between its body and apophyſes, a foramen large enough to admit a finger. Theſe foramina correſpond with each other through all the vertebræ, and form a long bony conduit for the lodgment of the ſpinal marrow.

m, Beſides this great hole, there are four notches on each ſide of every vertebra, between the oblique proceſſes and the body of the vertebra; two of theſe notches are at the upper, and two at the lower part of the bone; each of the inferior notches meeting with one of the ſuperior notches of the vertebra below it, forms a foramen; whilſt the ſuperior notches do the ſame with the inferior notches of the vertebra above it. Theſe four foramina, form paſſages for blood veſſels, and for the nerves that paſs out of the ſpine: the vertebræ are united together by means of a cartilaginous ſubſtance, which forms a kind of partition between the ſeveral vertebræ; theſe cartilages are thicker and more flexible between the lumbar vertebræ than in other parts of the ſpine; the moſt conſiderable motions of the trunk being performed on theſe vertebræ. Theſe cartilages being very elaſtic, the extenſion and flexion of the body, and its motion backwards and forwards, or to either ſide, are performed with great facility. This elaſticity ſeems to be the reaſon why people who have been long ſtanding, or have carried a conſiderable weight, are found to be ſhorter than when they have been long in bed. In the two firſt inſtances, the ligaments are evidently more expoſed to compreſſion than when we are in bed in an horizontal poſture.

n, The change which takes place in theſe cartilages in advanced life, occaſions the decreaſe in ſtature, and the ſtooping forwards which are uſually to be obſerved in old people. The cartilages then become ſhrivelled, and conſequently loſe in a great meaſure their elaſticity.

o, Beſides this connection of the ſeveral vertebræ by means of theſe cartilages, there are likewiſe particular ligaments which unite the ſeveral bones to each other; and the perioſteum externum, the membrane which incloſes the marrow, and the muſcles which are attached to the ſpine, all ſerve to ſtrengthen this union.

p, We may venture to remark, that all the vertebræ diminiſh in denſity and firmneſs of texture in proportion as they increaſe in ſize; ſo that the lower vertebræ, though larger, are not ſo heavy as thoſe above them; in conſequence of this mode of ſtructure, the ſize of the vertebræ is increaſed without adding to their weight; and this is an object of no little importance in a part of the body, which beſides flexibility and ſuppleneſs, ſeems to require lightneſs as one of its eſſential properties.

q, In very young children, each vertebra is compoſed of three bony pieces connected by cartilages which afterwards oſſify.

30 Vertebræ of the neck.

a, There are ſeven vertebræ of the neck; they are of a firmer texture than the other bones of the ſpine. The tranſverſe proceſſes of theſe vertebræ are forked for the lodgment of muſcles; and, at the bottom of each of theſe proceſſes, there is a foramen for the paſſage of the cervical artery and vein. The firſt and ſecond of theſe vertebræ muſt be deſcribed more particularly. The firſt approaches almoſt to an oval ſhape; on its ſuperior ſurface it has two cavities, which admit the condyles of the occipital bone with which it is articulated. This vertebra which is called *Atlas*, from its ſupporting the head, cannot well be deſcribed as having either body or ſpinous proceſs, being a kind of bony ring. Anteriorly where it is articulated to the odontoid proceſs of the ſecond vertebra, it is very thin.

b, The ſecond vertebra which is called *dentata*, has at its upper and anterior part, a proceſs called the *odontoid proceſs*; from its reſemblance to a large tooth, which is articulated with the atlas; to which this ſecond vertebra may be ſaid to ſerve as an axis.

c, It is commonly obſerved that the head turns to the right or left upon this vertebra; but this ſuppoſition ſeems to be erroneous.

d, The face cannot turn the quarter of a circle, that is, to the ſhoulder, upon this vertebra alone, without being liable to injure the ſpinal marrow, which would probably be divided tranſverſely by the firſt vertebra ; ſo that all the ſeven vertebræ ſeem to concur in this motion when it is in any conſiderable degree.

31 Vertebræ of the back. a, We have nothing particular to obſerve in theſe vertebræ, which are twelve in number ; except two lateral depreſſions in the ſides of each vertebra, and another in each tranſverſe proceſs, by means of which theſe bones are articulated with the ribs.

32 Lumbar vertebræ. a, Theſe five vertebræ differ only from thoſe of the back, in their being larger ; and in having their ſpinous proceſſes at a greater diſtance from each other. The moſt conſiderable motions of the trunk are made on theſe vertebræ ; and theſe motions could not be performed with ſo much eaſe, were the proceſſes placed nearer to each other.

33 Os ſacrum. a, The os ſacrum which is compoſed of five or ſix pieces in young ſubjects, becomes one bone in more advanced age.

b, It is nearly of a triangular figure, its inferior portion being bent a little forwards. Its ſuperior part has two oblique proceſſes which are articulated with the laſt of the lumbar vertebræ, and it has likewiſe a ſmall ſpinous proceſs. Its concave or anterior ſide has many prominences, which are filled up and covered with the muſcular and tendinous parts behind.

c, This bone has five pair of holes, which afford a paſſage to the blood veſſels, and likewiſe to the nerves which are derived from the ſpinal marrow ; for the marrow is continued even in the os ſacrum.

d, This bone is united laterally to the oſſa innominata or hip-bones, and below to the coccyx.

34 Coccyx. a, The coccyx, which like the os ſacrum, is in young people made up of ſeveral diſtinct parts, uſually becomes one bone in the adult ſtate.

b, It ſerves to ſupport the inteſtinum rectum ; and, by its being capable of ſome degree of motion at its articulation with the ſacrum, and being like that bone bent forwards, we are enabled to ſit with eaſe.

c, This bone is about three inches long ; it is broadeſt at its upper part, and from thence grows narrower to its apex, where it is not bigger than the little finger.

d, This bone, which has got its name from its ſuppoſed reſemblance to a cuckow's beak ; differs very much from the vertebræ, being uſually without proceſſes, and having no cavity for the medulla ſpinalis, or foramina for the paſſage of nerves.

e, The ſpine, of which we have now finiſhed the anatomical deſcription, is deſtined for many and important uſes. The medulla oblongata is lodged, in its bony canal, ſecure from external injury ; it defends the thoracic and abdominal viſcera ; it ſerves to ſupport the head, and gives a general firmneſs to the whole trunk.

f, We have before compared it to the letter S, and its different turns will be found to render it not very unlike the figure of that letter.

g, In the neck we ſee it projecting ſomewhat forwards to ſupport the head, which, without this aſſiſtance, would require a greater number of muſcles ; through the whole length of the thorax it is carried in a curved direction backwards ; and thus adds conſiderably to the cavity of the cheſt, and conſequently affords more room to the lungs, heart, and large blood veſſels. In the loins, the ſpine again projects forwards in a direction with the centre of gravity ; by which means the body is eaſily kept in an erect poſture ; for otherwiſe we ſhould be liable to fall forwards. But at its inferior part, it again recedes backwards, and helps to form a cavity called the *pelvis ;* in which the urinary bladder, inteſtinum rectum, and other viſcera are placed.

h, Whoever contemplates and clearly underſtands the ſtructure of this part of the human body, cannot but acknowledge that it is admirably adapted to the uſes to which it is deſtined ; and that it is evidently the work of a divine author.

i, If this bony column had been formed only of one piece, it would have been much more eaſily fractured than it is now ; and, by confining the trunk to a ſtiff ſituation, a variety of motions would have been altogether prevented, which are now performed with eaſe by the great number of bones of which it is compoſed.

k, It is firm, and yet to this firmneſs there is added a perfect flexibility. If it is required to carry a load upon the head, the neck becomes ſtiff with the aſſiſtance of its muſcles, and accommodates itſelf to the load as if it was compoſed only of one bone. In ſtooping likewiſe, or in turning to either ſide, the ſpine turns itſelf in every direction, as if all its bones were ſeparated from each other.

l, In a part of the body which is compoſed of ſo great a number of bones, and conſtructed for ſuch a variety of motion as the ſpine is, luxation is more to be expected than fracture ; and this is very wiſely guarded againſt in every direction, by the many proceſſes which are to be found in each vertebra ; and by the cartilages, ligaments, and other means of connection, which we have deſcribed as uniting them together.

Sect. ii. *Of the* Bones *of the Thorax.*

a, The thorax, or cheſt, is compoſed of many bones, *viz.* the ſternum, which is placed at its anterior part ; twelve ribs on each ſide which make up its lateral parts ; and the dorſal vertebræ, which conſtitute its poſterior part. Theſe laſt have been already deſcribed. 35

a, The ſternum is the long bone which extends itſelf from the upper to the lower part of the breaſt anteriorly, and to which the ribs and the clavicles are articulated. 36 Of the ſ num.

b, In children it is compoſed of ſeveral bones united by cartilages ; but as we advance in life, moſt of theſe cartilages oſſify, and the ſternum in the adult ſtate is found to conſiſt only of two pieces ; and ſometimes becomes one bone. It is, however, generally deſcribed as being compoſed of two parts ; one ſuperior, which is broad, thick, and ſhort ; and one inferior, which is thinner, narrower, and longer than the other.

c, It terminates at its lower part by a cartilage, which is called the *xyphoid*, or ſword-like cartilage ; from its ſuppoſed reſemblance to the point of a ſword ; but its ſhape is much more like that of a myrtle leaf.

d, We have already obſerved, that this bone is articulated with the clavicle on each ſide ; it is likewiſe joined to the fourteen true ribs ; *viz.* ſeven on its right, and ſeven on its left ſide.

a, The ribs are bones ſhaped like a bow, which compoſe the ſides of the cheſt. There are twelve on each ſide. They are diſtinguiſhed into true and falſe ribs ; the ſeven upper ribs, which are articulated to the ſternum, are called *true ribs ;* and the five lower ones, which are 37 Of the are not immediately attached to that bone, are called *falſe ribs*.

b, On the inferior and anterior ſurface of each rib, we obſerve a ſinuoſity for the lodgment of an artery, vein, and nerve.

c, The ribs are not bony through their whole length, their anterior part being cartilaginous. They are articulated with the vertebræ and ſternum; every rib, or at leaſt the greateſt number of them, has at its poſterior part, two proceſſes; one at its extremity, by means of which it is articulated with the body of two vertebræ; and another, which is a very evident tuberoſity, by which it is articulated with the tranſverſe proceſs of the loweſt of theſe two vertebræ; the firſt rib is not articulated by its extremity to two vertebræ, being ſimply attached to the upper part of the firſt vertebra of the back; the ſeven ſuperior or true ribs, are articulated anteriorly with the ſternum by their cartilages; but the falſe ribs are ſupported in a different manner; the eighth, which is the firſt of theſe ribs, being attached by its cartilage to the ſeventh; the ninth to the eighth, *&c.*

d, The two loweſt ribs differ likewiſe from all the reſt in the following particulars: they are articulated with the body of a vertebra, and not with a tranſverſe proceſs; and, anteriorly, their cartilage is looſe, not being attached to the cartilages of the other ribs; and this ſeems to be, becauſe the moſt conſiderable motions of the trunk are not performed on the lumbar vertebræ alone, but likewiſe on the two laſt vertebræ of the back; ſo that if theſe two ribs had been confined anteriorly like the reſt, and likewiſe attached to the bodies of two vertebræ, and to the tranſverſe proceſs, this diſpoſition would have impeded the motion of the two laſt vertebræ of the back, and conſequently affected the motion of the trunk in general.

e, The ribs ſerve to cover and ſecure the vital organs, *viz.* the heart and lungs; without this bony defence, theſe viſcera would be conſtantly expoſed to interruption, and perhaps to injury; which would not fail to be extremely prejudicial to health and even to life; for the functions of thoſe organs are ſo eſſential to life, that we cannot long exiſt without them.

Sect. ii. *Of the* Bones *of the Pelvis.*

38 a, The pelvis is compoſed of the os ſacrum, os coccygis, and two oſſa innominata. The two firſt of theſe bones were included in our account of the ſpine, to which they more properly belong.

b, Each os innominatum in children, is compoſed of three diſtinct bones; but as they advance in life, the marks of this ſeparation gradually diſappear, by the oſſification of the cartilages by which they were united to each other, and they become one bone; ſtill, however, continuing to retain the names of *ilium*, *iſchium*, and *pubis*, by which their diviſions were originally diſtinguiſhed; and to be deſcribed as three diſtinct bones by all anatomical writers. The os ilium forms the upper and largeſt part of the bone, the os iſchium its poſterior and inferior portion, and the os pubis its anterior part.

39 ilium. a, The os ilium is articulated poſteriorly to the os ſacrum, by a firm cartilaginous ſubſtance; and is united to the os pubis before, and to the os iſchium below; its ſuperior portion is thin, and terminates in a ridge called the *criſta* or *ſpine* of the ilium, and more commonly known by the name of the *haunch*. This criſta riſes up like an arch, being turned ſomewhat outwards; and from this appearance, the upper part of the pelvis when viewed together, has not been improperly compared to the wings of a phaeton.

b, Externally, this bone is unequally prominent and hollowed for the attachment of muſcles, and internally, it is ſmooth and concave; at its lower part there is a conſiderable ridge on its inner ſurface. This ridge which extends from the os ſacrum, and correſponds with a ſimilar prominence both on that bone and the iſchium, forms with the inner part of the oſſa pubis, what in midwifery is underſtood to be the brim of the pelvis.

c, The os ilium has likewiſe a ſmaller ſurface poſteriorly, by which it is articulated to the os ſacrum.

d, The criſta, or ſpine, which is originally an epiphyſis, has two conſiderable tuberoſities; one anteriorly, and the other poſteriorly which is the largeſt of the two; the ends of this ſpine too, from their projecting more than the parts of the bone below them, are called *ſpinal proceſſes;* before the anterior ſpinal proceſs, the ſpine is hollowed where part of the ſartorius muſcle is placed; and below the poſterior ſpinal proceſs there is a very large niche in the bone which is the recent ſubject; has a ſtrong ligament ſtretched over its lower part from the os ſacrum, to the ſharp pointed proceſs of the iſchium, ſo that a great hole is formed, through which paſs the great ſciatic nerve, and the poſterior crural veſſels under the pyriform muſcle, part of which is likewiſe lodged in this hole.

a, The os iſchium, which is a bone of a very irregular figure, is uſually divided into its body, tuberoſity, and ramus. The body externally forms the inferior and greateſt part of the acetabulum; and ſends a ſharp pointed apophyſis backwards, called the *ſpine of the iſchium*. This is the proceſs to which the ligament is attached, which we juſt now deſcribed as forming a great foramen for the paſſage of the ſciatic nerve. The tuberoſity is large and irregular, and is placed at the inferior part of the bone, giving origin to ſeveral muſcles. The tuberoſity which is the loweſt portion of the trunk, ſupports us when we ſit; from this tuberoſity the bone becoming narrower and thinner forms the ramus or branch, which paſſing forwards and upwards, makes with the ramus of the os pubis a large hole, called the *foramen ovale;* this hole which is cloſed by a membrane, affords through its whole circumference attachment to muſcles. 40 Os iſchium.

a, The os pubis which is the ſmalleſt of the three bones, is placed at the forepart of the pelvis, where it is united to the os pubis of the other ſide, by means of a very ſtrong cartilage, and conſtitutes what is called the ſymphyſis pubis. This bone is diſtinguiſhed by the body, angle, and ramus. The body, which is the outer part, is joined to the os ilium. The angle comes forwards to form the ſymphyſis, and the ramus is a thin apophyſis, which is united to the ramus of the iſchium. 41 Os pubis.

b, The three bones we have deſcribed as conſtituting the os innominatum on each ſide, all concur to form the great acetabulum or cotyloid cavity, which receives the head of the thigh-bone. A little foſſa is to be obſerved in this cavity, in which are placed the mucilaginous glands which ſerve to lubricate the joint, and facilitate its motions. We are able likewiſe to diſcover the impreſſion made by the round ligament, which by being attached both to this cavity and to the head of the os femoris, helps to ſecure the latter in the acetabulum.

c, The bones of the pelvis ſerve to lodge the inteſcines, urinary bladder, and other viſcera; and likewiſe to unite the trunk to the lower extremities: but beſides theſe uſes they are deſtined in the female ſubject, for other and more important purpoſes; and the accoucheur finds in the ſtudy of theſe bones, the great foundation of all midwifery knowledge.

CHAP. IV.

Of the EXTREMITIES.

42 a, THIS part of the oſteology is divided into the upper and lower extremities. We will begin with the firſt of theſe.

Sect. i. *Of the Upper Extremity.*

43 a, This conſiſts of the ſhoulder, arm, and hand.

§. 1. Of the BONES of the Shoulder.

44 a, The ſhoulder is compoſed of two bones, the clavicle and ſcapula.

45 Of the clavicula. a, The clavicula or collar bone, ſo called from its reſemblance to the key in uſe amongſt the ancients; is a little curved at both its extremities like an Italick *ſ*. This bone is about the ſize of the little finger, but longer, and being of a very ſpongy ſubſtance is very liable to fracture. At its interior part where it is round and thickeſt, it is articulated to the ſternum; and its poſterior part, which is flatter and broader than the other, is connected to a proceſs of the ſcapula called *acromion*.

b, The clavicle ſerves to regulate the motions of the ſcapula, by preventing its being brought too much forwards, or carried too far backwards. It affords attachment to ſeveral muſcles, and helps to cover and protect the ſubclavian arteries which derive their name from their ſituation under this bone.

46 Of the ſcapula. a, The ſcapula which aproaches nearly to a triangular figure, is fixed not unlike a buckler to the poſterior part of the true ribs. It is of a very unequal thickneſs, and like all other broad, flat bones, is ſomewhat cellular. Exteriorly it is convex, and interiorly concave, to accomodate itſelf to the convexity of the ribs. We obſerve in this bone three unequal ſides. The largeſt of the three called the *baſis*, is turned towards the vertebræ. Another which is leſs than the former, is below this; and the third which is the leaſt of the three, is at the upper part of the bone. Externally the bone is elevated into a conſiderable ſpine, which riſing ſmall at the baſis of the ſcapula, becomes gradually higher and broader; and divides the outer ſurface of the bone into two foſſæ. The ſuperior of theſe, which is the ſmalleſt, ſerves to lodge the ſupra ſpinatus muſcle; and the inferior foſſa which is much larger than the other, gives origin to the infra ſpinatus. This ſpine terminates in a broad and flat proceſs at the top of the ſhoulder, called the *proceſſus acromion*, to which the clavicle is articulated. This proceſs is hollowed at its lower part, to allow a paſſage to the ſupra and infra ſpinati muſcles. This bone has likewiſe another conſiderable proceſs at its ſuperior part, which from its reſemblance to the beak of a bird, is called the *coracoid proceſs*. From the external ſide of this coracoid proceſs, a ſtrong ligament paſſes to the proceſſus acromion; which prevents a luxation of the os humeri upwards.

b, The ſcapula is articulated to the clavicle and os humeri, to which laſt it ſerves as a fulcrum; and by altering its poſition, it affords a greater ſcope to the bones of the arm in their different motions. It likewiſe affords attachment to ſeveral muſcles, and poſteriorly ſerves as a defence to the thorax.

§. 2. Of the BONES of the Arm.

47 a, The arm is commonly divided into two parts, which are articulated to each other at the elbow. The upper part retains the name of *arm* properly ſo called, and the lower part is uſually called the *fore arm*.

Art. i. Of the ARM properly ſo called.

48 a, The arm is formed of a ſingle bone, called *os humeri*. This bone which is almoſt of a cylindrical form, may be divided into its body and its extremities.

b, The upper extremity terminates in a large round ſmooth head, which is admitted into the glenoid cavity of the ſcapula.

c, The lower extremity has many proceſſes and cavities. The principal proceſſes are its two condyles, one exterior and the other interior, and of theſe the laſt is the largeſt; between theſe two we obſerve two lateral protuberances, which together with a middle cavity, form as it were a kind of pully upon which the motions of the fore arm are chiefly performed. At each ſide of the condyles, as well exteriorly as interiorly, there is another eminence which affords attachment to ſeveral muſcles of the hand and fingers. Poſteriorly and ſuperiorly, ſpeaking with reſpect to the condyles, we obſerve a deep foſſa which receives a conſiderable proceſs of the ulna; and anteriorly, and oppoſite to this foſſa, we obſerve another which is much leſs, and receives another proceſs of the ſame bone.

d, The body of the bone has, at its upper and anterior part, a furrow which begins from behind the head of the bone, and ſerves to lodge the tendon of a muſcle. The body of the os humeri is hollow through its whole length; and like all other long bones, has its marrow.

e, The humerus is articulated at its upper part to the ſcapula. This articulation, which allows motion every way, is ſurrounded by a capſular ligament. Its lower extremity is articulated with the bones of the arm.

Art. 2. Of the Fore ARM.

49 a, The fore arm is compoſed of two bones, the ulna and radius.

50 Of the a, The ulna, or elbow bone, is much leſs than the humerus, and becomes gradually ſmaller as it deſcends to the wriſt. At its upper part it has two proceſſes and two cavities. Of the two proceſſes, the largeſt, which is ſituated poſteriorly and called the *olecranon*, is admitted into the poſterior foſſa of the humerus. The other proceſs is placed anteriorly, and is called the *coronoid proceſs*. In bending the arm it enters into the anterior foſſa of the humerus This proceſs being much ſmaller than the other, permits the fore arm to bend inwards; whereas the olecranon, which is ſhaped like a hook, reaches the bottom of its foſſa in the humerus

as ſoon as the arm becomes ſtraight; and will not permit the fore arm to be bent backwards. The ligaments likewiſe oppoſe this motion.

b, Between the two proceſſes which we have deſcribed, there is a conſiderable cavity called the *ſygmoid cavity;* and divided into two foſſæ by a ſmall eminence which paſſes from one proceſs to the other; it is by means of this cavity and the two proceſſes, that the ulna is articulated with the humerus by ginglimus.

c, At the bottom of the coronoid proceſs interiorly, there is a ſmall ſygmoid cavity, which ſerves for the articulation of the ulna with the radius.

d, The body of the ulna is of a triangular ſhape, its lower extremity terminates by a ſmall head and a little ſtyloid proceſs. The ulna is articulated above to the os humeri both above and below to the radius; and to the wriſt at its loweſt extremity. All theſe articulations are ſecured by means of ligaments.

51 f the ra- us. a, The radius is placed at the inſide of the fore arm; it is ſomewhat larger than the ulna, but not quite ſo long as that bone. Its upper part is cylindrical, hollowed ſuperiorly to receive the outer condyle of the os humeri laterally; it is admitted into the little ſygmoid cavity of the ulna, and the cylindrical part of the bone turns in this cavity in the motions of pronation and ſupination (R). This bone follows the ulna in flexion and extenſion, without at all aſſiſting in thoſe motions. The lower extremity of the radius is much larger and ſtronger than its upper part; the ulna, on the contrary is ſmaller and weaker below than above, ſo that they ſerve to ſupply each others deficiencies in both theſe parts.

b, On the external ſide of this bone, we obſerve a ſmall cavity which is deſtined to receive the lower end of the ulna; and its loweſt part is formed into a larger cavity, by means of which it is articulated with the bones of the wriſt. This bone ſupports the two firſt bones of the wriſt on the ſide of the thumb, whereas the ulna is articulated with that bone of the wriſt which correſponds with the little finger.

c, Thro' the whole length both of this bone and the ulna, a ridge is obſerved, which affords attachment to an interoſſeous ligament. This ligament fills up the ſpace between the two bones.

52

Art 3. Of the HAND.

53 the car- a, The carpus or wriſt, includes eight bones, diſpoſed in two ranks. Anatomical writers have not only uſually deſcribed the particular figure of theſe ſeveral bones; but have likewiſe given to each of them a different name.

b, Such minutiæ in this part of the oſteology, ſeem to be unneceſſary in this work; and we ſhall only obſerve, that they are articulated with the radius and ulna, and likewiſe with the bones of the fore arm by means of ſeveral ligaments.

54 the me- rpus. a, The metacarpus conſiſts of four bones, which ſupport the fingers; externally they are a little convex, and internally ſomewhat concave, where they form the palm of the hand. They are hollow, and of a cylindrical ſhape.

b, At each extremity they are a little hollowed for their articulation ſuperiorly with the bones of the carpus, and inferiorly with the firſt phalanx of the fingers, in the ſame manner as the ſeveral phalanges of the fingers are articulated with each other.

55 Of the fingers. a, Every body knows the number and the names of the fingers. The five fingers of each hand are compoſed of 15 bones, diſpoſed in three ranks called *phalanges*. The bones of the firſt phalanx, which are articulated with the metacarpus, are the largeſt; and thoſe of the laſt phalanx, are the ſmalleſt. All theſe bones are larger at their extremities than in their middle part.

b, We obſerve at the extremities of the bones of the carpus, metacarpus, and fingers, ſeveral inequalities which ſerve for their articulation with each other; and theſe articulations are ſtrengthened by means of the ligaments which ſurround them.

c, It will be eaſily underſtood that this multiplicity of bones in the hand (for there are 27 in each hand), is eſſential to the different motions we wiſh to perform. If each finger was compoſed only of one bone inſtead of three, it would be impoſſible for us to graſp any thing.

Sect ii. *Of the Lower Extremities.*

a, Each lower extremity is divided into four parts, *viz.* The os femoris, or thigh bone; the rotula or knee pan; the leg, and the foot. 56

§. 1. Of the Os Femoris.

a, The thigh is compoſed only of this bone, which is larger and ſtronger than any other bone of the body. It will be neceſſary to diſtinguiſh its body and extremities. Its body, which is of a cylindrical ſhape, is convex before and concave behind; where it ſerves to lodge ſeveral muſcles. Throughout two thirds of its length, we obſerve a ridge called *linea aſpera*, which affords inſertion to the triceps muſcle. 57

b, At its upper extremity, we muſt deſcribe the neck and head of the bone, and likewiſe two conſiderable proceſſes. The head, which forms the greater portion of a ſphere unequally divided, is turned inwards, and is received into the great cotyloid cavity of the os innominatum; at this part of the bone, there is a little foſſa to be obſerved to which the round ligament is attached; and which we have already deſcribed as tending to ſecure the head of this bone in the great acetabulum. The neck is almoſt horizonta, lconſidered with reſpect to its ſituation with the body of the bone. Of the two proceſſes, the external one, which is the largeſt, is called *trochanter major;* and the other, which is placed on the inſide of the bone, is called *trochanter minor;* they both afford attachment to muſcles. The articulation of the os femoris with the trunk, is ſtrengthened by means of a capſular ligament, which is attached every where to the ſurface of the great cotyloid cavity of the os innominatum, and ſurrounds the head of the bone.

c, The os femoris moves upon the trunk in every direction.

d, At the lower extremity of the bone are two proceſſes, called the *condyles;* and an intermediate cavity, by means of which it is articulated with the leg by ginglimus.

e, Between the condyles, there is a cavity poſteriorly

(R) The motions of pronation and ſupination may be eaſily deſcribed. If the palm of the hand, for inſtance, is placed on the ſurface of a table, the hand will be ſaid to be in a ſtate of pronation; but if the back part of the hand is turned towards the table, the hand will then be in a ſtate of ſupination.

ly in which the blood veſſels and nerves are placed ſecure from the compreſſions to which they would otherwiſe be expoſed in the action of bending the leg; and which would not fail to be hurtful.

f, At the ſide of each condyle externally there is a tuberoſity; from whence the lateral ligaments originate which are attached to the tibia.

g, A ligament likewiſe ariſes from each condyle poſteriorly, one of which paſſes from the right to the left, and the other from the left to the right; ſo that they interſect each other; and are called the *croſs ligaments*.

h, The lateral ligaments prevent the motion of the leg upon the thigh to the right or left, and the croſs ligaments, which are alſo attached to the tibia, prevent its being bent forwards.

i, In new-born children all the proceſſes of this bone are cartilaginous.

§. 2. Of the ROTULA.

58 a, THE rotula, patella, or knee-pan, as it is differently called; is a bone about four or five inches in circumference, which in ſome meaſure reſembles the common figure of the heart with its point downwards, and is placed at the fore part of the joint of the knee.

b, It is thicker in its middle part than at its edge; anteriorly it is ſmooth, and a little convex; its poſterior ſurface, which is more unequal, affords an elevation in the middle which is admitted between the two condyles of the os femoris.

c, This bone is retained in its proper ſituation by a ligament which every where ſurrounds it, and is attached both to the tibia and os femoris; and likewiſe by the tendons of ſeveral muſcles, which do not however prevent its ſliding from above downwards, and from below upwards.

d, In very young children this bone is entirely cartilaginous.

e, The uſe of this bone ſeems to be, to defend the articulation of the knee from external injury; it likewiſe tends to increaſe the power of the muſcles which act in the extenſion of the leg, by removing their direction farther from the centre of motion in the manner of a pully.

§. 3. Of the LEG.

59 a, THE leg is compoſed of two bones; of theſe the inner one, which is the largeſt, is called *tibia;* the other is much ſmaller, and is called the *fibula*.

60 Of the tibia. a, The tibia, which derives its name from its reſemblance to the muſical pipe of the ancients, has three ſurfaces, and is not very unlike a triangular priſm; its poſterior ſurface is the broadeſt; anteriorly it has a conſiderable ridge called the *ſhin*, between which and the ſkin there are no muſcles; at the upper extremity of this bone are two ſurfaces, a little concave, and ſeparated from each other by an intermediate elevation; the two little cavities receive the condyles of the os femoris, and the eminence between them is admitted into the cavity which we ſpoke of as being between the two condyles, ſo that this articulation affords a ſpecimen of the complete ginglimus. Under the external edge of the upper end of this bone, is a circular flat ſurface which receives the head of the fibula.

b, At the lower and inner portion of the tibia, we obſerve a conſiderable proceſs called *malleolus internus;* the baſis of the bone terminates in a large tranſverſe cavity, by which it is articulated with the uppermoſt bone of the foot; it has likewiſe another cavity at its lower end and outer ſide; which is ſomewhat oblong, and receives the lower end of the fibula.

c, The tibia is hollow through its whole length.

61 Of the fi la. a, The fibula is a ſmall long bone, placed on the outſide of the tibia; its upper extremity does not reach quite ſo high as that part of the tibia, but its lower end deſcends ſomewhat lower; both above and below, it is articulated with the tibia by means of the lateral cavities which we obſerved in our deſcription of that bone.

b, Its lower extremity is ſtretched out into a coronoid proceſs, which is flattened at its inſide, and is convex externally, forming what is called the *malleolus externus*, or outer ancle; this is rather lower than the leolus internus of the tibia.

c, The body of this bone, which is irregularly triangular, is a little hollowed at its internal ſurface, which is turned towards the tibia; and it affords like that bone, through its whole length, attachment to a ligament, which from its ſituation is called the *interoſſeous ligament*.

§. 4. Of the BONES of the Foot.

6 a, The bones of the foot, as well as thoſe the hand, are uſually deſcribed in three diviſions, but with different names; in the hand we ſpoke of the carpus, metacarpus, and fingers; but the diviſions of the foot are called the *tarſus*, *metatarſus*, and *toes*.

Art. 1. Of the Tarſus.

63 a, THE tarſus is compoſed of ſeven bones, *viz.* The aſtragalus, os calcis, os naviculare, os cuboides, and three others called *cuneiform bones*.

64 Of the a galus. a, The aſtragalus is a conſiderable bone, with which both the tibia and fibula are articulated; it is the uppermoſt bone of the foot, and has ſeveral ſurfaces to be conſidered. Its upper, and ſomewhat poſterior part, which is ſmooth and convex, is admitted into the cavity of the tibia; its lateral parts are connected with the malleoli of the two bones of the leg; below, it is articulated with the os calcis; and its anterior ſurface is received by the os naviculare: all theſe articulations are ſecured by means of ligaments.

65 Of the calcis. a, The os calcis, or calcaneum, which is the largeſt bone of the foot, is of a very irregular figure; behind, it is formed into a conſiderable tuberoſity called the *heel;* without this tuberoſity which ſupports us in an erect poſture, and when we walk, we ſhould be liable to fall backwards.

b, On the interval ſurface of this bone, we obſerve a conſiderable ſinuoſity which affords a paſſage to the tendon of a muſcle; and to the poſterior part of the os calcis a ſtrong tendinous cord called *tendo achillis* (s) is attached, which is formed by the tendons of ſeveral muſcles united together: the articulation of this with the other bones is ſecured by means of ligaments.

66 Of the navicul a, The os naviculare, or ſcaphoides (for theſe two terms have the ſame ſignification), is ſo called on account of its reſemblance to a little bark. At its poſterior

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(s) This tendon is ſometimes ruptured by jumping, dancing, or other violent efforts.

part, which is concave, it receives the aſtragalus; anteriorly it is articulated with the cuneiform bones, and laterally it is connected with the os cuboides.

67 f the os uboides.

a, The os cuboides forms an irregular cube. Poſteriorly it is articulated with the os calcis; anteriorly it ſupports the two laſt bones of the metatarſus; and laterally it joins the third cuneiform bone and the os naviculare.

68 f the oſſa ncifor- ia.

a, Each of theſe bones, which are three in number, reſembles a wedge, and from this ſimilitude their name is derived. They are placed next to the metatarſus by the ſides of each other, and are uſually diſtinguiſhed into *os cuneiſorme externum*, *medium* or *minimum*, and *internum* or *maximum*. The ſuperior ſurface of theſe bones, from their wedge-like ſhape, is broader than that which is below, where they help to form the ſole of the foot; poſteriorly they are united to the os naviculare, and anteriorly they ſupport the three firſt metatarſal bones.

b, the os cuneiforme externum is joined laterally to the os cuboides.

c, Theſe bones complete our account of the tarſus; and though what we have ſaid of this part of the oſteology has been very ſimple and conciſe, yet, many readers may not clearly underſtand it; but if they will be pleaſed to view theſe bones in their proper ſituation in the ſkeleton, all that we have ſaid of them will be eaſily underſtood.

Art. 2. Of the Metatarſus.

69 a, The metatarſus is made up of five bones, whereas the metacarpus conſiſts only of four. The cauſe of this difference is, that in the hand, the laſt bone of the thumb is not included among the metacarpal bones, whereas in the foot the great toe has only two bones. The firſt of theſe bones ſupports the great toe, and is much larger than the reſt, which nearly reſemble each other in ſize.

b, Theſe bones are articulated by one extremity with the cuneiform bones, and the os cuboides, and their other end, with the toes.

Art. 3. Of the Bones of the Toes.

a, All the fingers like the toes, are made up of three bones, except the great toe, which is compoſed only of two bones; and they are likewiſe diſtinguiſhed into three phalanges: although theſe bones do not move upon each other with ſo much eaſe as the bones of the fingers do, yet their number and arrangement ſeem to be perfectly adapted to the functions which they are intended to perform. Thus we obſerve, that the ſoles of the feet are naturally concave, and that we can at pleaſure increaſe this concavity, and form a kind of vault which adjuſts itſelf to the different inequalities, which occur to us in walking; and which without this mode of arrangement would incommode us exceedingly, eſpecially when bare footed. 70

OF THE OSSA SESAMOIDEA.

a, Beſides the bones we have already deſcribed, there are others of different figures and ſizes, met with only in the adult ſkeleton; and in perſons who are advanced in life, which from their ſuppoſed general reſemblance to the ſeeds of the ſeſamum, are called *oſſa ſeſamoidea;* they are found at the articulations of the great toes, and ſometimes at the joints of the thumbs; in the articulation of the metacarpus with the little finger; ſometimes in the little cavity which is at the exterior part of the outer condyle of the thigh, and under the os cuboides of the tarſus in the tendon which is attached there: age and hard labour ſeem to add to the number and ſize of theſe bones, and being moſt commonly found wherever the tendons and ligaments are moſt expoſed to preſſure from the action of the muſcles, they are now generally conſidered by anatomiſts as the oſſified parts of tendons and ligaments. 71

EXPLANATION OF THE PLATES OF OSTEOLOGY.

PLATE XIII.

FIGURE I. A MALE SKELETON.

A, Os frontis. B, Os parietale. C, Os temporum. D, Os occipitis. E, Oſſa naſi. F, Os malæ. G, Os maxillare ſuperius. H, Os maxillare inferius. I, The teeth, which are ſixteen in each jaw. K, The ſeven vertebræ of the neck, with their intermediate cartilages. L, *&c.* The twelve dorſal vertebræ, with their intermediate cartilages. M, The five lumbar vertebræ, and, N, Their intermediate cartilages. O, Os ſacrum. P, Os coccygis. Q, Os ilium. R, Os pubis. S, Os iſchium. T, The ſeven true ribs. U, The five falſe ribs. V, The ſternum. X, The clavicle. Y, The ſcapula. Z, The os humeri. a, Ulna. b, Radius. c, The eight bones of the carpus. d, The five metacarpal bones. e, The phalanges of the fingers. f, The os femoris. g, The patella. h, The tibia. i, The fibula. k, The ſeven bones of the tarſus. l, The five metatarſal bones. m, The phalanges of the toes.

FIG. 2. The internal view of the Os FRONTIS.

a, The ſuperior ſerrated edge, which aſſiſts to form the coronal ſuture. b, The external angular proceſs. c, The internal angular proceſs. d, The naſal proceſs. e, The orbitar proceſs. f, The frontal ſinus. g, The ſaggital ſuture, which (as here) is ſometimes continued to the noſe.

FIG. 3. The internal ſide of the left PARIETAL bone.

a, Its ſuperior edge, which, joined with the other, forms the ſaggital ſuture. b, The anterior edge, which aſſiſts in the formation of the coronal ſuture. c, The inferior edge for the ſquamous ſuture. d, The poſterior edge for the lambdoid ſuture. e, A depreſſion made by the lateral ſinus. f, The prints of the principal artery of the dura mater.

Fig. 4. The internal view of the OCCIPITAL bone.

a a, The two ſides, which aſſiſt to form the lambdoid ſuture. b, The extremity of the cuneiform proceſs, where it joins the ſphenoid bone. c c, The two condyloid proceſſes, which articulate the head with the ſpine. d d, The prints made by the poſterior lobes of the brain. e e, The prints made by the lobes of the cerebellum. f, The cruciform ridge. g, The foramen magnum, thro' which the ſpinal marrow paſſes. h, The foramen linguale, for the paſſage of the ninth pair of nerves.

FIG. 5. The internal ſide of the right TEMPORAL bone.

a, The upper edge which forms the ſquamous ſuture. b, The pars mammillaris. c, The pars patroſa. d, The zygomatic proceſs. e, The ſtyloid proceſs. f, The entry of the auditory nerve.

Fig. 6. The internal view of the Sphenoid bone.

a a, The temporal proceſſes. bb, The pterygoid proceſſes. cc, The ſpinous proceſſes. d d, The poſterior clinoid proceſſes. e e, The anterior clinoid proceſſes. f, The ſella turcica, for lodging the glandula pituitaria. g, The anterior proceſs, which joins the ethmoid bone.

Fig. 7. The exterior view of the Ethmoid bone.

a, The pars plana, which forms part of the orbit. b, The os ſpongioſum ſuperius. c, The naſal lamella. d, The ethmoid cells. e, Criſta galli.

Fig. 8. The poſterior view of the Ossa Nasi.

a, Their ſuperior ſides. b, Their inferior ſides. c, Their exterior ſides. d, Their joining.

Fig. 9. The ſide of the Os Unguis next to the noſe.

a, The orbitar part. b, The lachrymal part. c, The furrow between theſe two convex parts.

Fig. 10. The poſterior view of the right Os Malæ.

a, The ſuperior orbitar proceſs. b, The inferior orbitar proceſs. c, The malar proceſs. d, The zygomatic proceſs. e, The internal orbitar proceſs.

Fig. 11. A view of the lower part, and ſide next to the noſe, of the right Os Maxillare, with the Palate-bone, and Os Spongiosum Inferius.

a, The naſal proceſs. b, The tuber, at the top of which is the orbitar proceſs, and within it, k, The antrum maxillare. c, The naſal ſpine. d, The os ſpongioſum inferius. e, The palate-plate. f, The os palati. g, The two dentes inciſores. h, The dens caninus. i, The five dentes molares.

Fig. 12. The right Palate-Bone.

a, The palate-plate. b, The pterygoid proceſs. c, The naſal lamella. d, The orbitar proceſs.

Fig. 13. A view of the ſide next to the mouth of the left ſide of the lower jaw.

a, The ſubſtance in the middle of the chin. b, The baſe. c, The angle. d, The coronoid proceſs. e, The condyloid proceſs. f, The entry of the nerve and blood-veſſels. g, The five molares.

Fig. 14. A Tooth cut perpendicularly.

a, The fibres of the enamel. b, The oſſeous part. c, The entry at the point of the root, to d, The channel for the nerve and blood-veſſels.

Fig. 15. A view of the interior ſurface of the Base of the Scull.

A A A, The two tables of the ſcull, with the *diploe*. B B, The orbitar proceſſes of the *frontal bone*. C, The criſta galli, with the cribriform-plate of the *ethmoid bone* on each ſide of it. D, The cuneiform proceſs of the *os occipitis*. E, The cruciform ridge. F, The foramen magnum for the paſſage of the medulla ſpinalis. G, The zygoma, made by the joining of the zygomatic proceſſes of the oſſa temporum and occipitis. H, The pars ſquamoſa of the *os temporum*. I, The pars mammillaris. K, The pars petroſa. L, The temporal proceſs of the *ſphenoid bone*. M, The anterior clinoid proceſs of the right ſide. N, The poſterior clinoid proceſs of the right ſide, and between them, O, The ſella Turcica. 1. The foramen opticum of the left ſide. 2. The foramen lacerum. 3. The foramen rotundum.

Fig. 16. The frontal, occipital, ſphenoid, and ethmoid bones, being cut perpendicularly thro' the middle, and the naſal, maxillary, and palate bones ſeparated from each other, the interior view of the left ſide of the Cranium, and bones of the Upper Jaw, are repreſented.

A A, The two tables and *diploe* of the frontal and occipital bones. B, The coronal ſuture. C, The ſerrated edges of the parietal, for forming the ſaggital ſuture. D, The lambdoid ſuture. E, The ſquamous ſuture. F, The furrows made by the veſſels of the dura mater. G, The frontal ſinus. H, The criſta galli. I, The naſal lamella of the ethmoid bone. K, The temporal proceſs of the ſphenoid bone. L, The ſella turcica. M, The ſphenoid ſinus. N, The vomer. O, The palate-plate of the ſuperior maxillary bone; and from it the proceſſus alveolaris, which contains the teeth. P, The os naſi. Q, The paſſage into the left noſtril. 1. The meatus auditorius internus for the paſſage of the auditory nerve. 2. The paſſage of the ninth pair of nerves. 3. The foramen inciſivum.

Fig. 17. The external ſurface of the baſe of the Cranium and Upper Jaw.

A A, The lambdoid ſuture. B, The ſuperior horizontal ridge of the occipital bone, which is oppoſite to the cruciform ridge, where the ſuperior longitudinal ſinus divides to form the lateral ſinuſes. C, The perpendicular ridge. D, The inferior horizontal ridge. E, The foramen magnum, for the paſſage of the medulla ſpinalis. FF, The two condyles. G, The cuneiform proceſs. H H, The zygomatic proceſs of the *temporal bone*. I I, The maſtoid proceſſes. K, The vomer, which forms the back-part of the ſeptum naſi. L L, The ſtyloid proceſſes. M M, The foſſæ at the root of the maſtoid proceſſes, for the poſterior belly of the digaſtric muſcle. N N, The cavities for receiving the condyles of the lower jaw. O O, The oſſa palati. P, The longitudinal palate-ſuture. Q, The tranſverſe palate-ſuture. R, The alveoli, or ſpongy ſockets for the teeth. S, The zygomatic proceſs of the oſſa malarum. T T, The zygomatic ſuture. 1. Meatus auditorius externus. 2. Hole for the internal carotid artery. 3. For the artery of the dura mater. 4. Foramen ovale, for the third branch of the fifth pair, to the upper jaw.

Plate. XIV.

Fig. 1. A poſterior view of the Sternum and Clavicles, with the ligament connecting the clavicles to each other.

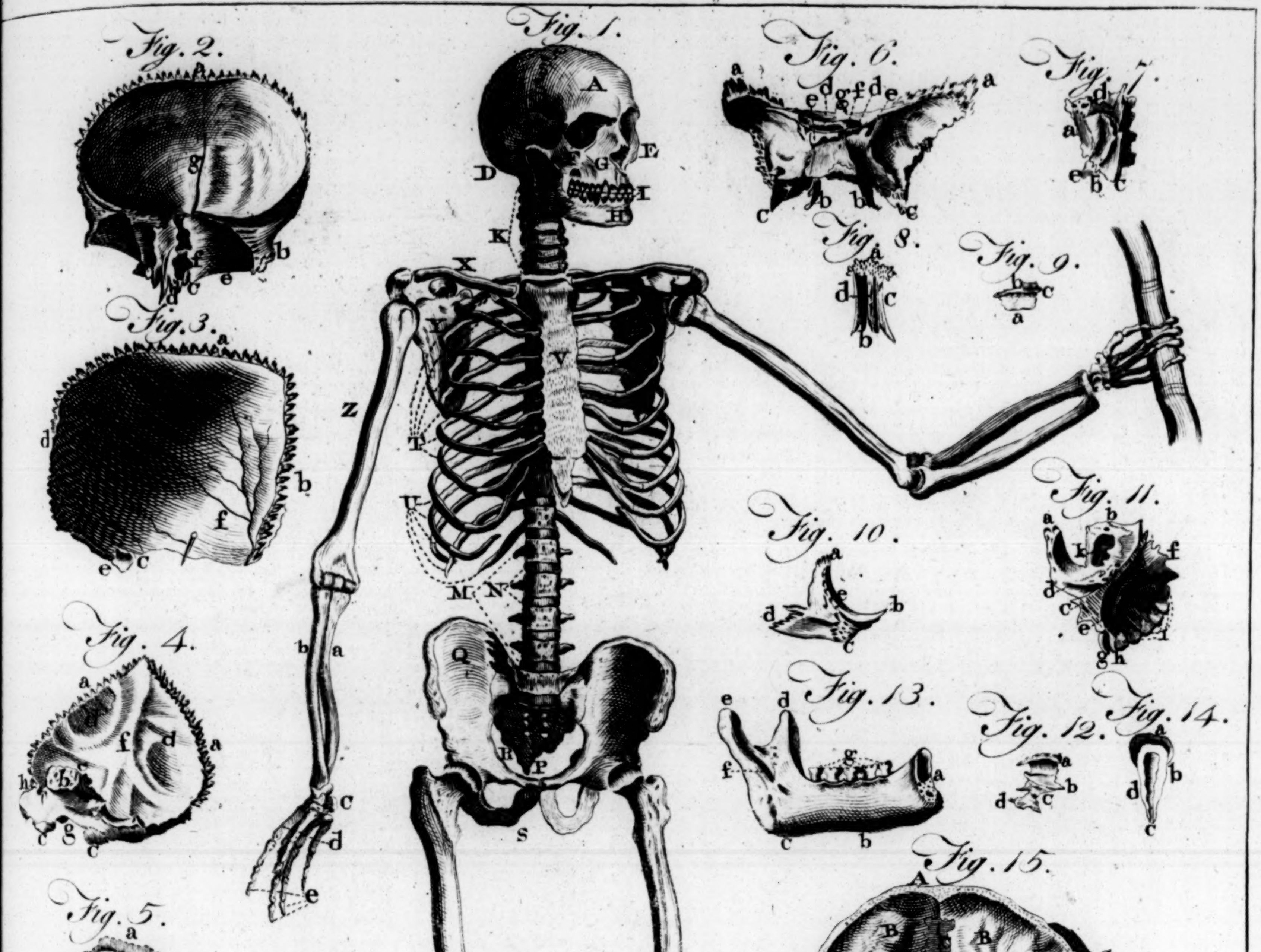
a, The poſterior ſurface of the ſternum. b b, The broken ends of the clavicles. c c c c, The tubercles near the extremity of each clavicle. d, The ligament connecting the clavicles.

Fig. 2. A fore view of the Left Scapula, and of a half of the Clavicle, with their ligaments.

a, The ſpine of the ſcapula. b, The acromion. c, The inferior angle. d, Inferior coſta. e, Cervix. f, Glenoid cavity, covered with cartilage for the arm-bone. g g, The capſular ligament of the joint. h, Coracoid proceſs. i, The broken end of the clavicle. k, Its extremity joined to the acromion. l, A ligament coming out ſingle from the acromion to the coracoid proceſs. m, A ligament coming out ſingle from the

the

Plate XIII



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A. Bell Sculp.

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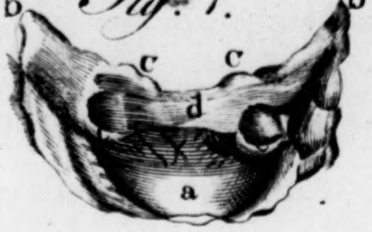

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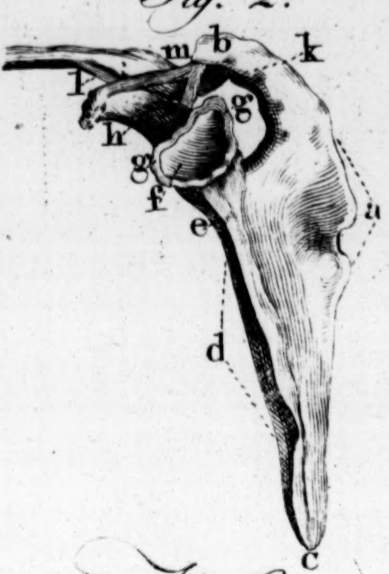
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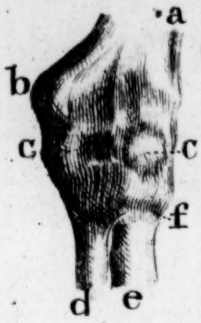

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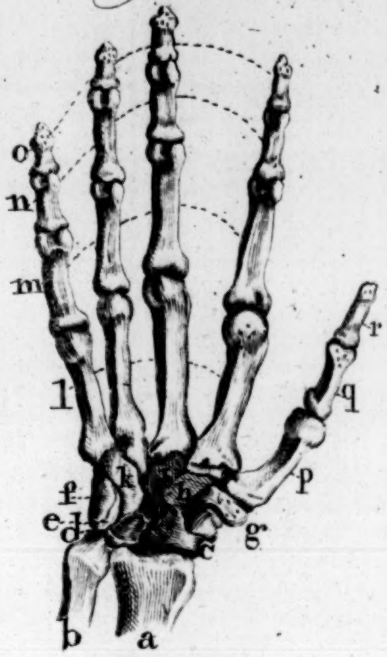
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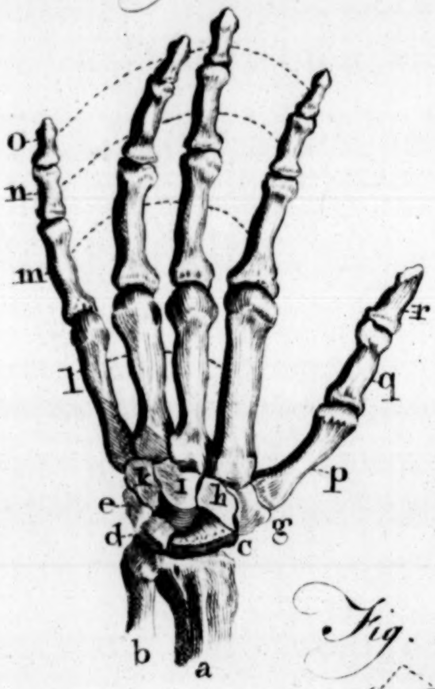
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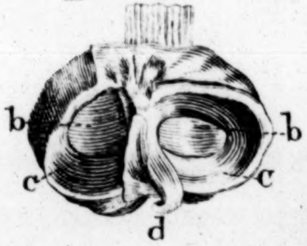

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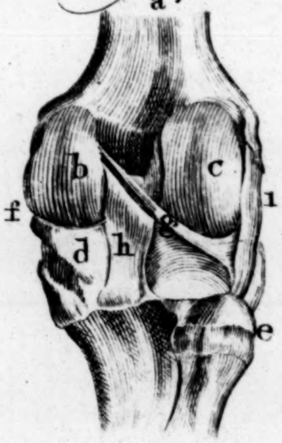

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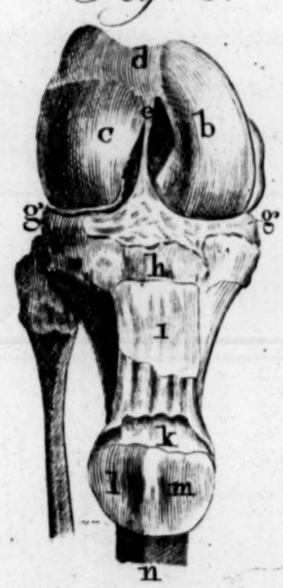
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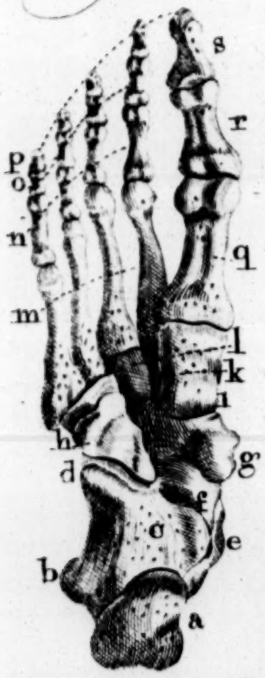
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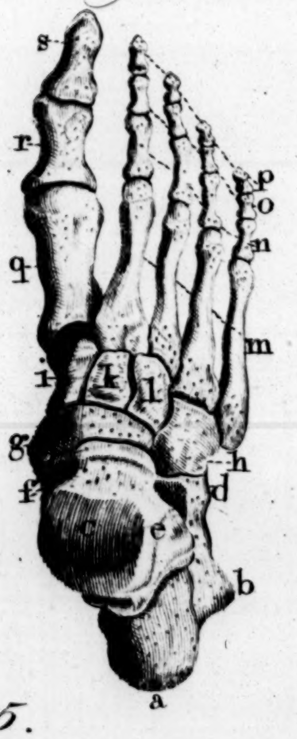
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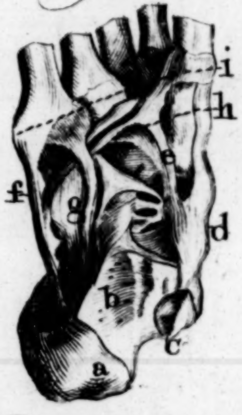

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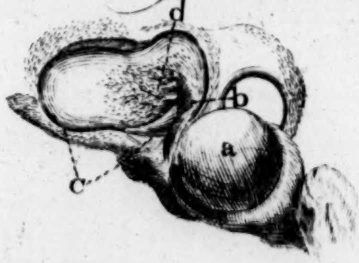

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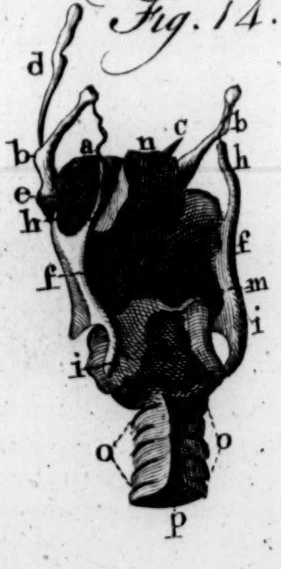
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Fig. 15.

A. Bell Sculp.

the acromion, and dividing into two, which are fixed to the coracoid proceſs.

FIG. 3. The joint of the elbow of the LEFT ARM, with the ligaments.

a, The os humeri. b, Its internal condyle. cc, The two prominent parts of its trochlea appearing through the capſular ligament. d, The ulna. e, The radius. f, The part of the ligament including the head of the radius.

FIG. 4. The Bones of the RIGHT-HAND, with the PALM in view.

a, The radius. b, The ulna. c, The ſcaphoid bone of the carpus. d, The os lunare. e, The os cuneiforme. f, The os piſiforme. g, Trapeſium. h, Trapeſoides. i, Capitatum. k, Unciforme. l, The four metacarpal bones of the fingers. m, The firſt phalanx. n, The ſecond phalanx. o, The third phalanx. p, The metacarpal bone of the thumb. q, The firſt joint. r, The ſecond joint.

FIG. 5. The poſterior view of the bones of the LEFT HAND.

The explication of Fig 4. ſerves for this figure ; the ſame letters pointing out the ſame bones, though in a different view.

FIG. 6. The upper extremity of the TIBIA, with the ſemilunar cartilages of the joint of the knee, and ſome ligaments.

a, The ſtrong ligament which connects the rotula to the tubercle of the tibia. b b, The parts of the extremity of the tibia, covered with cartilage, which appear within the ſemilunar cartilages. c c, The ſemilunar cartilages. d, The two parts of what is called the croſs ligament.

FIG. 7. The poſterior view of the joint of the RIGHT KNEE.

a, The os femoris cut. b, Its internal condyle. c, Its external condyle. d, The back-part of the tibia. e, The ſuperior extremity of the fibula. f, The edge of the internal ſemilunar cartilage. g, An oblique ligament. h, A larger perpendicular ligament. i, A ligament connecting the femur and fibula.

FIG. 8. The anterior view of the joint of the RIGHT KNEE.

b, The internal condyle. c, Its external condyle. d, The part of the os femoris, on which the patella moves. e, A perpendicular ligament. f f, The two parts of the crucial ligaments. g g, The edges of the two moveable ſemilunar cartilages. h, The tibia. i, The ſtrong ligament of the patella.—k, The back part of it where the fat has been diſſected away. l, The external depreſſion. m, The internal one. n, The cut tibia.

FIG. 9. A view of the inferior part of the bones of the RIGHT FOOT.

a, the great knob of the os calcis. b, A prominence on its outſide. c. The hollow for the tendons, nerves, and blood-veſſels. d, The anterior extremity of the os calcis. e, Part of the aſtragalus. f, Its head covered with cartilage. g, The internal prominence of the os naviculare. h, The os cuboides. i, The os cuneiforme internum ; k,—Medium ; l,—Externum. m, The metatarſal bones of the four leſſer toes. n, The firſt—o, The ſecond—p, The third phalanx of the four leſſer toes. q, The metatarſal bones of the four leſſer toes. n, The firſt—o, The ſecond. p, The third phalanx of the four leſſer toes. q, The metatarſal bones of the great toe. r, Its firſt—s, Its ſecond joint.

FIG. 10. The inferior ſurface of the two large SESAMOID BONES, at the firſt joint of the great toe.

FIG. 11. The ſuperior view of the bones of the RIGHT FOOT.

a, b, as in Fig. 9. c, The ſuperior head of the aſtragalus. d, *&c.* as in Fig. 9.

FIG. 12. The view of the Sole of the FOOT with its ligaments.

a, The great knob of the os calcis. b, The hollow for the tendons, nerves, and blood-veſſels. c, The ſheaths of the flexores pollicis, and digitorum longi opened. d, The ſtrong cartilaginous ligament ſupporting the head of the aſtragalus. e, h, Two ligaments which unite into one, and are fixed to the metatarſal bone of the great toe. f, A ligament from the knob of the os calcis to the metatarſal bone of the little toe. g, A ſtrong triangular ligament, which ſupports the bones of the tarſus. i, The ligaments of the joints of the five metatarſal bones.

FIG. 13. a, The head of the thigh bone of a child. b, The ligamentum rotundum connecting it to the acetabulum. c, The capſular ligament of the joint with its arteries injected. d, The numerous veſſels of the mucilaginous gland injected.

FIG. 14. The back view of the cartilages of the LARYNX, with the OS HYOIDES.

a, The poſterior part of the baſe of the os hyoides. b b, Its cornua. c, The appendix of the right ſide. d, A ligament ſent out from the appendix of the left ſide, to the ſtyloid proceſs of the temporal bone. e, The union of the baſe with the left cornu. f f, The poſterior ſides of (g) the thyroid cartilage. h h, Its ſuperior cornua. i i, Its inferior cornua. k, The cricoid cartilage. l l, The arytenoid cartilages. m The entry into the lungs, named *glottis*. n, The epiglottis. o o, The ſuperior cartilages of the trachea. p, Its ligamentous back-part.

FIG. 15. The ſuperior concave ſurface of the SESAMOID BONES at the firſt joint of the great toe, with their ligaments.

a, Three ſeſamoid bones. b, The ligamentous ſubſtance in which they are formed.

PART II. OF THE SOFT PARTS IN GENERAL; AND OF THE COMMON INTEGUMENTS.

ANATOMICAL writers uſually proceed to a deſcription of the muſcles after having finiſhed the oſteology ; but we ſhall deviate a little from the common method, with a view to deſcribe every thing clearly and diſtinctly, and to avoid a tautology which would otherwiſe be unavoidable. All the parts of the body are ſo intimately connected to each other, that it ſeems to be impoſſible to convey a juſt idea of any one of them, without being in ſome meaſure obliged to ſay ſomething of others; and on this account, we wiſh to mention in this place, the names and ſituation of the principal viſcera of the body; that when mention is hereafter made of any of them in the courſe of this treatiſe, the reader may at leaſt know where they are placed.

b, After this little digreſſion, the common integuments, and after them the muſcles, will be deſcribed; we then propoſe to enter into an examination of the ſeveral viſcera and their different functions. In deſcribing the brain, occaſion will be taken to ſpeak of the nerves and animal ſpirits. The circulation of the blood will follow the anatomy of the heart, and the ſecretions and other matters will be introduced in their proper places.

c, The body is divided into three great cavities. Of theſe,

d, The uppermoſt is formed by the bones of the cranium, and incloſes the brain and cerebellum.

e, The ſecond is compoſed of the vertebræ of the back, the ſternum and true ribs, with the additional aſſiſtance of muſcles, membranes and common integuments, and is called the *thorax*. It contains the heart and lungs. The third and inferior cavity is the abdomen. It is ſeparated from the thorax by means of the diaphragm, and is formed by the lumbar vertebræ, the os ſacrum, the oſſa innominata, and the falſe ribs; to which we may add the peritoneum, and a variety of muſcles. This cavity incloſes the ſtomach, inteſtines, omentum or cawl, liver, pancreas, ſpleen, kidneys, urinary bladder, and parts of generation.

f, Under the diviſion of common integuments, are uſually included the epidermis, or ſcarf ſkin; the reticulum mucoſum of Malpighi; the cutis, or true ſkin; and the membrana adipoſa. The hair and nails, as well as the miliary and ſebaceous glands, may be conſidered as appendages to the ſkin.

CHAP. I.

Of the EPIDERMIS.

73 a, THE epidermis, cuticula or ſcarf ſkin, is a fine, tranſparent, and inſenſible pellicle; deſtitute of nerves and blood-veſſels, which inveſts the body, and every where covers the true ſkin. This ſcarf ſkin which appears to be very ſimple, is compoſed of ſeveral laminæ or ſcales, which are increaſed by preſſure, as we obſerve in the hands and feet; where it is frequently much thickened, and becomes perfectly callous. It may be ſeparated from the true ſkin by heat, or by maceration in water (T). Some anatomical writers have ſuppoſed that it is formed by a humidity exhaled from the whole ſurface of the body, which gradually hardens when it comes into contact with the air. They were perhaps induced to adopt this opinion, by obſerving the ſpeedy regeneration of this part of the body when it has been by any means deſtroyed; it appearing to be renewed in all parts of its ſurface at the ſame time, whereas other parts which have been injured, are found to direct their circumference only towards their center; but a demonſtrative proof that the epidermis is not a viſcous humour hardened by means of the external air, is, that the fœtus in utero is found to have this covering. Its true origin ſeems to be from the expanſion of the extremities of the excretory veſſels, which are found every where on the ſurface of the true ſkin (U). And this formation ſeems to explain the cauſe of its quick growth.

b, It is pierced with an infinite number of pores, or little holes, which afford a paſſage to the hairs, ſweat, and inſenſible perſpiration; and likewiſe to warm water, mercury, and whatever elſe is capable of being taken in by the abſorbents of the ſkin. The lines which we obſerve on the epidermis belong to the true ſkin. The cuticula adjuſts itſelf to them, but does not form them.

CHAP. II.

Sect. i. *Of the* RETICULUM MUCOSUM.

74 a, THIS is a very fine membrane, pierced with an infinite number of pores, and moiſtened by a mucus which is ſuppoſed to tranſude from the ſurface of the true ſkin.

b, the colour of the body is found to depend on the colour of the reticulum mucoſum; for in negroes it is obſerved to be perfectly black, whilſt the true ſkin is of the ordinary colour.

c, The bliſters which raiſe the ſkin when burnt or ſcalded, are probably occaſioned by the rarefaction of this mucus.

Sect. ii. *Of the* CUTIS, *or* TRUE SKIN.

75 a, The cutis is compoſed of tendinous fibres cloſely compacted together, as we may obſerve in leather, which is the prepared ſkin of animals. Theſe fibres form a thick cellular network, which every where admits the filaments of nerves, and an infinite number of blood-veſſels and lymphatics.

b, The cutis, when the epidermis is taken off, is found to have throughout its whole ſurface innumerable tendinous papillæ, which appear like very minute granulations, and ſeem to be calculated to receive the impreſſions of the touch; being the moſt eaſily obſerved where the ſenſe of feeling is the moſt delicate, as in the palms of the hands, and on the fingers.

c, Theſe papillæ which are deſcribed as being of a pyramidal figure, are ſuppoſed by many anatomical writers to be continuations of the pulpy ſubſtance of nerves,

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(T) The ingenious Mr Gooch relates the caſe of a gentleman in Norfolk, who has been frequently attacked by a peculiar kind of fever, which has conſtantly produced an univerſal ſeparation of the cuticle from the ſkin. This ſeparation, which begins to take place within twenty-four hours from the firſt attack of the fever, is uſually completed within ten or twelve days, leaving the ſkin for ſometime exquiſitely ſenſible. The patient has ſometimes turned off the cuticle from the wriſts to his fingers ends like gloves. One of theſe cuticular gloves, with an account of the caſe having been tranſmitted to the members of the Royal Society, they have given an engraving of it in their tranſactions. See the Phil. Tranſ. and Gooch's Med. and Chirurg. Obſerv.

(U) This was Leuwenhoeck's opinion. Ruyſch attributed its origin to the nervous papillæ of the ſkin, and Heiſter thinks it probable that it may owe its formation both to the papillæ and the excretory veſſels.

nerves, whoſe coats have terminated in the cellular texture of the ſkin. The great ſenſibility of theſe papillæ evidently proves them to be exceedingly nervous; but ſurely the nervous fibrillæ of the ſkin are of themſelves ſcarcely equal to the formation of theſe papillæ; and it ſeems to be more probable that they are formed like the reſt of the cutis.

d, Theſe papillæ being deſcribed, the uſes of the epidermis and the reticulum mucoſum will be more eaſily underſtood; the latter ſerving to keep them conſtantly moiſt, whilſt the former protects them from the external air, and modifies their too great ſenſibility.

Sect. iii. *Of the* Glands *of the Skin.*

76 a, We meet with two ſorts of glands in the ſkin, *viz.* the ſebaceous, and miliary glands.

77 the ſe- ceous nds. a, Theſe are certain membranous veſicles, or ſmall cylindrical tubes, continued from the ends of arteries, and diſcharging a fat and oily humour which ſerves to lubricate and ſoften the ſkin. When this humour is collected and long retained in theſe tubes, it inſpiſſates; and by enlarging the tubes, gives them the ſpherical figure which has occaſioned them to be called *glands:* and when the fluid they ſecrete has acquired a certain degree of thickneſs, it approaches to the colour and conſiſtence of ſuet: from this appearance they have derived their name of *ſebaceous glands.*

74 b, They are found ſeated in all parts of the body that are under a neceſſity of being more immediately expoſed to the air; as in the face, and wherever the ſkin is liable to much attrition, as in the arm-pits, groin, &c. and it is the humour they ſecrete which diſcolours our linen when we are long without changing it.

78 the miliglands. a, Theſe glands which are called *miliary,* from their reſembling millet ſeeds; are deſcribed as ſmall ſpherical bodies placed in all parts of the ſkin in much greater abundance than the ſebaceous glands. Each of theſe little glands has its excretory duct, which paſſing thro' the reticulum mucoſum, opens on the ſurface of the 75 ſcarf ſkin, and diſtills the ſweat and matter of inſenſible perſpiration.

b, Beſides the excretory veſſels which are derived from theſe glands for the purpoſes of perſpiration, it ſeems probable that a conſtant exhalation is carried on from the extremities of the minute arteries which are 79 every where diſperſed thro' the ſkin.

the inſible perſation, of the at. a, It will perhaps not be difficult to explain how theſe proceſſes in the animal œconomy are conducted. The blood being carried by the circulation to the minute arteries of the cutis, diſcharges itſelf of thoſe ſubtile parts which are capable of paſſing through the little veſſels which open on the ſurface of the ſkin. Theſe exhaling veſſels are eaſily demonſtrated in the dead ſubject by throwing water into the arteries; for then ſmall drops exude from all parts of the ſkin and raiſe up the cuticle, the pores of which are cloſed by death; and in the living ſubject, a looking-glaſs placed againſt the ſkin is ſoon obſcured by the vapour.

b, When the perſpiration is by any means increaſed, and ſeveral drops which were inſenſible when ſeparate, are united together and condenſed by the external air, they form upon the ſkin ſmall but viſible drops called *ſweat.* This particularly happens after much exerciſe; the motion of the blood being then accelerated, and more of it carried to the extremities of the veſſels, a greater quantity of the perſpirable matter is conſequently forced thro' the paſſages which are diſtined to carry it off. So that the ſkin is found to ſerve as an emunctory, thro' which the redundant water and ſometimes other more ſaline parts of the blood become unfit for circulation are carried off; but perſpiration is not confined to the ſkin only; a great part of what we are conſtantly throwing off in this way is from the lungs. The quantity of humour exhaled from the human body by this inſenſible perſpiration is very conſiderable. Sanctorius (x) an Italian phyſician, who indefatigably paſſed a great many years in a ſeries of ſtatical experiments, demonſtrated long ago what has been confirmed by later obſervations; that the quantity of vapour exhaled from the ſkin, and from the ſurface of the lungs, amounts nearly to 5-8ths of the aliment we receive. So that if in the warm climate of Italy, a perſon eats and drinks the quantity of eight pounds in the courſe of a day, five pounds of it will paſs off by inſenſible perſpiration, while three pounds only will be evacuated by ſtool, urine, the ſaliva, &c. But in countries where the degree of cold is greater than in Italy, the quantity of perſpired matter is leſs. In ſome of the more northern climates it is found not to equal the diſcharge by urine. It is likewiſe obſerved to vary according to the ſeaſon of the year, and according to the conſtitution, age, ſex, diſeaſes, diet, exerciſe, paſſions, &c. of different people.

c, From what has been ſaid on this ſubject, it will be eaſily conceived that this evacuation cannot be either much increaſed or diminiſhed in quantity without affecting the health. If it is too copious, the maſs of blood is ſoon deprived of its moſt ſubtile parts, and flows with leſs freedom; the ſolids being conſequently rendered more dry and rigid. And if, on the contrary, the quantity of perſpirable matter is diminiſhed, it is either carried off thro' ſome other channels, or is liable to produce a variety of diſeaſes which will be found to vary according to the ſeaſon of the year, and the conſtitution of the body.

d, This perſpirable matter and the ſweat, for they are both evidently diſcharged thro' the ſame paſſages, and differ only in quantity, are analagous to the urine; as appears from their taſte and ſaline nature (y). And it is worthy of obſervation, that when either of theſe ſe-

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(x) The inſenſible perſpiration is ſometimes diſtinguiſhed by the name of this phyſician, who was born in the territories of Venice, and was afterwards a profeſſor in the univerſity of Padua. After eſtimating the aliment he took in, and the ſenſible ſecretions and diſcharges, he was enabled to aſcertain with great accuracy the weight or quantity of inſenſible perſpiration, by means of a ſtatical chair which he contrived for this purpoſe: and from his experiments, which were conducted with great induſtry and patience, he was led to determine what kinds of ſolid or liquid aliment increaſed or diminiſhed it. From theſe experiments he formed a ſyſtem, which he publiſhed at Venice in 1614, in the form of aphoriſms, under the title of "Ars de Medicina Statica." Baron Haller in his Bibliotheca Anatomica, enumerates no leſs than 27 editions of this work; of which, 19 are of the Latin original, and the others, tranſlations of it into different languages.

(y) Minute chryſtals have been obſerved to ſhoot upon the cloaths of men who work in glaſs-houſes. Haller Elem.

Phyſ.

ſecretions is increaſed in quantity, the other is diminiſhed; ſo that they who perſpire the leaſt, uſually paſs the greateſt quantity of urine, and vice verſa.

Sect. v. *Of the* Nails.

80 a, The nails are bodies of a hard and compact nature, reſembling horn; formed by a continuation of the papillæ of the ſkin, which enlarging, unite together and gradually harden.

b, The origin of the nails may be eaſily demonſtrated, by gently boiling the hands or feet of the human ſubject in water; for, by ſeparating the nails from the ſkin after this proceſs, they will be found adhering to the papillæ from which they are produced.

c, The nails increaſe from their roots, and not from their upper extremity. That part of a nail which is fartheſt from the root, is the hardeſt and leaſt ſenſible. We cut, for inſtance, the upper end of a nail without exciting any ſenſation, whilſt the moſt exquiſite pain is occaſioned by cutting it near its root; that is, near the papillæ from which it derives its origin.

d, The nails ſerve to cover and defend the ends of the fingers from external injury, and are uſeful to us when we take hold of ſmall and delicate bodies; which without their aſſiſtance we ſhould not always be able to accompliſh.

Sect. vi. *Of the* Hair.

81 a, The hairs, which from their being generally known, do not ſeem to require any definition; ariſe from diſtinct capſules or cartilaginous bulbs ſeated in the interior part of the ſkin (Z). Some of the bulbs incloſe ſeveral hairs. They may be obſerved at the roots of the hairs which form the beard or whiſkers of a cat.

b, The hairs, like the nails, grow only from below by a regular propulſion from their root where they receive their nouriſhment. Their bulbs, when viewed with a microſcope (A), are obſerved to be of an oval ſhape. The bodies of the hairs, which are the parts without the ſkin, vary in ſoftneſs and colour according to the difference of climate, age, or temperament of body (B).

c, In old people the hair uſually falls. This event ſeems to be occaſioned by the almoſt conſtant dryneſs which accompanies old age, and gradually hardens all the ſolid parts of the body. The bulbs of the hair partaking of this change, concrete and become impenetrable to any ſupply of nouriſhment. The hairs in conſequence of this want of moiſture fall out; and if we ſometimes ſee inſtances of people who preſerve their hair at a very advanced age, they are to be attributed to an uncommon degree of humidity in the conſtitution, which prolongs the ſuppleneſs of all the parts. Many people believe that both the hair and the nails grow after death; but this opinion is contradictory to experience.

d, Their general uſe in the body does not ſeem to be abſolutely determined; but hairs in particular parts, as on the eye-brows and eye-lids, are deſtined for particular uſes, which will be mentioned when thoſe parts are deſcribed.

Sect. vii. *Of the* Membrana Adiposa.

82 a, This membrane, which is likewiſe called the *cellular* (C) or *reticulur membrane;* may be conſidered as the laſt of the common integuments; it is every where found under the ſurface of the true ſkin, and is compoſed of an infinite number of minute cells united together, and communicating with each other (D). Theſe cells ſerve as reſervoirs to the oily part of the blood, called *fat*; which is depoſited in them by particular veſſels, continued from the ends of arteries.

b, The fullneſs and ſize of the body are in a great meaſure proportioned to the quantity of fat contained in theſe cells; and it ſeems to be an improper mode of expreſſion to ſay, that ſuch a one is well in fleſh, inſtead of ſaying he is fat; for an increaſe in bulk does not at all add to the ſize of the fleſh, which is made up of the muſcles. He who is leſs diſpoſed to be fat appears to be more muſcular; and has indeed commonly ſtronger and finer muſcles than he who is fat.

c, The adeps ſeems to be renewed by a conſtant abſorption and depoſition of it by the veſſels deſtined for that

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Phyſ.—But this may with as great reaſon be ſuppoſed to proceed from the evaporation of the ſaline matter uſed in the compoſition of glaſs; as no ſort of ſalt is found to be fixed enough for reſiſting the violent heat required in glaſs-making.

(Z) Malpighi, and after him the celebrated Ruyſch, ſuppoſed the hairs to be continuations of nerves; being of opinion that they originated from the papillæ of the ſkin, which are univerſally allowed to be nervous; and as a corroborating proof of what they advanced, they argued the pain we feel in plucking them out; but later anatomiſts ſeem to have rejected this doctrine, and conſider the hairs as particular bodies, not ariſing from the papillæ (for in the parts where the papillæ abound moſt there are no hairs) but from bulbs or capſules, which are peculiar to them.

(A) It ſeems to be much eaſier to ſuppoſe, than to demonſtrate, the appearance of the conſtituent parts of minute bodies like the hairs, which require the aſſiſtance of the microſcope in examining their anatomical ſtructure. M. Winſlow has deſcribed the membrane which inveſts the bulb, and the ſtructure of the bulb itſelf, as it appears thro' the microſcope; but neither the uſes nor the anatomy of the hair ſeem to be perfectly underſtood. The manner in which they are affected in the plica polonica ſeems to prove them to be pervious thro' their whole length, and they may perhaps ſerve ſome uſeful purpoſes in perſpiration.

(B) The hairs likewiſe differ from each other, and may not be improperly divided into two claſſes; one of which may include the hair of the head, chin, pubes, and axillæ; and the other, the ſofter hairs which either have no bulb, or at leaſt a very minute one; and which are to be obſerved almoſt every where on the ſurface of the body.

(C) Deſcribing this membrane as a common integument, it ſeems right to give it the name of *membrana adipoſa*; for under the ſkin its cells are uſually filled with fat; but the ſame membrane is found to inveſt the moſt minute fibres we are able to trace, and is called *cellullar membrane* in ſome parts of the body where its cells are not filled with fat, and *reticular* in others, where it appears like very minute net-work.

(D) The two diſeaſes which are peculiar to this membrane, are proofs of this communication; for in the emphyſema, all its cells are filled with air; and in the anaſarca, they are univerſally diſtended with water. Beſides theſe proofs of this communication from diſeaſe, a familiar inſtance of it may be obſerved amongſt butchers, who uſually puncture this membrane, and by inflating it with air add to the good appearance of their meat.

that purpoſe; for without this renewal it would probably become unfit for uſe. The great waſte of it in many diſeaſes, particularly in the conſumption, ſeems to be a ſufficient proof that this abſorption takes place; and it probably affords conſiderable nouriſhment to the body; for in people who have long faſted, the fat has been obſerved to decreaſe very faſt.

d, The fat is not confined to the ſkin alone, being met with every where in the interſtices of muſcles, in the omentum, about the kidnies, at the baſis of the heart, in the orbits, &c. and ſome anatomical writers (E) of eminence, have been induced to conſider it as the univerſal connecting medium of every part of the body.

e, The ordinary uſes of this oily humour ſeem to be, to afford moiſture to all the parts with which it is connected; to facilitate the action of the muſcles; to defend the body from the attrition of external ſubſtances; and laſtly, to add to its beauty, by making it every where ſmooth and equal.

PART III. OF THE MUSCLES.

CHAP. I.

Of the MUSCLES in General.

a, THE muſcles are the fleſhy parts of the body, and may be conſidered as the means by which all its movements are performed.

b, They are diſtinguiſhed by different names (F) which allude to the different diſpoſitions of their fibres, to their ſituation, or their uſe. In ſome, the fibres are placed parallel to each other, in a ſtraight direction, and form what is called a *rectilinear muſcle*; in others, the fibres are placed obliquely with reſpect to the tendons, like the plume of a pen; theſe are ſtiled *penniform muſcles*: and there are muſcles whoſe fibres croſs and interſect each other. There are likewiſe other diſtinctions, but to follow them minutely would lead us too far.

c, Anatomiſts uſually diſtinguiſh in the generality of muſcles, a body, or belly part, and two extremities. The belly of the muſcle is compoſed of an infinite number of fleſhy fibres, of a red colour, which every body will underſtand under the name of *fleſh*. The extremities include the ſame number of fibres as the belly of the muſcle; but they are more firmly united together, and degenerate into a firm, gliſtening, and inſenſible ſubſtance, of a white colour, called *tendon*; if it be round and ſlender; or *aponeuroſis*, if expanded into a broad flat ſurface.

d, That extremity which is attached to the moſt fixed part, has been named the *head of the muſcle*; and that end which is inſerted into the moveable part, has been called the *tail*. But theſe are arbitrary terms, and cuſtom only can be pleaded for their being retained; for the extremities of a muſcle vary with the different ſituations of the body; and parts that in ſome motions are fixed, become moveable in others.

e, The muſcles are not only ſurrounded by a very fine membrane, which envelops them ſeparately; but the fibres of every muſcle, upon a nice enquiry, are found to be divided into diſtinct faſciculi or bundles, and theſe diviſions are probably ſubdivided ad infinitum.

f, Leuwenhoeck fancied he had diſcovered, by means of his microſcope, the ultimate diviſion of a muſcle; and that he could point out the ſimple fibre, which appeared to him to be an hundred times leſs than a hair; but he was afterwards convinced how much he was miſtaken on this ſubject, and candidly acknowledged, that what he had taken for a ſimple fibre, was in fact a bundle of fibres.

g, It is eaſy to obſerve ſeveral of theſe faſciculi or bundles, in a piece of beef; in which, from the coarſeneſs of its texture, they are very evident.

h, The muſcles owe the red colour, which ſo particularly diſtinguiſhes their belly part, to an infinite number of blood-veſſels, which are every where diſperſed like net-work through their whole ſubſtance; for their fibres, after having been macerated in water, are, like all other parts of the body diveſted of their blood, found to be of a white colour. The blood-veſſels are accompanied by nerves, and they are both diſtributed in ſuch abundance to theſe parts, that in endeavouring to trace the courſe of the blood-veſſels in a muſcle, it would appear to be formed altogether by their ramifications; and in an attempt to follow the branches of its nerve, their number and minuteneſs would ſoon elude the eye and the knife of the anatomiſt; and the whole muſcle would appear perhaps as if compoſed only of nerves.

i, We defined the muſcles to be moving powers, and we are all ſenſible of the propriety of this definition; but nobody ſeems to underſtand perfectly how theſe powers are effected.

k, If a muſcle is pricked or irritated, it contracts, and becomes firm and rigid. This is called its tonic action, or irritable principle.

l, If it is much diſtended or compreſſed, it endeavours to re-eſtabliſh itſelf by its ſpring, like all elaſtic bodies.

m, But beſides theſe two properties, it poſſeſſes a third, which is peculiar to it; and this is, that without having been either pricked or irritated, drawn out or diſtended, it ſhortens itſelf, or at leaſt endeavours to ſhorten itſelf, at the command of the will. There are ſome muſcles, however, which are called involuntary; becauſe they act independent of the will, as the heart and muſcles of reſpiration. The laſt of theſe may be ſaid to have a mixed motion, being in ſome meaſure influenced by the will.

n, It is this action of the voluntary muſcles which is called *muſcular motion*; and of which we will endeavour to convey an idea in a few words. To illuſtrate

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(E) Haller.

(F) Different authors have deſcribed the ſame muſcle by different names. Many new Latin ones have lately been introduced by the celebrated Albinus with great ſeeming propriety; but ſuch alterations are liable to create confuſion. In France, Mr Winſlow's method is univerſally followed, who diſtinguiſhed all the muſcles by French names, which are often very different from any Latin name before in uſe. All theſe variations are pointed out in the later editions of Douglas's Myography.

luſtrate what we ſhall advance, it will be neceſſary to take a muſcle or two as examples.

o, In the oſteological part of the work, the generality of the bones were deſcribed as being articulated to each other with ſo much art, as to be capable of motion every way; but their motions cannot be performed by themſelves, as they are perfectly paſſive in all the movements of the body. The muſcles are a kind of cords attached to the bones, which they move in different directions by ſhortening their fibres. Every one is acquainted with the motion of the lower jaw: we are able firſt to lower it, and then to raiſe and apply it ſtrongly againſt the upper jaw. The action of the maſſeter muſcle, in this caſe is very ſenſible above. It is fixed to the os malæ, and part of the upper jaw; and below, it is attached to the lower and outer ridge of the under jaw. When we are willing then to raiſe the jaw, its muſcles are put into action. The maſſeter on each ſide contracts; its fleſhy part ſwells and enlarges, and becomes harder and ſhorter; and as the upper end of this muſcle is attached to a fixed and immoveable part, which is the caſe with the maxilla ſuperior, the lower extremity is neceſſarily drawn towards the upper one, bringing with it the lower jaw. This muſcle, when in action, may be eaſily felt, by applying the hand to the cheek, between the cheek bone and the lower jaw.

p, Again, when we deſire to bend the finger, the flexor muſcles which are attached to the os humeri, and the bones of the fore arm, and have their moveable part fixed to the inner extremities of the fingers, contract and ſhorten themſelves; and thus the ends of the fingers are drawn towards the palm of the hand.

q, It will here naturally be inquired by what mechaniſm this power to contract is occaſioned. Many opinions have been formed, and much has been written on this ſubject. Some of theſe ſyſtems were the reſult of much induſtry and ingenuity, and required no ſmall ſhare of mathematical knowledge not only to invent, but to underſtand them. Some have undertaken to explain the cauſe of contraction, by ſuppoſing that every muſcular fibre forms as it were a chain of very minute bladders; while the nerves which are diſtributed through the muſcle bring with them a ſupply of animal ſpirits, which at our will fill theſe bladders, and by increaſing their diameter in width, ſhorten them, and of courſe the whole fibre. We will dwell no longer on this ingenious hypotheſis, or ſay any thing of other ſyſtems, which as well as that we have mentioned, are far from being ſatisfactory; and we will only obſerve, that here, as in many other of her works, Nature ſeems to have drawn a boundary to our inquiries, beyond which no human penetration will probably ever extend.

q, Some few things we know with certainty on this ſubject, and theſe are, that the nerves are eſſentially neceſſary to muſcular motion; for if we tie up or divide the nerves leading to any muſcle, that muſcle becomes paralytic and incapable of action; that the cauſe of palſy is uſually not ſeated in the part affected, but commonly in the nerve leading to that part, and perhaps in the brain or ſpinal marrow, from whence the nerves originate; and that a ligature made on the artery leading to a muſcle produces the ſame effects as a ligature on the nerve, by rendering it inactive, and even inſenſible; and this laſt obſervation ſeems to prove, that a regular ſupply of blood, if not the immediate cauſe of muſcular motion, is at leaſt eſſentially necceſſary to it.

As the enumeration and deſcription of the particular muſcles muſt be dry and unentertaining to the generality of readers, yet cannot be omitted in a work of this nature, it appeared eligible to throw this part of the ſubject into the form of a table, leaving the reader to examine or paſs it over as he inclines.

A TABLE OF ALL THE MUSCLES

Parts of the Body.	Names of the MUSCLES.	ORIGIN.	IN
Integuments of the cranium.	1. *Occipito-frontalis.*	Ridge near the middle of the os occipitis.	Orbicularis palpebrarum, deſcending with a
	2. *Corrugator ſupercilii.*	Internal angular proceſs of the os frontis, above the joining of the os naſi with the ſuperior maxillary bone.	Inner part of the occipito-frontalis, where i
Ear-external.	1. *Attollens aurem.*	Tendon of the occipito-frontalis where it covers the aponeurosis of the temporal muſcle.	Upper part of the ear oppoſite to the antihe
	2. *Anterior auris.*	Poſterior part of the zygoma.	Eminence of the helix, oppoſite to the con
	3. *Retrahentes auris.*	By two or three ſmall muſcles from the maſtoid proceſs.	Back-ear, oppoſite to the ſeptum dividing t
	4. *Helicis major.*	Upper part of the helix.	Cartilage of the helix.
	5. *Helicis minor.*	Inferior part of the helix.	Crus of the helix.
	6. *Tragicus.*	Middle and outer part of the concha.	Point of the tragus.
	7. *Antitragicus.*	Internal part of the cartilage ſupporting the antitragus.	Tip of the antitragus.
	8. *Tranſverſus auris.*	Prominent part of the concha.	Oppoſite to the outſide of the antihelix.
Ear-internal.	1. *Laxator tympani.*	Spinous proceſs of the os ſphenoides.	Long proceſs of the malleus, within the ty
	2. *Tenſor tympani.*	Extremity of the euſtachian tube, and ſpinous proceſs of the os ſphenoides.	Small proceſs of the malleus.
	3. *Stapedius.*	A little cavern in the pars petroſa near the maſtoid proceſs.	Poſterior part of the head of the ſtapes.
Eye-lids.	1. *Orbicularis palpebrarum.*	Orbitar proceſs of the ſuperior maxillary bone.	Naſal proceſs of the ſuperior maxillary bon
	2. *Levator palpebræ ſuperioris.*	Foramen opticum of the os ſphenoides.	Cartilage called *tarſus*, ſupporting the uppe
Eye-balls.	1. *Levator oculi.*	Foramen opticum.	Upper and fore part of the tunica ſclerotica.
	2. *Depreſſor oculi.*	Inferior part of the foramen opticum.	Oppoſite to the former.
	3. *Adductor oculi.*	Between the obliquus ſuperior and depreſſor.	Oppoſite to the inner angle.
	4. *Abductor oculi.*	Bony partition between the foramen opticum and lacerum.	Globe of the eye, oppoſite to the outer can
	5. *Obliquus ſuperior*, ſeu *trochlearis.*	Edge of the foramen opticum.	Tunica ſclerotica.
	6. *Obliquus inferior.*	Orbitar proceſs of the ſuperior maxillary bone.	Tunica ſclerotica.
Noſe.	*Compreſſor naris.*	Root of the ala naſi externally.	Anterior extremity of the os naſi.
Mouth and Lips.	1. *Levator anguli oris.*	Hollow of the ſuperior maxillary bone, between the root of the ſocket of the firſt dens molaris, and the foramen infraorbitarium.	Angle of the mouth and under lip.
	2. *Levator labii ſuperioris alæque naſi.*	Two portions. 1. Orbitar proceſs; 2. Naſal proceſs of the ſuperior maxillary bone.	1. Upper lip, and orbicularis labiorum. 2.
	3. *Depreſſor labii ſuperioris alæque naſi.*	Os maxillare ſuperius.	Upper lip, and root of the ala naſi.
	4. *Depreſſor anguli oris.*	Lower edge of the maxilla inferior.	Angle of the mouth.
	5. *Depreſſor labii inferioris.*	Inferior part of the lower jaw.	Edge of the under lip.
	6. *Levator labii inferioris.*	Lower jaw, at the root of the dens caninus and two dentes inciſorii.	Under lip and ſkin of the chin.
	7. *Buccinator.*	Lower jaw, as far back as the laſt dens molaris.	Angle of the mouth within the orbicularis
	8. *Zygomaticus major.*	Os malæ near the zygomatic ſuture.	Angle of the mouth.
	9. *Zygomaticus minor.*	Upper part of the os malæ.	Upper lip near the corner of the mouth.
	10. *Orbicularis oris.*	Formed by the muſcles that move the lips.	
Lower-jaw.	1. *Temporalis.*	Semicircular ridge of the parietal bone.	Coronoid proceſs of the lower jaw.
	2. *Maſſeter.*	Superior maxillary bone.	Angle of the lower jaw, and out ſide of the
	3. *Pterygoidæus internus.*	Upper and internal part of the pterygoid proceſs.	Angle of the lower jaw internally.
	4. *Pterygoidæus externus.*	Outſide of the pterygoid, and root of the temporal proceſs of the ſphenoid bone from the adjoining tuberoſity of the os maxillare.	Condyloid proceſs of the lower jaw.
Anterior part of the neck.	1. *Platiſma-myoides.*	Cellular ſubſtance covering the upper parts of the deltoid and pectoral muſcles.	Lower jaw, between its angle and the origi
	2. *Sterno cleido-maſtoidæus.*	By two portions. 1. The top of the ſternum. 2. The upper and anterior part of the clavicle.	Maſtoid proceſs.
Between the lower-jaw and os hyoides.	1. *Digaſtricus.*	Root of the maſtoid proceſs of the temporal bone.	Anterior part of the lower jaw.
	2. *Mylo-hyoidæus.*	All the inſide of the lower jaw.	Lower edge of the baſis of the os hyoides.
	3. *Genio-hyoidæus.*	Internal protuberance in the middle of the lower jaw.	Baſis of the os hyoides.
	4. *Genio-gloſſus.*	The ſame with the former.	Tip, middle, and root of the tongue; alſo
	5. *Hyo-gloſſus.*	Baſe, cornu, and appendix of the os hyoides.	Side of the tongue near the ſtylo-gloſſus.
	6. *Lingualis.*	Root of the tongue laterally.	Tip of the tongue.
Between the os hyoides and trunk.	1. *Sterno-hyoidæus.*	Cartilaginous extremity of the firſt rib.	Baſe of the os hyoides.
	2. *Omo-hyoidæus.*	Superior coſta of the ſcapula.	Baſe of the os hyoides.
	3. *Sterno-thyroidæus.*	Whole edge of the uppermoſt bone of the ſternum internally.	Rough line at the external part of the inferi
	4. *Hyo-thyroidæus.*	Part of the baſis and almoſt all the cornu of the os hyoides.	Rough line oppoſite to the former.
	5. *Crico-thyroidæus.*	Side and fore part of the cricoid cartilage.	By two portions. 1. Into the lower part of
Between the lower-jaw and os hyoides laterally.	1. *Stylo-gloſſus.*	Styloid proceſs, and a ligament connecting it with the lower jaw.	Root of the tongue.
	2. *Stylo-hyoidæus.*	Middle and inferior part of the ſtyloid proceſs.	Os hyoides at the junction of the baſe and c
	3. *Stylo-pharyngæus.*	Root of the ſtyloid proceſs.	Side of the pharynx oppoſite to the ſuperio
	4. *Circumflexus*, or *Tenſor palati.*	Spinous proceſs of the os ſphenoides, and euſtachian tube.	Velum pendulum palati, and ſemi-lunar ed
	5. *Levator palati.*	Extremity of the pars petroſa of the temporal bone, and membranous part of the euſtachian tube.	Whole length of the velum pendulum pala
Entry into the fauces.	1. *Conſtrictor iſthmi faucium.*	Side of the tongue, near its root.	Middle of the velum pendulum.
	2. *Palato pharyngæus.*	Middle of the velum pendulum palati.	Edge of the upper, and back part of the th
	3. *Azygos uvulæ.*	Extremity of the ſuture joining the palate bones.	Tip of the uvula.
About the glottis, and behind the larynx.	1. *Crico-arytenoidæus poſticus.*	Back part of the cricoid cartilage.	Poſterior part of the baſe of the arytenoid
	2. *Crico-arytenoidæus lateralis.*	Cricoid cartilage, laterally, where it is covered by the thyroid.	Side of the baſe of the arytenoid cartilage.
	3. *Arytenoidæus obliquus.*	Baſe of one arytenoid cartilage, and croſſes its fellow.	Tip of the other arytenoid cartilage.
	4. *Arytenoidæus tranſverſus.*	Side of one arytenoid cartilage, its fibres running acroſs.	The other arytenoid cartilage.
	5. *Thyro-arytenoidæus.*	Poſterior part of the thyroid cartilage laterally.	Arytenoid cartilage.
	6. *Thyro-epiglottidæus.*	Near the former.	Epiglottis laterally.
	7. *Aryteno-epiglottidæus.*	Lateral and upper part of the arytenoid cartilage.	Epiglottis, along with the former:
Poſterior part of the pharynx.	1. *Conſtrictor pharyngis ſuperior.*	Cuneiform proceſs of the os occipitis; pterygoid proceſs of the os ſphenoides, and from the under and upper jaw.	White line in the middle of the pharynx.
	2. *Conſtrictor pharyngis medius.*	Appendix of the os hyoides, the cornu of the bone, and the ligament connecting it to the thyroid cartilage.	Middle of the cuneiform proceſs of the os
	3. *Conſtrictor pharyngis inferior.*	Side of the thyroid cartilage, and from the cricoid cartilage.	White line in the middle of the pharynx.

SCLES IN THE HUMAN BODY.

INSERTION.	USES.
um, deſcending with a fleſhy ſlip to the compreſſor naris.	To pull the ſkin of the head backward, raiſe the eye-brows, and wrinkle the forehead.
pito-frontalis, where it joins the orbicularis palpebrarum.	To draw the eye-brows together, pull down and wrinkle the ſkin of the forehead.
oppoſite to the antihelix.	To draw the ear upwards, and make the parts tenſe into which it is inſerted.
r, oppoſite to the concha.	To draw that eminence forwards.
the ſeptum dividing the ſcapha and concha.	To draw the ear back and ſtretch the concha.
	To depreſs the place from whence it ariſes.
	To contract the fiſſure of the cartilage oppoſite to the concha.
	To pull forwards the point of the tragus.
	To turn out the tip of the antitragus, and depreſs the antihelix.
e of the antihelix.	To ſtretch the ſcapha and concha, and draw together the places of its origin and inſertion.
alleus, within the tympanum.	To draw the malleus forwards.
alleus.	To pull inwards the malleus and membrana tympani.
ead of the ſtapes.	To draw the ſtapes obliquely upwards.
uperior maxillary bone.	To ſhut the eye, ſqueeze the lachrymal gland, and convey the tears to the puncta lachrymalia.
ſupporting the upper eye-lid.	To open the eye.
f the tunica ſclerotica.	To raiſe the globe of the eye.
r.	To pull down the globe of the eye.
angle.	To turn the eye towards the noſe.
oſite to the outer canthus.	To move the eye outwards.
	To roll the eye.
	To draw the eye forwards and inwards.
the os naſi.	To compreſs the ala towards the ſeptum naſi.
d under lip.	To draw the corner of the mouth upwards.
icularis labiorum. 2. Upper lip, and outer part of the ala naſi.	1. To raiſe the upper lip towards the orbit. 2. To draw the ſkin of the noſe upwards.
f the ala naſi.	To draw the upper lip and ala naſi downwards.
	To pull down the corner of the mouth.
	To pull down the lip, and ſkin of the chin.
he chin.	To pull upwards the parts into which it is inſerted.
ithin the orbicularis oris.	To draw back the angle of the mouth and contract its cavity.
	To make the cheek prominent.
ner of the mouth.	To draw the corner of the mouth obliquely upwards.
	To ſhut the mouth.
e lower jaw.	To pull the jaw upwards.
, and out ſide of the whole length of the coronoid proceſs.	To pull the lower jaw to the upper, and a little forwards and backwards.
internally.	To pull the jaw upwards, and to one ſide.
he lower jaw.	To pull the jaw forwards.
angle and the origin of the depreſſor anguli oris.	To aſſiſt the depreſſor anguli oris in drawing the ſkin of the cheek downwards.
	To turn the head to one ſide, and bend it forwards.
wer jaw.	To pull the jaw outwards and downwards, and when the jaws are ſhut, to raiſe the larynx and pharynx.
of the os hyoides.	To pull the os hyoides forwards, upwards, and to a ſide.
	To draw the os hyoides upwards and forwards.
of the tongue; alſo the baſis of the os hyoides, near its cornu.	To thruſt out, and draw backwards the tongue, to draw down its middle, and render the dorſum concave.
the ſtylo-gloſſus.	To pull the tongue to a ſide and backwards.
	To contract the ſubſtance of the tongue, and bring it backwards.
	To pull the os hyoides downwards.
	To pull the os hyoides obliquely downwards.
nal part of the inferior edge of the thyroid cartilage.	To draw the larynx downwards.
the former.	To pull the cartilage upwards, or the os hyoides downwards.
nto the lower part of the thyroid cartilage. 2. Into its inferior cornu.	To depreſs the thyroid, or elevate the cricoid cartilage.
	To draw the tongue laterally and backwards.
on of the baſe and cornu.	To pull the os hyoides to one ſide and a little upwards.
poſite to the ſuperior cornu of the thyroid cartilage.	To dilate and raiſe the pharynx upwards.
, and ſemi-lunar edge of the os palati.	To ſtretch the velum, to draw it downwards, and to a ſide.
lum pendulum palati.	To draw the velum upwards and backwards, ſo as to ſhut the paſſage from the fauces into the mouth and noſe.
ndulum.	To pull the velum towards the root of the tongue, and ſhut the opening into the fauces.
d back part of the thyroid cartilage.	To pull the uvula and velum backwards, and to pull upwards and ſhorten the pharynx.
	To raiſe upwards, and ſhorten the uvula.
ſe of the arytenoid cartilage.	To open the rima glottidis a little.
arytenoid cartilage.	The ſame with the former.
oid cartilage.	To pull the arytenoid cartilages towards each other.
rtilage.	To ſhut the rima glottidis.
	To open the external rima, and relax the upper ſide of the ventriculus laryngis, and the ligaments.
	To draw the epiglottis obliquely downwards.
the former.	To pull the epiglottis cloſe upon the glottis.
lle of the pharynx.	To compreſs the upper part of the pharynx, and draw it forwards and upwards.
m proceſs of the os occipitis.	To compreſs and draw upwards that part of the pharynx which it covers.
lle of the pharynx.	The ſame with the former.

Parts of the Body.	Names of the MUSCLES.	ORIGIN.	
Anterior part of the abdomen.	1. *Obliquus deſcendens externus.*	Eight of the inferior ribs.	Whole length of the linea alba, the
	2. *Obliquus aſcendens internus.*	Spine of the os ilium, the tendon of the latiſſimus dorſi, Poupart's ligament, aid the forepart of the os pubis.	Cartilago enſiformis, the cartilages
	3. *Tranſverſalis.*	Tranſverſe proceſs of the laſt vertebra of the back, and thoſe of the four ſiperior vertebræ of the loins; the ſpine of the os ilium internally, and the tendon of the obliquus externus.	Whole length of the linea alba, cart lower ribs.
	4. *Rectus abdominis.*	By two heads, from the fore and upper part of the os pubis, and the cartiage joining the two oſſa pubis together.	The cartilages of the three inferior
	5. *Pyramidalis.*	Along with the rectus.	Linea alba, and edge of the rectus.
Male organs of generation.	1. *Dartos.*	Cremaſter muſcle.	Lines of the ſcrotum.
	2. *Cremaſter.*	Obliquus internus.	Tunica vaginalis of the teſticle.
	3. *Erector penis.*	Tuberoſity of the os iſchium.	Tendinous membrane covering the
	4. *Accelerator urinæ*, ſeu *ejaculator ſeminis.*	Sphincter ani, membranous part of the urethra, crus, and beginning of the corpus cavernoſum penis.	Line in the middle of the bulb of th
	5. *Tranſverſalis penis.*	Membrane covering the tuberoſity of the os iſchium.	Accelerator urinæ and ſphincter an
Anus.	1. *Sphincter ani.*	Skin and fat ſurrounding the anus.	Perinæum, acceleratores urinæ, tra
	2 *Levator ani.*	Os pubis, or iſchium, and tendinous membrane covering the obturator internus and coccygæus.	Sphincter ani and os coccygis.
Female organs of generation.	1. *Erector clitoridis.*	Crus of the os iſchium.	Upper part of the crus and body of
	2. *Sphincter vaginæ.*	Sphincter ani, and poſterior ſide of the vagina.	Body, or union of the crura clitori
	3. *Tranſverſus perinæi.*	Cellular membrane covering the os iſchium.	Upper part of the ſphincter ani, an
	4. *Sphincter ani.*	As in the male.	White tough ſubſtance in the perin
	5. *Levator ani*	As in the male.	Perinæum and ſphincter ani.
Within the pelvis.	1. *Obturator internus.*	Os ilium, iſchium, and internal circumference of the foramen thyroidæum.	Large pit at the root of the trochan
	2. *Coccygæus.*	Spinous proceſs of the os iſchium.	Extremity of the os ſacrum, and n
Within the cavity of the abdomen.	1. *The ſuperior, or greater muſcle of the* diaphragm.	Cartilago enſiformis, cartilages of the ſeventh, and all the inferior ribs on both ſides.	The ſemilunar tendon in the middl
	2. *The inferior, or leſſer muſcle of the* diaphragm.	Inferior part of the middle tendon.	Root of the tranſverſe proceſs of th
	3. *Quadratus lumborum.*	Poſterior part of the ſpine and the os ilium.	Tranſverſe proceſſes of all the verteb
	4. *Pſoas parvus.*	Sides of the two upper vertebræ of the loins.	Brim of the pelvis at the junction
	5. *Pſoas magnus.*	Side of the body, and tranſverſe proceſs of the laſt vertebræ of the back, and in the ſame manner from all thoſe of the loins.	Trochanter minor of the os femori
	6. *Iliacus internus.*	Spine, and edge of the os ilium, and moſt of the hollow part of the ilium.	Along with the pſoas magnus.
Anterior part of the thorax.	1. *Pectoralis major.*	Cartilaginous extremities of the fifth and ſixth ribs, almoſt the whole length of the ſternum, and near half the inferior part of the clavicle.	Upper and inner part of the os hu
	2. *Subclavius.*	Clavicle.	Cartilage joining the firſt rib with
	3. *Pectoralis minor.*	Coracoid proceſs of the ſcapula.	Upper edge of the third, fourth, a
	4. *Serratus magnus.*	Baſe of the ſcapula internally.	The nine ſuperior ribs.
Between the ribs, and within the thorax.	1. *Intercoſtales externi.*	Inferior acute edge of each ſuperior rib.	Upper obtuſe edge of each inferior
	2. *Intercoſtales interni.*	In the ſame manner as the former.	The ſame as the former.
	3. *Triangularis*, or *Sterno-coſtalis.*	Cartilago enſiformis, and edge of the lower part of the ſternum.	Lower edge of the cartilages of the
Anterior part of the neck cloſe to the vertebræ.	1. *Longus colli.*	Three ſuperior vertebræ of the back laterally, and the tranſverſe proceſſes of the third, fourth, fifth, and ſixth vertebræ of the neck.	Fore part of all the bodies of the v
	2. *Rectus capitis internus major.*	Tranſverſe proceſſes of the third, fourth, fifth, and ſixth vertebræ of the neck.	Cuneiform proceſs of the os occipi
	3. *Rectus capitis internus minor.*	Fore part of the body of the firſt vertebra of the neck.	Near the root of the condyloid pro
	4. *Rectus capitis lateralis.*	Point of the tranſverſe proceſs of the firſt vertebra of the neck.	Os occipitis oppoſite to the forame
Poſterior part of the trunk.	1. *Trapezius ſeu cucullaris.*	Protuberance in the middle of the os occipitis, the rough curved line extending from the protuberance towards the maſtoid proceſs of the temporal bone, the ſpinous proceſſes of the inferior vertebræ of the neck, and from all thoſe of the back.	The poſterior half of the clavicle,
	2. *Latiſſimus dorſi.*	Poſterior part of the os ilium, all the ſpinous proceſſes of the os ſacrum, and vertebræ of the loins; the ſeven inferior ones of the vertebræ of the back; and the extremities of the three inferior ribs.	Inner edge of the groove for lodgi
	3. *Serratus poſticus inferior.*	Spinal proceſſes of the two inferior vertebræ of the back, and the three ſuperior of the loins.	Lower edges of the four inferior
	4. *Rhomboides.* 1. *Major.* 2. *Minor.*	1. From the ſpinous proceſſes of the five ſuperior vertebræ of the back 2. Spinous proceſſes of the three inferior vertebræ of the neck, and from the ligamentum nuchæ.	1. All the baſis of the ſcapula bel
	5. *Splenius.*	Four ſuperior ſpinous proceſſes of the vertebra of the back; the five inferior of the neck.	Five ſuperior tranſverſe proceſſes o into the os occipitis.
	6. *Serratus ſuperior poſticus.*	Spinous proceſſes of the two laſt vertebræ of the neck, and the three uppermoſt of the back.	Second, third, fourth, and fifth
	7. *Spinalis dorſi.*	Spinous proceſſes of the two uppermoſt vertebræ of the loins, and the three inferior of the back.	Spinous proceſſes of the nine upp
	8 *Longiſſimus dorſi.*	Side, and all the ſpinal proceſſes of the os ſacrum; poſterior ſpine of the ilium, from all the ſpinous proceſſes, and the roots of the tranſverſe proceſſes of the vertebræ of the loins.	All the tranſverſe proceſſes of the two inferior.
	9. *Sacrolumbalis.*	In common with the longiſſimus dorſi.	Into all the ribs where they begin
	10. *Complexus.*	Tranſverſe proceſſes of the ſix ſuperior vertebræ of the back, and four inferior of the neck.	Inferior edge of the protuberance runs forward to that protuberan
	11. *Trachelo-maſtoidæus.*	Tranſverſe proceſſes of the three uppermoſt vertebræ of the back, and the five lowermoſt of the neck.	Middle of the back part of the m
	12. *Levator ſcapulæ.*	Tranſverſe proceſſes of the five ſuperior vertebræ of the neck.	Superior angle of the ſcapula.
	13. *Semiſpinalis dorſi.*	Tranſverſe proceſſes of the ſeventh, eighth, ninth, and tenth vertebræ of the back.	Spinous proceſſes of all the verteb
	14. *Multifidus ſpinæ.*	Side and ſpinous proceſſes of the os ſacrum, the poſterior part of the os ilium; all the oblique and tranſverſe proceſſes of the vertebræ of the loins; all the tranſverſe proceſſes of thoſe of the back, and of the neck, except the three firſt.	All the ſpinous proceſſes of the v
	15. *Semiſpinalis colli.*	Tranſverſe proceſſes of the uppermoſt ſix vertebræ of the back.	Spinous proceſſes of all the verteb
	16. *Rectus capitis poſticus major.*	External part of the ſpinous proceſs of the ſecond vertebra of the neck.	Os occipitis, near the rectus capit
	17. *Rectus capitis poſticus minor.*	Protuberance in the middle of the back part of the firſt vertebra of the neck.	Sides of a dimple in the os occipi
	18. *Obliquus capitis ſuperior.*	Tranſverſe proceſs of the firſt vertebra of the neck.	Os occipitis, behind the maſtoid
	19. *Obliquus capitis inferior.*	Spinous proceſs of the ſecond vertebra of the neck.	Tranſverſe proceſs of the firſt ver
	20. *Scalenus anticus.*	Fourth, fifth, and ſixth, tranſverſe proceſſes of the vertebræ of the neck.	Upper ſide of the firſt rib, near i
	21. *Scalenus medius.*	All the tranſverſe proceſſes of the vertebræ of the neck.	Upper and outer part of the firſt
	22. *Scalenus poſticus.*	Fifth and ſixth tranſverſe proceſſes of the vertebræ of the neck.	Upper edge of the firſt rib, not f

OF THE MUSCLES.

INSERTION.	USES.
of the linea alba, the oſſa pubis, and ſpine of the os ilium.	To ſupport and compreſs the peritonæum and abdomen.
ormis, the cartilages of the ſeventh, and all the falſe ribs, and into the linea alba.	To aſſiſt the former.
of the linea alba, cartilago enſiformis, and the inner part of the cartilages of the ſeven	To aſſiſt the two former.
of the three inferior true ribs, and the extremity of the ſternum.	To compreſs the lower part of the belly, and bend the body forwards.
d edge of the rectus.	To aſſiſt the rectus.
crotum.	To contract the ſcrotum.
lis of the teſticle.	To ſuſpend and draw up the teſticle.
mbrane covering the corpora cavernoſa of the penis.	To compreſs the crus penis.
iddle of the bulb of the urethra.	To drive forward the urine or ſemen, and diſtend the glans.
inæ and ſphincter ani.	To dilate the bulb, and draw outwards and backwards the perinæum and verge of the anus.
celeratores urinæ, tranſverſalis penis, and os coccygis.	To ſhut the anus, and pull down the bulb of the urethra.
and os coccygis.	To draw up the rectum.
the crus and body of the clitoris.	To erect the clitoris.
n of the crura clitoridis.	To contract the mouth of the vagina.
the ſphincter ani, and a white tough ſubſtance in the perinæum.	To keep the perinæum in its proper place.
ſubſtance in the perinæum, and into the os coccygis.	To ſhut the rectum, and aſſiſt in contracting the vagina.
l ſphincter ani.	To raiſe the extremity of the rectum.
he root of the trochanter major.	To move upwards the os femoris, and roll it obliquely outwards.
the os ſacrum, and near the whole length of the os coccygis laterally.	To move the os coccygis forwards.
r tendon in the middle.	The principal agents in reſpiration, particularly in *inſpiration*.
ranſverſe proceſs of the ſecond vertebra of the loins on both ſides.	
oceſſes of all the vertebræ of the loins, the laſt rib near the ſpine, and laſt vertebra of the back.	To move to one ſide, and bend forwards the loins.
elvis at the junction of the os ilium and pubis.	To aſſiſt the pſoas magnus.
inor of the os femoris, and into that bone a little below it.	To bend the thigh forwards, and to aſſiſt in bending the body.
he pſoas magnus.	To aſſiſt the pſoas in bending the thigh, and bring it directly forwards.
ner part of the os humeri.	To move the arm forwards and obliquely upwards.
ing the firſt rib with the ſternum.	To pull the firſt rib upwards.
f the third, fourth, and fifth ribs.	To raiſe the ribs upwards, or bring the ſcapula forwards.
erior ribs.	To dilate the thorax.
edge of each inferior rib.	To raiſe the ribs in inſpiration.
he former.	
f the cartilages of the third, fourth, and fifth ribs.	To depreſs theſe cartilages and the extremities of the ribs.
ll the bodies of the vertebræ of the neck.	To bend the neck gradually forward and to one ſide.
oceſs of the os occipitis.	To bend the head forwards.
of the condyloid proceſs of the os occipitis.	To nod the head forwards.
ppoſite to the foramen ſtylo-maſtoidæum of the temporal bone.	To bend the head a little to one ſide.
half of the clavicle, the acromion, and almoſt all the ſpine of the ſcapula.	To move the ſcapula backwards, and obliquely upwards, and obliquely downwards and backwards.
the groove for lodging the tendon of the long head of the biceps.	To pull the arm backwards and downwards, and roll the os humeri.
of the four inferior ribs.	To depreſs the ribs into which it is inſerted.
ſis of the ſcapula below its ſpine. 2. The baſis of the ſcapula oppoſite to its ſpine.	To aſſiſt the former.
tranſverſe proceſſes of the vertebræ of the neck, poſterior part of the maſtoid proceſs, and occipitis.	To pull the head backwards, directly, and laterally.
l, fourth, and fifth ribs.	To elevate the ribs and dilate the thorax.
eſſes of the nine uppermoſt vertebræ of the back, except the firſt.	To erect and fix the vertebræ, and to aſſiſt in raiſing the ſpine.
verſe proceſſes of the vertebræ of the back, and the lower edge of all the ribs, except the r.	To extend the vertebræ, and to raiſe and keep the trunk of the body erect.
ibs where they begin to be curved forwards.	To pull the ribs down.
of the protuberance in the middle of the os occipitis, and a part of the curved line that rd to that protuberance.	To draw the head backwards, directly, and laterally.
e back part of the maſtoid proceſs.	To aſſiſt the former; but it pulls the head more to a ſide.
le of the ſcapula.	To pull the ſcapula upwards and a little forwards.
eſſes of all the vertebræ of the back above the eighth, and into the lowermoſt of the neck.	To extend the ſpine obliquely backwards.
ous proceſſes of the vertebræ of the loins, back, and neck, except the firſt.	To extend the vertebræ laterally, or backwards.
ceſſes of all the vertebræ of the neck, except the firſt and laſt.	To turn the neck obliquely backwards, and a little to one ſide.
near the rectus capitis lateralis, and the inſertion of the obliquus capitis ſuperior.	To pull the head a little backwards.
mple in the os occipitis, near its foramen magnum.	To aſſiſt the rectus major in moving the head a little backwards.
behind the maſtoid proceſs of the temporal bone.	To turn the head obliquely to one ſide.
roceſs of the firſt vertebra of the neck.	To aſſiſt the former, by turning the head more to one ſide.
f the firſt rib, near its cartilage.	To elevate the ribs, dilate the thorax, or bend the neck to one ſide.
uter part of the firſt rib.	
of the firſt rib, not far from the ſpine.	

A TABLE OF THE MUSC

Parts of the Body.	Names of the Muscles.	ORIGIN.	INS
	23. *Interſpinales colli.*	Double, from the ſpinous proceſſes of the inferior vertebræ of the neck.	Double, into the ſuperior proceſſes.
	24. *Intertranſverſales colli.*	Inferior tranſverſe proceſſes of the vertebræ of the neck, and firſt of the back.	Superior tranſverſe proceſſes of each of theſe
	25. *Interſpinales dorſi.*	Are ſmall tendons which fill up the ſpaces between the ſpinous proceſſes of the vertebræ of the back, and ſerve to connect them to each other.	
	26. *Intertranſverſales dorſi.*	Are tendons connecting the tranſverſe proceſſes of the back in the ſame manner as the former do thoſe of the neck.	
	27. *Interſpinales lumborum.*	Are tendons connecting the ſpinous proceſſes of the lumbar vertebræ to each other.	
	28. *Intertranſverſales lumborum.*	Are four diſtinct ſmall bundles of fleſh, which fill up the ſpaces between the tranſverſe proceſſes of the vertebræ of the loins, and ſerve to draw them towards each other.	
On the ſcapula.	1. *Supra-ſpinatus.*	All the part of the baſe of the ſcapula above the ſpine, from the ſpine and ſuperior coſta.	Protuberance of the head of the os humeri n of the biceps.
	2. *Infra-ſpinatus.*	All that part of the baſe of the ſcapula between its ſpine and inferior angle; from the ſpine, and the edge of all the foſſa running above the ſpine.	Upper and middle part of the protuberance o
	3. *Teres minor.*	Round edge of all the inferior coſta of the ſcapula.	Outer part of the protuberance of the head of
	4. *Teres major.*	Inferior angle of the ſcapula, and all that portion of its inferior coſta that is rough and thicker than the reſt.	Ridge at the inner ſide of the groove for lod with the latiſſimus dorſi.
Before the ſcapula.	1. *Deltoides.*	All the poſterior part of the clavicle not poſſeſſed by the pectoralis; from the acromion, and lower margin of almoſt the whole ſpine of the ſcapula oppoſite to the cucullaris muſcle.	A rough protuberance in the middle of the o
	2. *Coraco brachialis.*	Fore part of the coracoid proceſs of the ſcapula.	Middle of the internal part of the os humeri.
	3. *Subſcapularis.*	All the baſe of the ſcapula internally, and from its ſuperior and inferior coſtæ.	Upper part of the internal protuberance at th
Os humeri.	1. *Biceps flexor cubiti.*	Double; 1. From the upper edge of the glenoid cavity of the ſcapula. 2. From the coracoid proceſs of the ſcapula.	Tubercle on the upper end of the radius exte
	2. *Brachialis internus.*	Middle of the os humeri.	Coronoid proceſs of the ulna.
	3. *Triceps extenſor cubiti.*	By three heads. 1. The *longus*, from the inferior coſta of the ſcapula, near its cervix. 2. *Brevis*, from the os humeri a little below its head outwardly. 3. *Brachialis externus*, from the os humeri, near the inſertion of the teres major.	Upper and external part of the proceſs of the os humeri.
	4. *Anconæus.*	Poſterior part of the external condyle of the os humeri.	A ridge on the lateral part of the ulna.
Cubit, or fore-arm.	1. *Palmaris longus.*	Internal condyle of the os humeri.	Ligamentum carpi annulare, and the tendino
	2. *Palmaris brevis.*	Skin and fat covering the abductor minimi digiti, and the os piſiforme.	The ſame with the former.
	3. *Flexor carpi radialis.*	Internal condyle of the os humeri, and the anterior part of the upper end of the ulna.	Upper part of the metacarpal bone that ſuſtai
	4. *Flexor carpi ulnaris.*	Internal condyle of the os humeri, and outer ſide of the olecranon.	Os piſiforme.
	5. *Extenſor carpi radialis longior.*	Lower part of the external ridge of the os humeri, above its external condyle.	Fore part of the metacarpal bone that ſuſtains
	6. *Extenſor carpi radialis brevior.*	External condyle of the os humeri, and the ligament that connects the radius to it.	Metacarpal bone that ſuſtains the middle fing
	7. *Extenſor carpi ulnaris.*	External condyle of the os humeri.	Fore part of the metacarpal bone ſuſtaining t
	8. *Flexor ſublimis perforatus.*	Internal condyle of the os humeri, coronoid proceſs of the ulna, tubercle, and middle of the fore part of the radius.	Fore part of the ſecond bone of each finger.
	9. *Flexor profundus perforans.*	External ſide and upper part of the ulna.	Third or laſt bone of all the fingers.
	10. *Lumbricales.*	Outſide of the tendons of the flexor profundus.	Sides of the broad tendons of the interoſſei m
	11. *Extenſor digitorum communis.*	External condyle of the os humeri.	Poſterior part of all the four fingers.
	12. *Supinator radii longus.*	External ridge of the os humeri above the condyle.	External part of the inferior extremity of th
	13. *Supinator radii brevis.*	External condyle of the os humeri, the external and upper part of the ulna.	Head and tubercle of the radius near the inſer
	14. *Pronator radii teres.*	Internal condyle of the os humeri, and coronoid proceſs of the ulna.	Middle of the outer edge of the radius.
	15. *Pronator radii quadratus.*	Lower and inner part of the ulna.	External and lower part of the radius.
Hand.	1. *Flexor longus pollicis manus.*	Upper part of the radius below its tubercle, and the internal condyle of the os humeri.	Laſt joint of the thumb.
	2. *Flexor brevis pollicis manus.*	Os trapezoides, magnum, and unciforme of the carpus.	Oſſa ſeſamoidea, and ſecond joint of the thu
	3. *Opponens pollicis.*	Os trapezium, and ligamentum carpi annulare.	Anterior part of the metacarpal bone of the
	4 *Extenſor oſſis metacarpi pollicis manus.*	Middle and external part of the ulna, external part of the middle of the radius, and from the interoſſeous ligament.	Os trapezium, and upper part of the metaca
	5. *Extenſor primi internodii.*	External part of the radius near the former muſcle, and from the interoſſeous ligament.	Anterior part of the ſecond bone of the thum
	6. *Extenſor ſecundi internodii.*	Ulna a little above its inferior extremity, and the ligamentum annulare.	Laſt bone of the thumb.
	7. *Abductor pollicis manus.*	Ligamentum carpi annulare, and os trapezium.	Second bone of the thumb.
	8. *Adductor pollicis manus.*	Almoſt the whole length of the metacarpal bone ſuſtaining the middle finger.	Poſterior part of the ſecond bone of the thu
	9. *Indicator.*	Middle of the poſterior part of the ulna.	Poſterior part of the fore finger.
	10. *Abductor indicis manus.*	Os trapezium, and outſide of the metacarpal bone of the thumb.	Side of the poſterior part of the firſt joint of
	11. *Abductor minimi digiti manus.*	Os piſiforme and ligamentum carpi annulare.	Poſterior part of the firſt joint of the little fi
	12. *Adductor minimi digiti manus.*	Thin edge of the os unciforme, and the ligament of the wriſt.	Side and anterior part of the metacarpal bon
	13. *Flexor parvus minimi digiti.*	Internal ſide of the os unciforme, and the ligament of the wriſt.	Anterior part of the firſt bone of the little fi
	14. *Prior indicis.*	Poſterior and inner part of the metacarpal bone ſuſtaining the fore-finger.	Inſide of the tendinous expanſion covering t
	15. *Poſterior indicis.*	Root and outer part of the metacarpal bone ſuſtaining the fore-finger.	Outſide of the tendinous expanſion along the
	16. *Prior annularis.*	Root of the inſide of the metacarpal bone ſuſtaining the ring finger.	Inſide of the tendinous expanſion covering t
	17. *Interoſſeus annularis.*	Root and inner ſide of the metacarpal bone of the little finger.	Inſide of the tendinous expanſion covering t
	18. *Prior medii*	Roots of the metacarpal bones ſuſtaining the fore and middle fingers.	Inſide of the tendinous expanſion covering t
	19. *Poſterior medii.*	Roots of the metacarpal bones ſuſtaining the middle and ring fingers.	Outſide of the tendinous expanſion running
	20. *Poſterior annularis.*	Roots of the metacarpal bones ſuſtaining the ring and little fingers.	Outſide of the tendinous expanſion running
Inferior extremities.	1. *Pectinalis.*	Upper and anterior part of the os pubis, above the foramen thyroidæum.	Anterior and upper part of the linea aſpera
	2. *Triceps adductor femoris.* 1. *longus.*	1. Upper and anterior part of the os pubis.	Near the middle of the poſterior part of the
	2 *brevis.*	2. Os pubis, near its joining.	Anterior and upper part of the linea aſpera.
	3. *magnus.*	3. Os pubis, a little lower than the former, and from the os iſchium.	Almoſt the whole length of the linea aſpera and a ridge above the condyle.
	3. *Obturator externus.*	Lower part of the os pubis and iſchium.	Cavity at the root of the trochanter major.
	4. *Glutæus maximus.*	Poſterior part of the ſpine of the os ilium; the whole external ſide of the os ſacrum; and the poſterior ſacro-iſchiatic ligament.	Upper and outer part of the linea aſpera.
	5. *Glutæus medius.*	Anterior and ſuperior proceſs of the os ilium, and all the outer edge of the ſpine of the ilium.	Outer and poſterior part of the trochanter m
	6. *Glutæus minimus.*	A ridge continued from the ſuperior anterior proceſs of the os ilium, and middle of the dorſum of that bone.	Fore and upper part of the trochanter major.
	7. *Pyriformis.*	Within the pelvis, from the ſecond, third, and fourth pieces of the os ſacrum.	Upper part of the cavity at the root of the tr
	8. *Gemini.*	Double, from the ſpinous proceſs and tuberoſity of the os iſchium, and from the poſterior ſacro-iſchiatic ligament.	Cavity at the root of the trochanter major.
	9. *Quadratus femoris.*	Outſide of the tuberoſity of the os iſchium.	Rough ridge on the outſide of the trochanter
	10. *Tenſor vaginæ femoris.*	External part of the anterior ſuperior ſpinous proceſs of the os ilium.	Doubling of the membranous faſcia that cov

INSERTION.	USES.
or proceſſes.	To draw together theſe proceſſes.
eſſes of each of theſe vertebræ.	To draw theſe proceſſes towards each other, and turn the neck a little to one ſide.
d of the os humeri next the groove for lodging the tendon of the long head	To raiſe the arm upwards, and pull the capſular ligament from between the bones.
f the protuberance on the head of the os humeri.	To pull the arm upwards and backwards, and to pull the ligament from between the bones.
erance of the head of the os humeri.	To aſſiſt the former.
f the groove for lodging the tendon of the long head of the biceps, along ſi.	To move the arm backwards and downwards, and to roll the head of the os humeri.
the middle of the os humeri.	To pull the arm directly upwards, and a little forwards or backwards.
rt of the os humeri.	To raiſe the arm upwards.
al protuberance at the head of the os humeri.	
nd of the radius externally.	To bend the fore arm, and turn it ſupine.
ulna.	To bend the fore arm.
of the proceſs of the ulna called *olecranon*, and partly into the condyles of the	To extend the arm.
rt of the ulna.	To aſſiſt in extending the fore arm.
are, and the tendinous membrane that covers the palm of the hand.	To bend the hand, and ſtretch that tendinous membrane.
er.	To aſſiſt in contracting the palm of the hand.
arpal bone that ſuſtains the fore-finger.	To bend the wriſt together with the hand,
	To aſſiſt in bending the hand.
pal bone that ſuſtains the fore-finger.	To extend and bring the hand backwards.
tains the middle finger.	To aſſiſt the former.
pal bone ſuſtaining the little finger.	To aſſiſt the former in extending the hand.
bone of each finger.	
the fingers.	To bend the laſt joint of the fingers.
ns of the interoſſei muſcles.	To aſſiſt in bending the fingers.
four fingers.	To extend all the joints of the fingers.
rior extremity of the radius.	To roll the radius outwards, and palm of the hand upwards.
radius near the inſertion of the biceps.	The ſame with the former.
of the radius.	To roll the radius inwards.
of the radius.	The ſame with the former.
	To bend the laſt joint of the thumb.
ond joint of the thumb.	To bend the ſecond joint of the thumb.
acarpal bone of the thumb.	To bring the thumb inwards, oppoſite to the other fingers.
r part of the metacarpal bone of the thumb.	To extend the thumb outwardly.
ond bone of the thumb.	To extend the ſecond bone of the thumb obliquely outwards.
	To extend the laſt joint, with the thumb, obliquely backwards.
nb.	To draw the thumb from the fingers.
ond bone of the thumb.	To pull the thumb towards the fingers.
e finger.	
t of the firſt joint of the fore-finger.	To bring the fore finger towards the thumb.
t joint of the little finger laterally.	To extend and draw the little finger from the reſt.
f the metacarpal bone of the little finger.	To bend and bring this finger to the reſt.
bone of the little finger.	To bend the little finger and aſſiſt the adductor.
xpanſion covering the poſterior part of the fore-finger.	To draw the fore-finger inwards towards the thumb, and extend it obliquely.
expanſion along the poſterior part of the fore-finger.	To extend the fore-finger obliquely, and draw it outwards.
xpanſion covering the ring finger.	To extend and pull the ring finger towards the thumb.
xpanſion covering the little finger.	To extend and draw the little finger inwards.
xpanſion covering the outſide of the middle finger.	To extend and draw the fore-finger inwards.
expanſion running along the poſterior part of the middle finger.	To extend and draw the middle finger outwards.
expanſion running along the poſterior part of the ring finger.	To extend and draw the ring finger outwards.
of the linea aſpera of the os femoris.	To bring the thigh upwards and inwards.
poſterior part of the linea aſpera.	To bring the thigh inwards and upwards.
of the linea aſpera.	
h of the linea aſpera, upper part of the internal condyle of the os femoris, condyle.	
trochanter major.	To roll the thigh-bone obliquely outwards.
the linea aſpera.	To extend the thigh.
of the trochanter major.	To aſſiſt the glutæus maximus.
he trochanter major.	To aſſiſt the two former in pulling the thigh forwards.
at the root of the trochanter major.	To move the thigh a little upwards and roll it outwards.
trochanter major.	To roll the thigh outwards.
ide of the trochanter major.	The ſame with the former.
anous faſcia that covers the thigh.	To ſtretch the membranous faſcia, to extend the leg, and turn it a little outwards.

Parts of the Body.	Names of the Muscles.	ORIGIN.	
	11. *Sartorius.*	Anterior ſuperior ſpinous proceſs of the os ilium.	Inferior part of the tubercle of the
	12. *Gracilis.*	Os pubis near the ſymphyſis.	Tibia, near the ſartorius.
	13. *Rectus.*	Inferior anterior ſpinous proceſs of the os ilium, and from the dorſum of that bone.	Upper part of the patella; and fro of the tibia.
	14. *Vaſtus externus.*	Root of the trochanter major, and upper part of the linea aſpera.	A large ſhare of the upper part of
	15. *Vaſtus internus.*	Between the forepart of the os femoris and root of the trochanter minor, and from almoſt all the inſide of the linea aſpera.	Upper and inſide of the patella.
	16. *Cruræus.*	Between the two trochanters.	Upper part of the patella.
	17. *Semitendinoſus.*	Poſterior part of the tuberoſity of the os iſchium.	Inſide of the ridge of the tibia, a li
	18. *Semimembranoſus.*	Upper and poſterior part of the tuberoſity of the os iſchium.	Superior and back part of the head
	19. *Biceps flexor cruris* { 1. *longus.* 2. *brevis.*	1. Upper and poſterior part of the tuberoſity of the os iſchium. 2. Linea aſpera.	Upper part of the head of the fibul
	20. *Poplitæus.*	External condyle of the os femoris.	Ridge at the upper and internal ed
	21 *Gaſtrocnemius externus,* ſeu *Gemellus.*	Double, from the internal condyle of the os femoris, and from that bone a little above the condyle.	
	22. *Solæus, ſeu Gaſtrocnemius internus.*	Double, from the upper and back part of the head of the fibula, and from the poſterior part of its middle.	Upper and poſterior part of the os
	23. *Plantaris.*	External condyle of the os femoris.	Inſide of the poſterior part of the
	24. *Tibialis anticus.*	Middle of that proceſs of the tibia to which the fibula is connected.	Inſide of the os cuneiforme internu
	25. *Tibialis poſticus.*	Fore and upper part of the tibia; from the back part of the fibula next the tibia, from near one half of the upper part of the fibula; and from the interoſſeous ligament.	Os naviculare, cuneiforme internu bone ſuſtaining the middle toe.
	26. *Peronæus longus.*	Fore part of the head of the fibula.	Out ſide of the root of the metatar
	27. *Peronæus brevis.*	Out ſide of the upper part of the fibula.	Root and external part of the meta
	28. *Extenſor longus digitorum pedis.*	Upper and outer part of the head of the fibula, from its interior ſpine, and from the tendinous faſcia covering the upper and outſide of the leg.	Root of the firſt joint of each of the
	29. *Extenſor brevis digitorum pedis*	Fore and upper part of the os calcis.	Tendinous expanſion covering the
	30. *Flexor brevis digitorum pedis,* ſeu *Sublimis perforatus.*	Protuberance of the os calcis.	Second phalanx of the four leſſer t
	31. *Flexor longus digitorum pedis,* ſeu *profundus perforonis.*	Back part of the tibia.	Extremity of the laſt joint of the
	32. *Flexor digitorum acceſſorius,* ſeu *maſſa carnea Jacobi Sylvii.*	Sinuoſity at the inſide of the os calcis, and from behind the tuberoſity of the ſame bone.	Tendon of the flexor longus.
	33. *Lumbricales pedis.*	Quadruple, from the tendon of the flexor profundus.	Inſide of the firſt joint of the four
	34. *Extenſor proprius pollicis pedis*	Upper and anterior part of the fibula.	Poſterior part of the firſt and laſt j
	35. *Flexor longus pollicis pedis.*	Poſterior part of the fibula, almoſt its whole length.	Laſt joint of the great toe.
	36. *Flexor brevis pollicis pedis.*	Os calcis, and cuneiforme externum.	External os ſeſamoidæum, and ro
	37. *Abductor pollicis pedis.*	Inſide of the os calcis.	The ſame with the former.
	38. *Adductor pollicis pedis.*	Os calcis, cuboides, cuneiforme externum, and root of the metatarſal bone of the ſecond toe.	External os ſeſamoidæum, and ro
	39. *Abductor minimi digitis pedis.*	Protuberance of the os calcis, and root of the metatarſal bone of the little toe.	Root of the firſt joint of the little
	40. *Flexor brevis minimi digiti pedis.*	Os cuboides, and outſide of the metatarſal bone ſuſtaining the little toe.	Anterior extremity of the metatarſ
	41. *Abductor indicis pedis.*	Double, from the root of the inſide of the metatarſal bone of the fore toe, from the metatarſal bone of the great toe, and from the os cuneiforme.	Inſide of the root of the firſt joint
	42. *Adductor indicis pedis.*	Roots of the metatarſal bones of the fore and ſecond toe.	Outſide of the root of the firſt join
	43. *Abductor medii digiti pedis.*	Roots of the metatarſal bones of the ſecond and third toes.	Outſide of the root of the firſt join
	44. *Abductor tertii digiti pedis.*	Roots of the metatarſal bones of the third and little toe.	Outſide of the root of the firſt join
	45. *Adductor medii digiti pedis.*	Inſide of the root of the metatarſal bone of the middle toe internally.	Inſide of the root of the firſt joint
	46. *Adductor tertii digiti pedis.*	Root of the metatarſal bone of the third toe.	Root of the firſt joint of the third
	47. *Adductor minimi digiti pedis.*	Root of the metatarſal bone of the little toe.	Root of the firſt joint of the little
	48. *Tranſverſalis pedis.*	Metatarſal bone of the great toe, and os ſeſamoidæum of the firſt joint.	Outſide of the anterior extremity o

ABLE OF THE MUSCLES.

INSERTION.	USES.
f the tubercle of the tibia, and the upper part of its ſpine.	To move the leg obliquely inwards, or to bring one leg and thigh croſs the other.
e ſartorius.	To bend the thigh and leg inwards.
the patella; and from the inferior part of this bone the tendon is ſent off to the tubercle	To extend the leg by means of the patella, like a pulley.
of the upper part of the patella.	To extend the leg.
ide of the patella.	To extend the leg.
the patella.	To aſſiſt in the extenſion of the leg.
idge of the tibia, a little below its tubercle.	To bend the leg backwards and a little inwards.
ack part of the head of the tibia.	To bend the leg and bring it directly backwards.
the head of the fibula.	To bend the leg.
pper and internal edge of the tibia.	To move the leg obliquely outwards, and to aſſiſt in bending it.
ſterior part of the os calcis, by the tendo Achillis.	To extend the foot.
oſterior part of the os calcis.	To aſſiſt the former.
s cuneiforme internum, and poſterior end of the metacarpal bone ſuſtaining the great toe.	To bend the foot.
cuneiforme internum and medium; os calcis, cuboides, and the root of the metatarſal ing the middle toe.	To bring the foot inwards and upwards.
e root of the metatarſal bone ſuſtaining the great toe, and os cuneiforme internum.	To move the foot outwards, and bend it a little.
ernal part of the metatarſal bone ſuſtaining the little toe.	To pull the foot outwards and upwards.
ſt joint of each of the ſmall toes, and expanded over their upper ſide as far as the laſt joint.	To extend all the joints of the four ſmall toes.
panſion covering the ſmall toes, and that covering the upper part of the great toe.	To extend the toes.
x of the four leſſer toes.	To bend the ſecond joint of the toes.
the laſt joint of the four leſſer toes.	To bend the toes.
e flexor longus.	To aſſiſt the the former.
irſt joint of the four leſſer toes.	To aſſiſt in bending the toes.
of the firſt and laſt joint of the great toe.	To extend the great toe.
he great toe.	To bend the laſt joint of the great toe.
ſamoidæum, and root of the firſt joint of the great toe.	To bend this firſt joint.
h the former.	To pull the great toe from the reſt.
ſamoidæum, and root of the metatarſal bone of the great toe.	To bring this toe nearer the reſt.
rſt joint of the little toe externally.	To draw the little toe outwards.
emity of the metatarſal bone, and root of the firſt joint of the little toe.	To bend the little toe.
oot of the firſt joint of the fore toe.	To pull the fore toe inwards.
root of the firſt joint of the fore toe.	To pull the foretoe outwards towards the reſt.
root of the firſt joint of the ſecond toe.	To pull the ſecond toe outwards.
root of the firſt joint of the third toe.	To pull the third toe outwards.
oot of the firſt joint of the middle toe.	To pull the middle toe inwards.
rſt joint of the third toe.	To pull the third toe inwards.
rſt joint of the little toe.	To pull the little toe inwards.
anterior extremity of the metatarſal bone of the little toe.	To bring the little toe towards the great one.

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Plate XV.

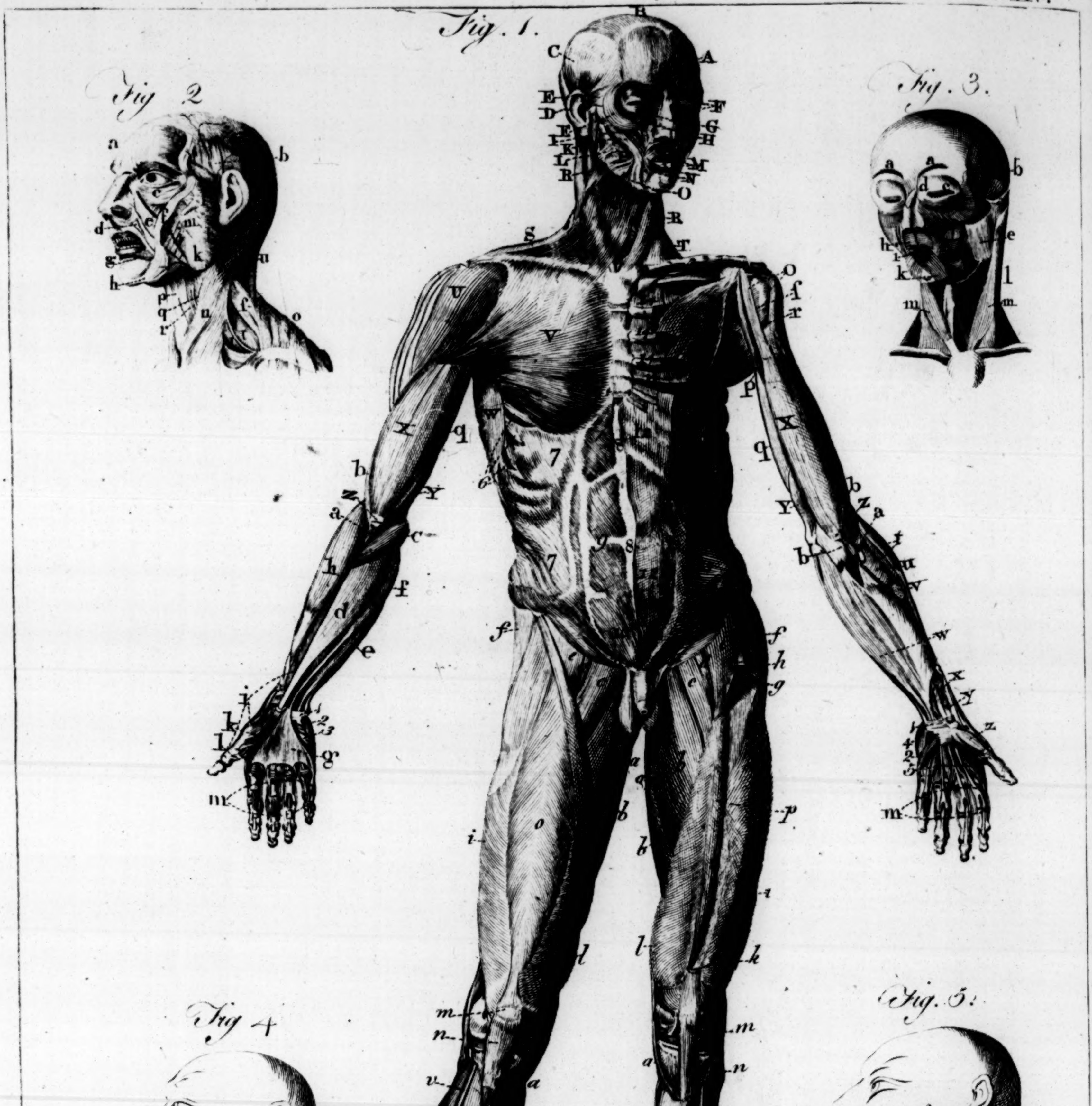
Fig. 1.
Fig. 2
Fig. 3.
Fig. 4
Fig. 5.

A. Bell Sculp.

EXPLANATION of PLATE XV. and XVI.

Plate XV.

Fig. I. The Muscles immediately under the common teguments on the anterior part of the body, are repreſented on the right ſide; and on the left ſide the Muscles are ſeen which come in view when the exterior ones are taken away.

A, The frontal muſcle. B, The tendinous aponeuroſis which joins it to the occipital; hence both named *occipito-frontalis*. C, Attollens aurem. D, The ear. E, Anterior auris. F F, Orbicularis palpebrarum. G, Levator labii ſuperioris alæque naſi. H, Levator anguli oris. I, Zygomaticus minor. K, Zygomaticus major. L, Maſſeter. M, Orbicularis oris. N, Depreſſor labii inferioris. O, Depreſſor anguli oris. P, Buccinator. Q Q, Platyſma myoides. R R, Sterno-cleido-maſtoidæus. S, Part of the trapezius. T, Part of the ſcaleni.

Superior Extremity.—U, Deltoides. V. Pectoralis major. W, Part of the latiſſimus dorſi. X X, Biceps flexor cubiti. Y Y, Part of the brachialis externus. Z Z, The beginning of the tendinous aponeuroſis, (from the biceps) which is ſpread over the muſcles of the fore-arm. a a, Its ſtrong tendon inſerted into the tubercle of the radius. b b, Part of the brachialis internus. c, Pronator radii teres. d, Flexor carpi radialis. e, Part of the flexor carpi ulnaris. f, Palmaris longus. g, Aponeuroſis palmaris. 3, Palmaris brevis. 1, Ligamentum carpi annulare. 2 2, Abductor minimi digiti. h, Supinator radii longus. i, The tendons of the thumb. k, Abductor pollicis. l, Flexor pollicis longus. m m, The tendons of the fluxor ſublimis perforatus, profundus perforans, and lumbricales.—The ſheaths are entire in the right hand,—in the left cut open, to ſhew the tendons of the flexor profundus perforating the ſublimis.

Muscles not referred to—in the left ſuperior extremity.—n, Pectoralis minor, ſeu ſerratus anticus minor. o, The two heads of (x x) the biceps. p, Coracobrachialis. q q, The long head of the triceps extenſor cubiti. r r, Teres major. ſ ſ, Subſcapularis. t t, Extenſores radiales. u, Supinator brevis. v, The cut extremity of the pronator teres. w, Flexor ſublimis perforatus. x, Part of the flexor profundus. y, Flexor pollicis longus. z, Part of the flexor pollicis brevis. 4, Abductor minimi digiti. 5, The four lumbricales.

Trunk.—6, Serrated extremities of the ſerratus anticus major. 7 7, Obliquus externus abdominis. 8 8, The linea alba. 9, The umbilicus, 10, Pyramidalis. 11 11, The ſpermatic cord. On the left ſide, it is covered by the cremaſter. 12 12, Rectus abdominis. 13. Obliquus internus. 14 14, &c. Intercoſtal muſcles.

Inferior Extremities.—*a a*, The gracilis. *b b*, Parts of the triceps. *c c*. Pectialis. *d d*, Pſoas magnus. *e e*, Iliacus internus. *f*, Part of the glutæus medius. *g*, Part of the glutæus minimus. *h*, Cut extremity of the rectus cruris. *i i*, Vaſtus externus. *k*, Tendon of the rectus cruris. *l l*, Vaſtus internus. * Sartorius muſcle. * * Fleſhy origin of the tenſor vaginæ femoris or membranoſus. Its tendinous aponeuroſis covers (*i*), the vaſtus externus in the right-ſide. *m m*, Patella. *n n*, Ligament or tendon from it to the tibia. *o*, Rectus cruris. *p*, Cruræus. *q q*, The tibia. *r r*, Part of the gemellus or gaſtrocnemius externus. *ſ ſ ſ*, Part of the ſoleus or gaſtrocnemius internus. *t*, Tibialis anticus. *u*, Tibialis poſticus. *v v*, Peronæi muſcles. *w w*, Extenſor longus digitorum pedis. *x x*, Extenſor longus pollicis pedis. *y*, Abductor pollicis pedis.

Fig. 2. The Muscles, Glands, &c. of the left ſide of the face and neck, after the common teguments and platyſma myoides have been taken off.

a, The frontal muſcle. b, Temporalis and temporal artery. c, Orbicularis palpebrarum. d, Levator labii ſuperioris alæqui naſi. e, Levator anguli oris. f, Zygomaticus. g, Depreſſor labii inferioris. h, Depreſſor anguli oris. i, Buccinator. k, Maſſeter. l l, Parotid gland. m, Its duct. n, Sterno-cleido-maſtoidæus. o, Part of the trapezius. p, Sterno-hyoidæus. q, Sterno-thyroidæus. r, Omo-hyoidæus. ſ, Levator ſcapulæ. t t, Scaleni. u, Part of the ſplenius.

Fig. 3. The Muscles of the face and neck, in view after the exterior ones are taken away.

a a, Corrugator ſupercilii. b, Temporalis. c, Tendon of the levator palpebræ ſuperioris. d, Tendon of the orbicularis palpebrarum. e, Maſſeter. f, Buccinator. g, Levator anguli oris. h, Depreſſor labii ſuperioris alæque naſi. i, Orbicularis oris. k, Depreſſor anguli oris. l, Muſcles of the os hyoides. m, Sterno-cleido-maſtoidæus.

Fig. 4. Some of the Muscles of the os hyoides, and ſubmaxillary gland.

a, Part of the maſſeter muſcle. b, Poſterior head of the digaſtric. c, Its anterior head. d d, Sterno-hyoidæus. e, Omo-hyoidæus. f, Stylo-hyoidæus. g, Submaxillary gland in ſitu.

Fig. 5. The ſubmaxillary gland and duct.

a, Muſculus mylo-hyoidæus. b, Hyo-gloſſus. c, ſubmaxillary gland extra ſitu. d, Its duct.

Plate XVI.

Fig. I. The Muscles immediately under the common teguments on the poſterior part of the body are repreſented in the right ſide; and on the left ſide the Muscles are ſeen which come in view when the exterior ones are taken away.

Head—A A, Occipito-frontalis. B, Attollens aurem. C, Part of the orbicularis palpebrarum. D, Maſſeter. E, Pterygoidæus internus.

Trunk.—Right ſide. F F F, Trapezius ſeu cucullaris. G G G G, Latiſſimus dorſi. H, Part of the obliquus externus abdominis.

Trunk.—Left ſide. I. Splenius. K, Part of the complexus. L, Levator ſcapulæ. M, Rhomboides. N N, Serratus poſticus inferior. O, Part of the longiſſimus dorſi. P, Part of the ſacro-lumbalis. Q, Part of the ſemi-ſpinalis dorſi. R, Part of the ſerratus anticus major. S, Part of the obliquus internus abdominis.

Superior Extremity.—Right ſide. T, Deltoides.

U, Triceps extenſor cubiti. V. Supinator longus. W W, Extenſores carpi radialis longior and brevior. X X, Extenſor carpi ulnaris. Y Y, Extenſor digitorum communis. Z, Abductor indicis. 1 2 3, Extenſores pollicis.

Superior Extremity.—Left ſide. a, Supra ſpinatus. b, Infra-ſpinatus. c, Teres minor. d, Teres major. e, Triceps extenſor cubiti. f f, Extenſores carpi radiales. g, Supinator brevis. h, Indicator. 1 2 3, Extenſores pollicis. i, Abductor minimi digiti. k, Interoſſei.

Inferior Extremity.—Right ſide. l, Glutæus maximus. m, Part of the glutæus medius. n, Tenſor vaginæ femoris. o, Gracilis. p p, Adductor femoris magnus. q, Part of the vaſtus internus. r, Semimembranoſus. s, Semitendinoſus. t, Long head of the biceps flexor cruris. u u, Gaſtrocnemius externus ſeu gemellus. v, Tendo Achillis. w, Soleus ſeu gaſtrocnemius internus. x x, Peronæus longus and brevis. y, Tendons of the flexor longus digitorum pedis;—and under them * flexor brevis digitorum pedis. z, Abductor minimi digiti pedis.

Inferior Extremity.—Left ſide. *m*, *n*, *o*, *p p*, *q*, *r*, *s*, *t*, *v*, *w w*, *x x*, *y*, *z*. Point the ſame parts as in the right ſide. *a*, Pyriformis. *b b*, Gemini. *c c*, Obturator internus. *d*, Quadratus femoris. *e*, Coccygæus. *f*, The ſhort head of the biceps flexor cruris. *g g*, Plantaris. *h*, Poplitæus. *i*, Flexor longus pollicis pedis.

Fig. 2. The palm of the left hand after the common teguments are removed, to ſhew the Muscles of the fingers.

a, Tendon of the flexor carpi radialis. b, Tendon of the flexor carpi ulnaris. c, Tendons of the flexor ſublimis perforatus, profundus perforans and lumbricales. d, Abductor pollicis. e e, Flexor pollicis longus. f, Flexor pollicis brevis. g, Palmaris brevis. h, Abductor minimi digiti. i, Ligamentum carpiannulare. k, A probe put under the tendons of the flexor digitorum ſublimis; which are perforated by l, the flexor digitorum profundus. m m m m, Lumbricales. n, Adductor pollicis.

Fig. 3. A fore-view of the foot and tendons of the flexores digitorum.

a, Cut extremity of the tendo Achillis. b, Upper part of the aſtragalus. c, Os calcis. d, Tendon of the tibialis anticus. e, Tendon of the extenſor pollicis longus. f, Tendon of the peronæus brevis. g, Tendons of the flexor digitorum longus, with the nonus Veſalii. h h, The whole of the flexor digitorum brevis.

Fig. 4. Muscles of the Anus.

a a, An outline of the buttocks, and upper part of the thighs. b, The teſtes contained in the ſcrotum. c c, Sphincter ani. d, Anus. e, Levator ani. f f, Erector penis. g g, Accelerator urinæ. h, Corpus cavernoſum urethræ.

Fig. 5. Muscles of the Penis.

a a, b, d, e e, f f, h, point the ſame as in fig. 4. c, Sphincter ani. g g, Tranſverſalis penis.

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PART IV. Of the ABDOMEN, or LOWER BELLY.

a, THE abdomen, or lower belly, extends from the lower extremity of the ſternum, or the hollow uſually called the *pit of the ſtomach*, and more properly *ſcorbiculus cordis*, to the lower part of the trunk.

b, It is diſtinguiſhed into three diviſions, called *regions:* of theſe the ſuperior one, which is called the *epigaſtric region*, begins immediately under the ſternum, and extends to within two finger's-breadth of the navel, where the middle or *umbilical region* begins, and reaches to the ſame diſtance below the navel. The third, which is called the *hypogaſtric*, includes the reſt of the abdomen, as far as the os pubis.

c, Each of theſe regions is ſubdivided into three parts; two of which compoſe the ſides, and the other the middle part of each region.

d, The middle part of the upper region is called *epigaſtrium;* and its two ſides *hypochondria*. The middle part of the next region is the *umbilical region*, properly ſo called, (G) and its two ſides are the flanks, or iliac regions. Laſtly, the middle part of the lower region retains the name of *hypogaſtrium*, and its ſides are called *inguina* or *groins*. The back part of the abdomen bears the name of *lumbar region*.

e, Theſe are the diviſions of the lower belly, which are neceſſary to be held in remembrance as they frequently occur in chirurgical and anatomical writing. We will now proceed to examine the contents of the abdomen, and after having pointed out the name and arrangement of the ſeveral viſcera contained in it, deſcribe each of them ſeparately.

f, After having removed the ſkin, adipoſe membrane, and abdominal muſcles, of which there are five on each ſide, we diſcover the peritonæum; for ſo the membrane is called which envelops all the viſcera of the lower belly. This being opened, the firſt part that preſents itſelf is, the omentum or cawl, floating on the ſurface of the inteſtines; which are likewiſe ſeen every where looſe and moiſt, and making a great number of circumvolutions through the whole cavity of the abdomen. The ſtomach is placed in the epigaſtrium, and under the ſtomach is the pancreas. The liver fills the right hypochondrium, and the ſpleen is ſituated in the left. The kidneys are ſeen about the middle of the lumbar region, and the urinary bladder and parts of generation are ſeated in the lower diviſion of the belly.

Chap. I.

Of the Peritonæum. 350

a, The peritonæum is a ſtrong, ſimple membrane, by which all the viſcera of the abdomen are ſurrounded, and in ſome meaſure ſupported. Many anatomical writers have deſcribed it as being compoſed of two diſtinct membranous laminæ; but their deſcriptions ſeem to be erroneous. What perhaps appeared to be a ſecond lamina, being found to be ſimply a cellular coat; which ſends off productions to the blood veſſels paſſing out

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(G) The navel is formed by the extremities of the veſſels which keep up a communication between the mother and the fœtus in utero. As ſoon as the child comes into the world, theſe veſſels are divided and ſecured by ligature, their cavities diſappear, and in progreſs of time they become a ligamentous cord.

Plate XVI.

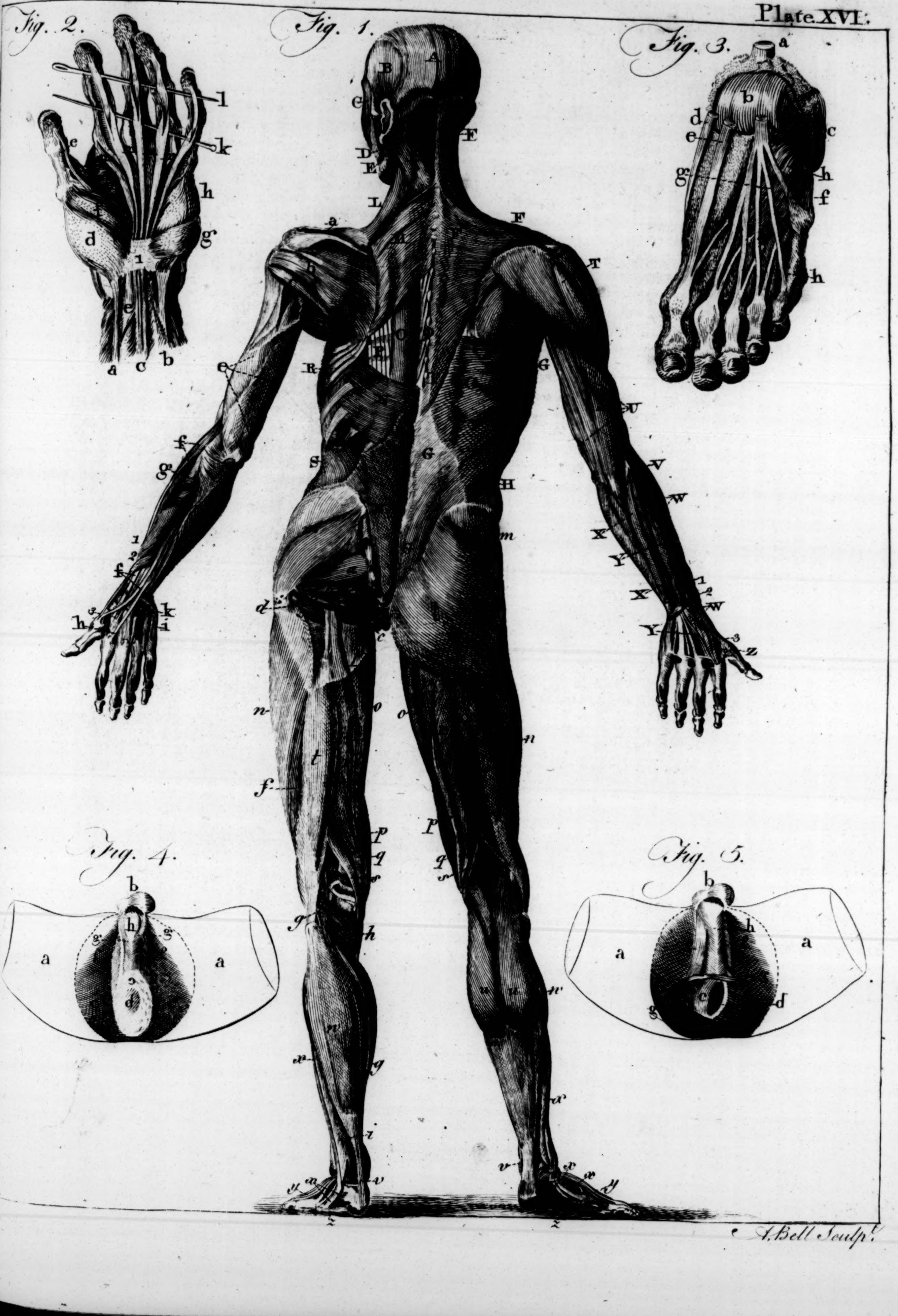
Fig. 2.
l
k
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1
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a c b
Fig. 1.
A
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Fig. 3.
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Fig. 4.
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Fig. 5.
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A. Bell Sculp^t.

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out of the abdominal cavity. The aorta, and vena cava, likewiſe, derive a covering from the ſame membrane; which ſeems to be a part of the cellular membrane we have already deſcribed.

b, The peritonæum, by its productions and reduplications, envelops the greateſt part of the abdominal viſcera. It is ſoft, and capable of conſiderable extenſion, and is kept ſmooth and moiſt by a vapour which is conſtantly exhaling from its inner ſurface, and is returned again into the circulation by the abſorbents.

c, This moiſture not only contributes to the ſoftneſs of the peritonæum, but prevents the attrition, and other ill effects which would otherwiſe probably be occaſioned by the motion of the viſcera upon each other.

d, When this fluid is ſupplied in too great a quantity, or the abſorbents become incapable of carrying it off, it acumulates; and conſtitutes an aſcites or dropſy of the belly: and when by any means the exhalation is diſcontinued, the peritonæum thickens; becomes diſeaſed; and the viſcera are ſometimes found adhering to each other.

e, It is ſupplied with blood by branches of the mammary, epigaſtric, and phrenic arteries; and the blood is carried back by veins of the ſame name. Its nerves are derived from the ſpinal marrow of the lumbar vertebræ, and os ſacrum; being branches of the nerves diſtributed to the abdominal muſcles, and it likewiſe receives ſome branches from the nerves which go to the diaphragm.

CHAP. II.

351 Of the OMENTUM.

a, THE omentum or cawl is a moſt delicate double membrane, interlarded with a great deal of fat, which is attached to the ſtomach, ſpleen, duodenum, and colon; and from thence hangs down looſe and floating on the ſurface of the inteſtines. Sometimes it deſcends as low as the groin, and in people who are ſubject to ruptures, it is now and then found to paſs through the abdominal rings, and diſtend the hernial ſac. The diſeaſe is then called *epiplocele*, for the Greeks gave the name of *epiploon*, to this viſcus. The omentum, by being double, forms a kind of pouch open only at one end, and ſome French writers have on this account compared it to a *cul de ſac*. The celebrated M. Winſlow has demonſtrated this aperture, which is ſituated under the great lobe of the liver near the beginning of the leſſer lobe; and the whole pouch may be diſtended by blowing air in at this opening (H).

b, The cæliac and meſenteric arteries ſend off branches to the omentum, and its redundant blood paſſes into the branches of the vena porta.

c, The uſe of this viſcus is not perfectly known. It has been ſuppoſed, with great appearance of probability, to contribute to the warmth and moiſture of the other viſcera; for adheſions have been obſerved to have taken place where the fat of the omentum has been much waſted. But there are authors who conſider it as aſſiſting in the preparation of bile; and Malpighi has remarked, that in warming the part which in frogs ſupplies the place of omentum, the fat was ſeen to diſſolve into ſpherical drops, which paſſed into the vena porta.

CHAP. III.

Of the STOMACH. 352

a, THE ſtomach is a membranous and muſcular bag, in ſhape not unlike a bag-pipe, lying acroſs the upper part of the abdomen, and inclining rather more to the left than the right ſide.

b, It has two orifices, one of which receives the end of the œſophagus, and is called the *cardia;* and ſometimes the left and upper orifice of the ſtomach; though its ſituation is not much higher than the other, which is ſtiled the right and inferior orifice, and more commonly the *pylorus;* both theſe openings are more elevated than the body of the ſtomach.

c, The aliment paſſes down the œſophagus into the ſtomach through the cardia, and after having undergone the neceſſary digeſtion, paſſes out at the pylorus, where the inteſtinal canal commences.

d, The ſtomach is compoſed of four tunics or coats, which are ſo intimately connected together, that it requires no little dexterity in the anatomiſt to demonſtrate them. The exterior one is membranous, being derived from the peritonæum. The ſecond is a muſcular tunic, compoſed of fleſhy fibres which are in the greateſt number about the two orifices. The third is called the nervous coat, and within this is the villous or velvetlike coat, which compoſes the inſide of the ſtomach.

e, The two laſt coats being more extenſive than the two firſt, form the folds which are obſerved every where in the cavity of this viſcus; and more particularly about the pylorus, where they ſeem to impede the two haſty excluſion of the aliment, making a conſiderable plait, called *valvula pylori*.

f, The inner coat is conſtantly moiſtened by a mucus which approaches to the nature of the ſaliva, and is called the *gaſtric juice;* this liquor is ſuppoſed to be ſecreted by certain minute glands (I) ſeated in the nervous tunic, whoſe excretory ducts open on the ſurface of the villous coat.

g, The arteries of the ſtomach called the *gaſtric arteries*, are derived from the cæliac; ſome of its veins paſs to the ſplenic, and others to the vena porta; and its nerves are chiefly from the eighth pair or par vagum.

h, The account given of the tunics of the ſtomach may be applied to the whole alimentary canal; for both the œſophagus and inteſtines are, like this viſcus, compoſed of four coats.

i, Before we deſcribe the courſe of the aliment and the uſes of the ſtomach, it will be neceſſary to ſpeak of other parts which aſſiſt in the proceſs of digeſtion.

CHAP. IV.

Of the OESOPHAGUS. 353

a, THE œſophagus or gullet, is a membranous and muſcular canal extending from the bottom of the mouth to

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(H) This membranous bag, though exceedingly thin and tranſparent, is found capable of ſupporting mercury thrown into it by the ſame channel.

(I) Heiſter ſpeaking of theſe glands very properly ſays, "in *porcis* facile, in *homine* raro obſervantur," for altho' many anatomical writers have deſcribed their appearance and figure, yet they do not ſeem to have been hitherto ſatisfactorily demonſtrated in the human ſtomach.

to the upper orifice of the ſtomach. Its upper part where the aliment is received, is ſhaped ſomewhat like a funnel, and is called the *pharynx*.

b, From hence it paſſes down cloſe to the bodies of the vertebræ as far as the diaphragm, where there is an opening through which it paſſes; and then terminates in the ſtomach about the eleventh or twelfth vertebra of the back.

c, The œſophagus is ſupplied with blood veſſels from the carotid arteries, and from the aorta; and receives other branches from the intercoſtal and cæliac arteries. The blood is returned from theſe veſſels into the jugular veins, and the azygos.

d, Its nerves are derived from the eighth pair.

e, We likewiſe meet with a mucus in the œſophagus which every where lubricates its inner ſurface, and tends to aſſiſt in deglutition. This mucus ſeems to be ſecreted by very minute glands, like the mucus in other parts of the alimentary canal.

CHAP. V.

354

Of the INTESTINES.

a, THE inteſtines form a canal which is uſually ſix times longer than the body to which it belongs. This canal extends from the pylorus or inferior orifice of the ſtomach, to the anus.

b, It will be eaſily underſtood, that a part of ſo great length muſt neceſſarily make many circumvolutions to be confined with ſo many other viſcera in the capacity of the lower belly.

c, Although the inteſtines are in fact, as we have obſerved, only one long and extenſive canal; yet different parts have been diſtinguiſhed by different names.

d, The inteſtines are firſt diſtinguiſhed into two parts, one of which begins at the ſtomach and is called the *thin* or *ſmall inteſtines*, from the ſmall ſize of the canal, and the thickneſs of its coats when compared with the other part, which is called the *large inteſtines;* and includes the lower portion of the canal down to the anus.

e, Each of theſe parts has its ſubdiviſions. The ſmall inteſtines being diſtinguiſhed into duodenum, jejunum, and ileum; and the larger portion into cæcum, colon, and rectum.

f, The ſmall inteſtines fill the middle and fore-parts of the belly, while the large inteſtines fill the ſides and both the upper and lower parts of the cavity.

g, The *duodenum*, which is the firſt of the ſmall inteſtines, is ſo called, becauſe it is about twelve inches long. It begins at the pylorus, and terminates in the *jejunum;* which is a part of the canal obſerved to be uſually more empty than the other inteſtines; this appearance gives it its name, and likewiſe ſerves to point out where it begins.

h, The next diviſion is the *ileum*, which of itſelf exceeds the united length of the duodenum and jejunum; and has received its name from its ſituation in the lower part of the umbilical region, near the oſſa innominata. The large circumvolution of the ileum covers the firſt of the large inteſtines called the *cæcum*, which ſeems properly to belong to the colon; being a kind of pouch about as wide as four fingers, and nearly of the ſame length; having exteriorly a little appendix, called *appendix cæci*.

i, The cæcum is placed in the cavity of the os ilium on the right ſide, and terminates in the *colon*, which is the largeſt of all the inteſtines.

k, This inteſtine aſcends by the right kidney to which it is attached, paſſes under the hollow part of the liver, and the bottom of the ſtomach to the ſpleen to which it is likewiſe ſecured, as it is alſo to the left kidney; and from hence paſſes down towards the os ſacrum, where from its ſtraight courſe the canal begins to take the name of *rectum*.

l, There are three ligamentous bands extending thro' the whole length of the colon, which by being ſhorter than its two inner coats, ſerve to increaſe the plaits on the inner ſurface of this gut..

m, The anus which terminates the inteſtinum rectum, is furniſhed with three muſcles; one of theſe is compoſed of circular fibres, and from its uſe in ſhutting the paſſage of the anus, is called *ſphincter ani*.

n, The other two are the *levatores ani;* ſo called, becauſe they elevate the anus after dejection. When theſe by palſy, or any other diſeaſe, loſe the power of contracting, the anus prolapſes; and when the ſphincter is affected by ſimilar cauſes, the fæces are voided involuntarily.

o, It has already been obſerved, that the inteſtinal canal is compoſed of four tunics; but it remains to be remarked, that here, as in the ſtomach, the two inner tunics being more extenſive than the other two, form the plaits which are to be ſeen in the inner ſurface of the inteſtines, and are called *valvulæ conniventes*.

p, Some authors have conſidered theſe plaits as tending to retard the motion of the fæces, ſo as to afford more time for the ſeparation of the chyle; but there are others who attribute to them a different uſe: They contend that theſe valves, by being naturally inclined downwards, cannot impede the deſcent of the fæces; but that they are intended to prevent their return upwards.

q, They are probably deſtined for both theſe uſes; for altho' theſe folds incline to their lower ſide, yet the inequalities they occaſion in the canal are ſufficient to retard in ſome meaſure the progreſſive motion of the fæces, and to afford a greater ſurface for the abſorption of chyle; and their natural poſition ſeems to oppoſe itſelf to the return of the aliment.

r, Beſides the *valvulæ conniventes*, there is one more conſiderable than the reſt, called the *valve of the colon;* which is found at that part of the canal where the inteſtinum ileum is joined to the colon. This valve permits the alimentary pulp to paſs downwards, but ſerves to prevent its return upwards; and it is by this valve that glyſters are prevented from paſſing into the ſmall inteſtines (K).

ſ, Of the little vermiform appendix of the cæcum, it will be ſufficient to ſay that its uſes have never yet been aſcertained. In birds we meet with two of theſe appendices.

t, The inteſtines are lubricated by a conſtant ſupply of mucus, formerly believed to be ſecreted by very minute glands, but now generally ſuppoſed to be exhaled from

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(K) This, however, is not invariably the caſe; for the contents of a glyſter have been found not only to reach the ſmall inteſtines, but to be voided at the mouth. Such inſtances however are not common.

from the minute ends of arteries. This mucus promotes the deſcent of the alimentary pulp, and, in ſome meaſure, defends the inner ſurface of the inteſtines from the irritation, to which it would perhaps otherwiſe be continually expoſed, from the aliment; and which, when in a certain degree, excites a painful diſorder called *colic*, a name given to the diſeaſe, becauſe its moſt uſual ſeat is in the inteſtinum colon.

u, The inteſtines are likewiſe frequently diſtended with air, and this diſtenſion ſometimes occaſions pain, and conſtitutes the flatulent colic.

v, The arteries of the inteſtines are continuations of the meſenteric arteries, which are derived in two conſiderable branches from the aorta. The redundant blood is carried back into the vena portarum.

w, In the rectum the veins are called *hemorrhoidal*; and are there diſtinguiſhed into internal and external: The firſt are branches of the inferior meſenteric vein, but the latter paſs into other veins. Sometimes theſe veins are diſtended with blood from obſtructions, from weakneſs of their coats, or from other cauſes; and what we call the *hemorrhoids* takes place. In this diſeaſe they are ſometimes ruptured, and the diſcharge of blood which conſequently follows, has probably occaſioned them to be called *hemorrhoidal* veins.

x, The nerves of the inteſtines are derived from the eighth pair.

CHAP. VI.

355 Of the MESENTERY.

a, THE name of the meſentery implies its ſituation amidſt the inteſtines. It is in fact a part of the peritonæum; being a reduplication (L) of that membrane from each ſide of the lumbar vertebræ to which it is firmly attached; ſo that it is formed of two laminæ, connected to each other by cellular membrane.

b, The inteſtines in their different circumvolutions form a great number of arches, and the meſentery accompanies them through all theſe turns; but by being attached only to the hollow part of each arch, it is found to have only a third of the extent of the inteſtines.

c, That part of this membrane which accompanies the ſmall inteſtines is the *meſentery, properly ſo called*; but thoſe parts of it which are attached to the *colon* and *rectum*, are diſtinguiſhed by the names of *meſo-colon*, and *meſo-rectum*.

d, There are many glands diſperſed thro' this double membrane, through which the lacteals and lymphatics paſs in their way to the thoracic duct. The blood veſſels of the meſentery were deſcribed in ſpeaking of the inteſtines.

e, This membrane, by its attachment to the vertebræ, ſerves to keep the inteſtines in their natural ſituation. The idea uſually formed of the colic called *miſerere*, is perfectly erroneous; it being impoſſible that the inteſtines can be twiſted, as many ſuppoſe they are, in that diſeaſe, their attachment to the meſentery effectually preventing ſuch an accident; but a diſarrangement ſometimes takes place in the inteſtinal canal itſelf, which is productive of diſagreeable and ſometimes fatal conſequences. This is by an introſuſception of the inteſtine; an idea of which may be eaſily formed by taking the finger of a glove, and involving one part of it within the other.

f, If inflammation takes place, the ſtricture in this caſe is increaſed; and the periſtaltic motion of the inteſtines (by which is meant the progreſſive motion of the fæces downwards) is inverted, and what is called the *iliac paſſion* takes place. The ſame effects may be occaſioned by a deſcent of the inteſtine, or of the omentum either with it or by itſelf; and thus conſtituting what is called *an hernia* or *rupture*, a term by which in general is meant the falling down or protruſion of any part of the inteſtine, or omentum, which ought naturally to be contained within the cavity of the belly.

g, To convey an idea of the manner in which ſuch a deſcent takes place, it will be neceſſary to obſerve, that the lower edge of the tendon of the *muſculus obliquus aſcendens* is ſtretched from the fore-part of the os ilium or haunch bone, to the os pubis; and conſtitutes what is called *Poupart's*, or *Fallopius's ligament*; forming an opening, through which paſs the great crural artery and vein. Near the os pubis the ſame tendinous fibres are ſeparated from each other, and form an opening on each ſide, called the *abdominal rings*, through which the ſpermatic veſſels paſs in men, and the ligamenta uteri in women. In conſequence of violent efforts, or perhaps of natural cauſes, the inteſtines are found ſometimes to paſs through theſe openings; but the peritonæum which incloſes them when in their natural cavity, ſtill continues to ſurround them even in their deſcent. This membrane does not become torn or lacerated by the violence, as might be eaſily imagined, but its dilatability enables it to paſs out with the viſcus; which it incloſes as it were in a bag, and thus forms what is called the *hernial ſac*.

h, If the hernia be under Poupart's ligament, it is called *femoral*; if in the groin, *inguinal*; (M) and *ſcrotal* if in the ſcrotum: different names are likewiſe given to the hernia, as the contents of the *ſac* differ, whether of omentum only, or inteſtine, or both; but theſe definitions more properly belong to the province of ſurgery.

CHAP. VII.

Of the PANCREAS. 356

a, THE pancreas is one of thoſe glands which anatomiſts have agreed to call *conglomerate*; becauſe they are compoſed of an infinite number of ſingle or conglobate

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(L) He who only reads of the reduplication of membranes, will perhaps not eaſily underſtand how the peritonæum and pleura are reflected over the viſcera in their ſeveral cavities; for one of theſe ſerves the ſame purpoſes in the thorax, that the other does in the abdomen. This diſpoſition, for the diſcovery of which we are indebted to modern anatomiſts, ſeems now to be ſatiſfactorily aſcertained, and conſtitutes a curious part of anatomical knowledge: but the ſtudent, unaided by experience, and aſſiſted only by what the limits of this treatiſe would permit us to ſay on the occaſion, would probably imbibe only confuſed ideas of the matter; and it will perfectly anſwer the preſent purpoſe, if he conſiders the meſentery as a membrane attached by one of its ſides to the lumbar vertebræ; and by the other, to the inteſtines.

(M) The *hernia congenita* will be deſcribed with the male organs of generation; with which it is intimately connected.

bate glands collected together.

b, It is placed behind the bottom of the ſtomach, towards the firſt vertebra of the loins; being ſhaped like a dog's tongue, with its point ſtretched out towards the ſpleen, and its other end extending towards the duodenum. It is about eight fingers breadth in length, two or three in width, and one in thickneſs.

c, This viſcus, which is of a yellowiſh colour, ſomewhat inclined to red, is covered with a membrane which it derives from the peritonæum. Its arteries, which are rather numerous than large, are branches of the *ſplenic;* and its veins paſs into the veins of the ſame name; its nerves are derived from the intercoſtal.

d, The many little glands of which it has been obſerved the pancreas is compoſed, all ſerve to ſecrete a liquor called the *pancreatic juice;* which in its colour, conſiſtence, and other properties, does not ſeem to differ from the ſaliva. Each of theſe glands ſends out a little excretory duct, which uniting with others, helps to form larger ducts; and all theſe at laſt terminate in one common excretory duct, firſt diſcovered by Virtſungus, in 1642, which runs through the middle of the gland, and is now uſually called *Ductus Pancreaticus Virtſungi.* This canal opens into the inteſtinum duodenum, ſometimes by the ſame orifice with the biliary duct, and ſometimes by a diſtinct opening; the liquor it diſcharges being of a mild and inſipid nature, ſerves to dilute the alimentary pulp, and to incorporate it more eaſily with the bile.

CHAP. VIII.

357 Of the LIVER.

a, THE liver is a viſcus of conſiderable ſize, and of a reddiſh colour; convex above, and in the forepart where it is placed under the ribs and diaphragm, and of an unequal ſurface behind. It is chiefly ſituated in the right hypochondrium, and under the falſe ribs; but it likewiſe extends into the epigaſtric region, where it borders upon the ſtomach. It is covered by a production of the peritonæum, which ſerves to attach it by three of its reduplications to the falſe ribs: theſe reduplications are called *ligaments,* though very different in their texture from what are called by the ſame name in other parts of the body. The umbilical cord too, which in the fœtus is pervious, gradually becomes a ſimple ligament after birth, and by paſſing to the liver, ſerves likewiſe to ſecure it in its ſituation.

b, At the poſterior part of this organ where the umbilical veſſels enter, it is found divided into two lobes; of theſe, the largeſt is placed in the right hypochondrium; the other, which covers part of the ſtomach, is called the *little lobe.* All the veſſels which go to the liver paſs in at the fiſſure we have mentioned, and the production of the peritonæum, which inveſts the liver, accompanies them in their paſſage and ſurrounds them like a glove. The credit of this diſcovery is due to an Engliſh anatomiſt, in honour of whom, this membranous production is now univerſally known by the name of *Gliſſon's capſula.*

c, The liver was conſidered by the ancients as an organ deſtined to prepare and perfect the blood, but later diſcoveries have proved that this opinion was wrong; and that the liver is a glandular ſubſtance formed for the ſecretion of the bile.

d, The blood is conveyed to the liver by the hepatic artery and the vena porta. This is contrary to the mode of circulation in other parts, where veins only ſerve to carry off the redundant blood; but, in this viſcus, the hepatic artery, which is derived from the cæliac, is wholly deſtined for its nouriſhment; and the vena porta, which is formed by the union of the veins from all the principal abdominal viſcera, only furniſhes the blood from which the bile is to be ſeparated; ſo that theſe two ſeries of veſſels ſerve very diſtinct purpoſes. The vena porta as it is ramified through the liver, performs the office both of an artery and a vein; for it not only carries blood to the liver, but after having depoſited its bile, brings back not only its own redundant blood, but likewiſe that of the hepatic artery into the vena cava.

e, The nerves of the liver are branches of the intercoſtal and par vagum. The bile after being ſeparated from the maſs of blood, in a manner of which mention will be made in another place, is conveyed out of this organ by very minute excretory ducts called *pori biliarii;* theſe uniting together like the excretory ducts in the pancreas, gradually form larger ones; which at length terminate in a conſiderable channel called *ductus hepaticus.*

CHAP. IX.

Of the GALL BLADDER, its contents and office. 358

a, THE gall bladder is a little membranous bag, ſhaped like a pear, and attached to the poſterior and almoſt inferior part of the great lobe of the liver.

b, It has three tunics, of which the exterior one is a production of the peritonæum; in the ſecond there are muſcular fibres, and the interior coat which is called the *nervous tunic,* forms ſeveral wrinkles on its inner ſurface, which is ſupplied with a mucus ſerving to defend it from the acrimony of the bile.

c, The gall bladder is ſupplied with blood veſſels from the hepatic arteries; theſe branches are called the *cyſtic arteries,* and the *cyſtic veins* carry back the blood.

d, Its nerves are derived from the ſame origin as thoſe of the liver.

e, The neck of the gall bladder is continued in the form of a canal called the *ductus cyſticus;* which ſoon unites with the *ductus hepaticus* we deſcribed as the excretory duct of the liver, and forming one common canal takes the name of *ductus choledochus communis;* through which both the cyſtic and hepatic bile are diſcharged into the duodenum: this canal opens into the inteſtine in an oblique direction, firſt paſſing thro' the exterior tunic, and then piercing the other coats after running between each of them a very little way; this œconomy ſerves two uſeful purpoſes, to promote the diſcharge of bile, and to prevent its return.

a, The bile may be defined to be a natural liquid ſoap, ſomewhat fat and bitter, and of a yellowiſh colour. It eaſily mixes with water, oil and vinous ſpirits, and is capable of diſſolving reſinous ſubſtances. Its chemical analyſis affords much animal oil, ſome volatile alkali, and a conſiderable quantity of water. 359 The bile.

b, Its definition ſeems ſufficiently to point out the uſes for which it is intended (N). It blends the alimentary maſs by dividing and attenuating it; corrects the too great diſpoſition to aceſcency which the aliment acquires in the ſtomach, and finally by its acrimony, tends to excite the periſtaltic motion of the inteſtines.

c, After what has been ſaid, it will be eaſily conceived that there are two ſorts of bile; one of which is derived immediately from the liver thro' the hepatic duct, and the other from the gall bladder. Theſe two biles do not eſſentially differ from each other. The hepatic bile, however, is milder and more liquid than the gall, which is conſtantly thicker and yellower; and by being more bitter, ſeems to poſſeſs greater activity than the other.

d, It is generally known that the *hepatic bile* is ſecreted from the maſs of blood by the liver; but the origin of the *cyſtic bile* has occaſioned no little controverſy amongſt anatomical writers. There are ſome who contend that it is ſeparated in the ſubſtance of the liver, from whence it paſſes into the gall bladder thro' particular veſſels (O).

e, There are others who ſuppoſe it is ſecreted by certain veſſels in the bladder itſelf; and there are ſome writers who conſider the gall bladder ſimply as a reſervoir of hepatic bile, which not being perhaps at all times permitted to paſs into the inteſtine, flows back into the cyſtic duct; and that the difference in the colour, conſiſtence, and taſte of the bile, is merely the reſult of ſtagnation, increaſing in proportion to the length of time it has remained in the reſervoir. Again, their are other anatomiſts who ſuppoſe that the bile may be conveyed into the gall bladder by all theſe means.

f, We will not here relate all the arguments that have been advanced in favour of theſe ſeveral opinions, nor will we aim at eſtabliſhing any one of them in particular.

g, From whatever ſource the cyſtic bile is derived, it ſeems to be certain, that the gall bladder is a reſervoir in which it is collected, and where it gradually thickens. When the ſtomach is diſtended with aliment, this reſervoir undergoes a certain degree of compreſſion, and the bile paſſes out into the inteſtinal canal; and in the efforts to vomit, the gall bladder ſeems to be conſtantly affected, and at ſuch times diſcharges itſelf of its contents.

h, Sometimes the bile concretes in the gall bladder ſo as to form what are called *gall ſtones* (P); and when theſe concretions paſs into the cyſtic duct, they ſometimes occaſion exquiſite pain, by diſtending the canal in their way to the duodenum; and they frequently produce a temporary jaundice by lodging in the ductus choledochus communis, and preventing the bile from flowing into the inteſtine; but the jaundice is thought to be moſt uſually produced by obſtructions in the liver itſelf, which by preventing the ſeparation of bile from the blood, tend to give that univerſal yellowneſs to the body which is the characteriſtic of the diſeaſe.

CHAP. X.

Of the SPLEEN. 360

a, THE ſpleen is a ſoft and ſpungy viſcus, of a bluiſh colour, about five or ſix fingers breadth in length, and three in width; ſituated in the left hypochondrium, between the ſtomach and the falſe ribs. That ſide of it which is placed on the ſide of the ribs, is convex; and the other which is turned towards the ſtomach, is concave.

b, The ſplenic artery, which is a branch from the cæliac, ſupplies this viſcus with blood, and a vein of the ſame name carries it back into the vena porta.

c, Its nerves are derived from a particular plexus called the *ſplenic*, which is formed by branches of the intercoſtal nerve, and by the eight pair or par vagum.

d, The uſes of the ſpleen have never yet been ſatisfactorily aſcertained.

e, The ancients, who ſuppoſed two ſorts of bile, conſidered it as the receptacle of what they called *atra bilis*; and Havers, who wrote profeſſedly on the bones, determined its uſe to be that of ſecreting the ſynovia; but theſe opinions have long ſince been rejected, tho' the want of an excretory duct has occaſioned the real uſe of it to be ſtill doubtful: perhaps the blood undergoes ſome change in this viſcus, which may aſſiſt in the preparation of the bile. This is the opinion of the generality of modern phyſiologiſts; and the great quantity of blood with which it is ſupplied, and the courſe of its veins into the vena porta ſeem to render it probable (Q).

CHAP. XI.

(N) The ancients, who were not acquainted with the real uſe of the liver, conſidered the bile as an excrementitious and uſeleſs fluid.

(O) In deer, and in ſome other quadrupeds, there ſeems to be an evident communication, by means of particular veſſels, between the liver and the gall bladder. Bianchi of Turin, and the celebrated M. Winſlow have both aſſerted their exiſtence in the human ſubject, and have named them *hepatic-cyſtic-ducts*, but later obſervations tend to prove that no ſuch ducts exiſt. In obſtructions of the cyſtic duct for inſtance, the gall bladder has been found ſhrivelled and empty; and the generality of anatomiſts of theſe times, ſeem to conſider the gall bladder as a reſervoir of hepatic bile.

(P) Theſe concretions ſometimes remain in the gall bladder without cauſing any uneaſineſs. Dr Heberden relates, that a gall ſtone weighing two drachms was found in the gall bladder of the late Lord Bath, though he had never complained of the jaundice, nor of any diſorder which he could attribute to that cauſe. *Med. Tranſ.*

(Q) The late Mr Hewſon of London, in the ſecond part of his experimental inquiries ſays, he has been led to aſcertain the uſes of the lymphatic glands, the thymus, and the ſpleen; which have ſo long been conſidered as the *Opprobria* of anatomiſts; and he propoſed to deſcribe them in a future publication: but that very ingenious phyſiologiſt is ſince dead. An imperfect abſtract of his diſcoveries has appeared in the medical commentaries of Edinburgh, from which we are enabled to collect, that Mr Hewſon conſidered the ſpleen as an organ of great importance; that he rejected the ſuppoſition of its being ſubſervient to the liver, becauſe fluids of greater conſequence in the œconomy are prepared by one organ; that its ſtructure is very analogous to that of the lymphatic glands; that from its being ſometimes taken out without inconvenience, he ſuppoſed that ſomething elſe in the ſyſtem is capable of performing its functions, which he concluded to be the thymus, from their ſimilarity in ſtructure; that he conſidered the lymphatic veſſels, as the only excretory ducts of the ſpleen; and laſtly, that the lymphatic glands concurred with this organ and the thymus, in the formation of the red globules of the blood.

CHAP. XI.

Of the GLANDULÆ RENALES, KIDNEYS, and URETERS.

361 Glandulæ renales. a, THE *glandulæ renales*, which were by the ancients ſuppoſed to ſecrete the *atra bilis*, and by them named *capſulæ atrabiliares*, are two flat bodies of an irregular figure, one on each ſide between the kidney and the aorta.

b, In the fœtus they are as large as the kidneys, but they do not increaſe afterwards in proportion to thoſe parts; and in adults and old people, they are generally found ſhrivelled, and much waſted. They have their arteries and veins. Their arteries uſually ariſe from the ſplenic or the emulgent, and ſometimes from the aorta; and their veins go to the neighbouring veins, or to the vena cava; their nerves are branches of the intercoſtal.

c, The uſe of theſe parts is not yet perfectly known. In the fœtus the ſecretion of urine muſt be in a very ſmall quantity, and a part of the blood may perhaps then paſs thro' theſe channels, which in the adult is carried to the kidneys, to ſupply the matter of urine.

362 Kidneys. a, The *kidneys* are two in number, ſituated one on the right, and the other on the left ſide in the lumbar region, between the laſt falſe rib and the os ilium, by the ſides of the vertebræ. Each kidney in its figure reſembles a ſort of bean (R), which from its ſhape is called *kidney bean*. The concave part of each kidney is turned towards the aorta and vena cava aſcendens. They are ſurrounded by a good deal of fat, and receive a coat from the peritonæum; and when this is removed, a very fine membrane is found inveſting their ſubſtance and the veſſels which ramify through them.

b, Each kidney has a conſiderable artery and vein, which are called the *emulgent*. The artery is a branch from the aorta deſcendens, and the vein paſſes into the vena cava. Their nerves, which every where accompany the blood veſſels, ariſe from a conſiderable *plexus*, which is derived from the intercoſtal.

c, In each kidney, which in the adult is of a pretty firm texture, there are three ſubſtances to be diſtinguiſhed (S). The outer part is *glandular* or *cortical*, beyond this is the *vaſcular* or *tubular ſubſtance*; and the inner part is *papillary* or *membranous*.

d, It is in the cortical part of the kidney that the ſecretion is carried on; the urine being here received from the minute extremities of the capillary arteries, is conveyed out of this cortical ſubſtance by an infinite number of very ſmall cylindrical canals or excretory veſſels, which conſtitute the *tubular* part. Theſe tubes as they approach the inner ſubſtance of the kidney, gradually unite together; and thus forming larger canals, at length terminate in ten or twelve little protuberances called *papillæ*, the orifices of which may be ſeen without the aſſiſtance of glaſſes. Theſe papillæ unite together to form one cavity or reſervoir, which is called the *pelvis* of the kidney (T). From this pelvis the urine is conveyed thro' a membranous canal, which paſſes out from the hollow ſide of the kidney, a little below the blood veſſels, and is called *ureter*.

363 Ureters. a, The *ureters* are each about as large as a common writing pen. They are ſomewhat curved in their courſe from the kidneys like the letter *ſ*; and at length terminate in the poſterior and almoſt inferior part of the bladder, at ſome diſtance from each other. They paſs into the bladder in the ſame manner as the *ductus choledochus communis* paſſes into the *inteſtinum duedenum*, not by a direct paſſage, but by an oblique courſe between the ſeveral coats; ſo that the diſcharge of urine into the bladder is promoted, whilſt its return is prevented. Nor does this mode of ſtructure prevent the paſſage of fluids only from the bladder into the ureters, but likewiſe air: for air thrown into the bladder inflates it, and it continues to be diſtended if a ligature is paſſed round its neck; which ſeems to prove ſufficiently that it cannot paſs into the ureters.

CHAP. XII.

Of the URINARY BLADDER, its office and contents.

364 Urinary bladder. a, THE *urinary bladder* is a membranous bag, in ſhape not unlike a bottle with its neck downwards; ſituated in the pelvis, between the inteſtinum rectum and os pubis. The bottom of the bladder is covered by a production of the peritonæum, and it has three other tunics; of theſe, the external one is compoſed of fleſhy or muſcular fibres. The ſecond is called its *nervous* coat, and within this is its *villous* coat, which reſembles the *villous* coat of the inteſtines. The ureters have each the ſame number of coats, and the whole urinary paſſage is conſtantly moiſtened by a ſlimy liquor, which defends it againſt the acrimony of the urine.

b, The *neck of the bladder*, from which a canal is continued called the *urethra*, thro' which we diſcharge the urine; is encircled by muſcular fibres, which are diſtinguiſhed by the name of *ſphincter veſicæ* (U).

c, This muſcle, by cloſing the neck of the bladder, prevents an involuntary flow of urine; for without this *ſphincter* it would conſtantly fall drop by drop from the urethra, as it is diſtilled thro' the ureters.

365 The urine. a, It will be eaſily conceived from what has been ſaid, that the kidneys are two glandular bodies thro' which a ſaline and excrementitious fluid called *urine*, is conſtantly ſeparating from the maſs of blood; but though anatomiſts generally agree in aſſerting that the urine is ſeparated from the blood by the mere action of filtration, yet its appearance is altogether unaccountable upon this ſuppoſition. It is impoſſible to *filter* from any thing what it does not previouſly contain; and both

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(R) The human kidneys are in ſhape much like the kidneys of ſheep.

(S) The kidneys in the fœtus are diſtinctly lobulated, and apparently *conglomerate* in their ſtructure; but in the adult, they become perfectly firm, ſmooth and regular, and would ſeem to be glands of the *conglobate* kind.

(T) The pelvis is not formed by the papillæ, as M. Perſon and ſome other writers have believed; but appears to be a diſtinct membranous bag, ſending off proceſſes which embrace the *papillæ*.

(U) In compliance with the moſt general method of anatomical writers, we have deſcribed the *ſphincter veſicæ*; but there are ſome modern anatomiſts who are of opinion, that the neck of the bladder has no muſcular fibres; and of this number is M. Lieutard, who contends that the urine is confined in the bladder by means of the levatores ani, and the particular ſtructure of the bladder itſelf, which he deſcribes as being adapted for this purpoſe. See *Lieutard, Eſſais Anatomiques.*

both the blood itſelf, and the chyle from which it is formed are exceedingly mild, without any ſaline principle; whereas the urine is full of ſalts, and thoſe too of ſuch a nature as are ſcarce to be found any where elſe. See Urine and Chemistry, n°. 308.

b, While only a ſmall quantity of urine is collected in the bladder, it excites no kind of uneaſineſs; but when accumulated to a certain degree, the bladder becomes diſtended, the ſalts contained in the urine ſeem to become more active, and beginning to irritate the inner coat of the bladder, excite in us a certain ſenſation; which brings on as it were a voluntary contraction of the bladder to promote its diſcharge: but this contraction is not effected by the muſcular fibres of the bladder alone, for all the abdominal muſcles contract in obedience to our will, and preſs downwards all the viſcera of the lower belly; and theſe powers being united, at length overcome the reſiſtance of the *ſphincter*, which dilates and affords a paſſage to the urine thro' the urethra,

c, The frequency of this evacuation depends on the quantity of urine ſecreted, on the degree of acrimony it poſſeſſes, on the ſize of the bladder, and on its degree of ſenſibility.

d, When the urine is loaded with acrid ſalts, a very ſmall quantity of it is ſufficient to irritate the inner ſurface of the bladder, and occaſion its diſcharge; and the ſame effect will take place when the bladder is by any means inflamed.

e, Every body is converſant with the natural conſiſtence of the urine. In a healthy ſtate it is nearly of a ſtraw colour. After being kept ſome time it depoſits a tartareous matter, which is found to be compoſed chiefly of earth and ſalt, and ſoon incruſts the ſides of the veſſel in which it is contained. While this ſeparation is taking place, appearances, like minute fibres or threads of a whitiſh colour, will be ſeen in the middle of the urine, and an oily ſcum will be obſerved floating on its ſurface. So that the moſt common appearances of the urine are ſufficient to aſcertain that it is not pure water, but a ſeroſity, impregnated with earthy, ſaline, and oily particles.

f, The urine is not always voided of the ſame colour and conſiſtence; for theſe are found to depend on the proportion of its watery part to that of its other conſtituent principles. Its colour and degree of fluidity ſeem to depend on the quantity of ſaline and inflammable particles contained in it; ſo that an increaſed proportion of thoſe parts will conſtantly give the urine a higher colour, and add to the quantity of ſediment.

g, The variety in the appearance of the urine, depends on the nature and quantity of ſolid and fluid aliment we take in; and it is likewiſe occaſioned by the different ſtate of the urinary veſſels; by which we mean the channels thro' which it is ſeparated from the blood, and conveyed thro' the pelvis into the ureters. If theſe paſſages are contracted, in conſequence of inflammation, or any other means, their diameter is of courſe diminiſhed; they permit only the more limpid parts of the blood to paſs through them, and the urine is found to be perfectly clear and colourleſs like pure water. But, if, on the contrary, their diameter is encreaſed, they not only afford a paſſage to the watery part, which preſents itſelf for ſecretion, but likewiſe to an increaſed quantity of other particles, which conſequently give the urine a higher colour and add to its conſiſtence.

h, If the urinary veſſels are naturally of too looſe and ſoft a texture, they will ſometimes admit groſſer particles (v), which they will not always be able to carry off; and theſe particles will not fail to accumulate in the canal, and occaſion thoſe painful diſtenſions of it, which conſtitute the *nephritic colic*. The ſeat of this diſeaſe is ſometimes in the kidney itſelf, and ſometimes in the ureters; depending on the part where the paſſage of theſe concretions to the bladder is obſtructed. When theſe concretions, or any extraneous body admitted into the bladder, continue to reſide in it, they become a *nucleus* to a *calculus*; and if the urine continues to have a diſpoſition to add to it, it gradually increaſes in ſize, and what is called a *calculus* or *ſtone*, is formed in the bladder; which can only be extracted by the operation of lithotomy, unleſs nature, by a favourable effort as is very often the caſe, carries it out of the bladder before it becomes too large to paſs into the urethra.

i, It having been obſerved, that after drinking any light wine or Spa water, it very ſoon paſſed off by urine, it was ſuppoſed by ſome anatomiſts that the urine is not altogether conveyed to the bladder by the ordinary courſe of circulation, but that there muſt certainly exiſt ſome other ſhorter means of communication, perhaps by certain veſſels between the ſtomach and the bladder; or that the fluid tranſudes thro' the coats of the ſtomach, and is then taken into the bladder by abſorption; but, from ſome experiments on living animals, others have denied the truth of this doctrine. If we open the belly of a dog, preſs out the urine from the bladder, paſs a ligature round the emulgent arteries, and then ſew up the abdomen, and give him even the moſt diuretic liquor to drink, the ſtomach and other channels will be diſtended with it, but not a drop of urine will be found to have paſſed into the bladder. This experiment then, ſeems to prove that all the urine we evacuate is conveyed to the kidneys thro' the emulgent arteries, in the manner already deſcribed. It is true that wine and other liquors promote a ſpeedy evacuation of urine, but the diſcharge ſeems to be merely the effect of the ſtimulus they occaſion; by which the bladder and urinary parts are ſolicited to a more copious diſcharge of the urine, which was before in the body, and not immediately of that which was laſt drank; and this increaſed diſcharge, if the ſupply is kept up, will continue: nor will this appear wonderful, if we conſider the great capacity of the veſſels which go to the kidneys, the conſtant ſupply of freſh blood which is eſſential to health, and the rapidity with which it is inceſſently circulated through the heart to all parts of the body.

Chap. XIII.

The inſtruments and proceſs of Digestion.

366 a, By *digeſtion* is to be underſtood the changes the aliment

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(v) The reader muſt conſider this, only as one among many other cauſes of calculous concretions in the urinary paſſages, which are to be looked for in the natural conſtitution of the body, mode of life, &c. The urine itſelf, in people who have much natural tendency to theſe complaints, though ſeemingly pure and limpid when firſt ſecreted, has a wonderful diſpoſition to concrete.

aliment undergoes for the formation of chyle, theſe changes are effected in the mouth, ſtomach, and ſmall inteſtines.

b, The *mouth*, of which every body has a general knowledge, is the cavity between the two jaws, the fore part and ſides of which are formed by the lips, teeth, and cheeks; the back part terminating in the throat.

c, The lips and cheeks are made up of fat and muſcles, covered by the cuticle, which is continued over the whole inner ſurface of the mouth, like a fine and delicate membrane. Beſides this membrane, the inſide of the mouth is furniſhed with a ſpongy and very vaſcular ſubſtance, called the *gums*, by means of which the teeth are ſecured in their ſockets. A ſimilar ſubſtance covers the roof of the mouth, and forming what is called the *velum palati*, terminates in a ſoft, ſmall, and conical body, called the *uvula;* which appears as it were ſuſpended from the middle of the arch over the baſis of the tongue.

d, The *tongue* is compoſed of ſeveral muſcles which enable it to perform a variety of motions, for the articulation of the voice, for the purpoſes of maſtication, and for conveying the aliment into the pharynx. Its upper part is covered with *papillæ*, which conſtitute the organ of taſte, and are eaſily to be diſtinguiſhed; it is covered by the ſame membrane that lines the inſide of the mouth, and which makes at its inferior part towards its baſis a reduplication called the *frænum.*

e, Under the velum palati, and at the baſis of the baſis of the tongue, is the *pharynx;* which is the beginning of the œſophagus, ſtretched out every way ſo as to reſemble the top of a funnel, through which the aliment paſſes into the ſtomach.

f, The *mouth* has a communication with the noſtrils, at its poſterior and upper part; with the ears by the euſtachian tubes; with the lungs by means of the larynx; and with the ſtomach by means of the œſophagus.

g, The *pharynx* is conſtantly moiſtened by a fluid ſecreted by two conſiderable glands, called the *tonſils;* one on each ſide of the velum palati. Theſe glands, from their ſuppoſed reſemblance to almonds, have likewiſe been called *amygdales*. The tonſils, from ſome vicious diſpoſition in the fluid they ſecrete, or from other cauſes, ſometimes ſwell, and conſtitute what is called a *baſtard quinſey*. In the *true quinſey*, which is a very acute diſeaſe, the pharynx or larynx, and ſometimes both at the ſame time, are affected.

h, The mouth is moiſtened by a conſiderable quantity of ſaliva. This humour is derived from the *parotid glands*, a name by which its etymology points out their ſituation to be near the ears. They are two in number, one on each ſide under the os malæ, and are of the conglomerate kind; being formed of many ſmaller glands, each of which ſends out a very ſmall excretory duct, which uniting with each other, form one common channel, that runs over the cheek, and piercing the buccinator muſcle, opens into the mouth on each ſide, by an orifice into which a briſtle may be eaſily introduced. Beſides theſe, the *maxillary glands*, which are placed near the inner ſurface of the angle of the lower jaw on each ſide; the *ſublingual glands*, which are ſituated at the root of the tongue; and the *glands of the palate*, which are ſeated in the velum palati; together with many other leſs conſiderable ones, pour the ſaliva into the mouth through their ſeveral excretory ducts.

i, The *ſaliva*, like all the other humours of the body, is found to be different in different people; but in general, it is a limpid and inſipid fluid, without ſmell in healthy ſubjects; and theſe properties would ſeem to prove that it contains very few ſaline or inflammable particles. It is ſo much diſpoſed to fermentation, that the inhabitants of Otaheite, and other barbarous nations, uſe it by way of yeaſt, to make their liquors ferment.

k, The uſes of the ſaliva ſeem to be to moiſten and lubricate the mouth, and to aſſiſt in reducing the aliment into a ſoft pulp before it is conveyed into the ſtomach.

367 Hunger and thirſt.

a, The variety of functions which are conſtantly performed by the living body, muſt neceſſarily occaſion a continual waſte and diſſipation of its ſeveral parts. A great quantity is every day thrown off by the inſenſible perſpiration and other diſcharges; and were not theſe loſſes conſtantly recruited by a freſh ſupply of chyle, the body would ſoon effect its own diſſolution. But nature has very wiſely favoured us with organs fitted to produce ſuch a ſupply, and has at the ſame time endued us with the ſenſations of *hunger* and *thirſt*, that our attention may not be diverted from the neceſſary buſineſs of nutrition. Hurried on by the occurrences of life, we ſhould perhaps without theſe admonitions, ſometimes omit to take in the proper ſupply of aliment; but the demands of hunger are not to be withſtood. This ſenſation is univerſally known; but it would perhaps be difficult to deſcribe it perfectly in words. In deſcribing the ſtomach, mention was made of the gaſtric juice, as every where lubricating its inner coat. This humour mixes itſelf with the aliment in the ſtomach, and helps to prepare it for its paſſage into the inteſtines; but when the ſtomach is perfectly empty, this ſame fluid irritates the coats of the ſtomach itſelf, and produces the ſenſation of hunger.

b, A certain proportion of liquid aliment is required to aſſiſt in the proceſs of digeſtion, and to afford that moiſture to the body, of which there is ſuch a conſtant diſſipation. *Thirſt* induces us to take this neceſſary ſupply of drink; and the ſeat of this ſenſation is in the tongue, fauces, and œſophagus, which from their great ſenſibility are required to be kept moiſt; for although the fauces are naturally moiſtened by the mucus and ſalival juices, yet the blood, when deprived of its watery part, or rendered acrimonious by any natural cauſes, never fails particularly to affect theſe parts, and the whole alimentary canal, and to occaſion thirſt. This is the common effect of fevers, and of hard labour; by both which too much of the watery part of the blood is diſſipated.

368 Maſtication and deglutition.

a, It has been obſerved that the aliment undergoes ſome preparation in the mouth before it paſſes into the ſtomach; and this preparation is the effect of *maſtication.* In treating of the upper and lower jaws, mention was made of the number and arrangement of the teeth. The upper jaw was deſcribed as being immoveable; but the lower jaw was ſpoken of as being capable of elevation and depreſſion, and of a grinding motion. The aliment, when firſt carried into the mouth, is preſſed between the teeth of the two jaws by a very ſtrong and frequent motion of the lower jaw; and the tongue and the cheeks aſſiſting in this proceſs, continue to replace the food between the teeth till it is perfectly divided, and reduced to the conſiſtence of pulp. The inciſores and canini, divide it firſt into ſmaller pieces; but it is between the ſurfaces of the dentes molares, by the grinding motion of the jaw, that the maſtication is completed.

b, During this proceſs, the ſalival glands being gently compreſſed by the contraction of the muſcles that move the lower jaw, and ſomewhat ſtimulated by the ſaline particles of the aliment, pour out their ſaliva, which helps to divide and break down the food, which at length becomes a kind of pulp, and is then carried over the baſis of the tongue into the fauces. But to effect this paſſage into the œſophagus, it is neceſſary that the other openings which were mentioned as having a communication with the mouth as well as the pharynx, ſhould be cloſed; that none of the aliment, whether ſolid or liquid, may paſs into them, whilſt the pharynx alone is dilated to receive it; ſuch a diſpoſition actually takes place in a manner we ſhall endeavour to deſcribe.

c, The *trachea arteria* or *windpipe*, through which the air is conveyed to the lungs, is placed before the œſophagus in the act of ſwallowing, then if the larynx is not cloſed, (for ſo the upper part of the trachea is called,) the aliment will paſs into it in its way to the œſophagus. But this is prevented by a ſmall and very elaſtic cartilage, called *epiglottis*, which is attached only to the forepart of the larynx; ſo that the food in its paſſage to the œſophagus, preſſes down this cartilage which then covers the *glottis*, or opening of the larynx; and at the ſame time the velum palati being capable of ſome degree of motion, is drawn backwards by its muſcles, and cloſes the openings into the noſe and the euſtachian tubes: this is however not all. The larynx, which being compoſed of cartilaginous rings, cannot fail in its ordinary ſtate to compreſs the membranous canal of the œſophagus, is, in the act of *deglution*, carried forwards and upwards by muſcles deſtined for that purpoſe; and conſequently drawing the forepart of the pharynx with it, that opening is fully dilated. When the aliment has reached the pharynx, its deſcent is promoted by its own proper weight, and by the muſcular fibres of the œſophagus, which continue to contract from above downwards, until the aliment has reached the ſtomach. That theſe fibres have no inconſiderable ſhare in deglutition, any perſon may experience, by ſwallowing with his head downwards, when the deſcent of the aliment cannot poſſibly be effected by its weight.

d, It is neceſſary that the noſtrils and the lungs ſhould communicate with the mouth, for the purpoſes of ſpeech and reſpiration; but if the moſt minute part of our food happens to be introduced into the trachea, it never fails to produce a violent cough, and ſometimes the moſt alarming ſymptoms; this is liable to happen when we laugh or ſpeak, in the act of deglutition. The food is then ſaid to have paſſed the wrong way; and indeed this is not improperly expreſſed, for death would ſoon follow, if the quantity of aliment introduced into the trachea ſhould be ſufficient to obſtruct the reſpiration only during a very ſhort time; or if the irritating particles of food ſhould not ſoon be thrown up again by means of the cough, which in theſe caſes very ſeaſonably increaſes in proportion to the degree of irritation.

e, If the velum palati did not cloſe the paſſage to the noſtrils, deglutition would be performed with difficulty, and perhaps not at all; for the aliment would return thro' the noſe, as is ſometimes the caſe in drinking. Children, from a deficiency in this velum palati, have been ſeen to die a few hours after birth; and they who from diſeaſe or any other cauſes have not this part perfect, ſwallow with difficulty.

f, The aliment, after having been ſufficiently divided by the action of the teeth, and attenuated by the ſaliva, is received into the ſtomach, where it is deſtined to undergo a more conſiderable change.

g, The properties of the aliment not being much altered at its firſt entrance into the ſtomach, and before it is thoroughly blended with the gaſtric juice, is capable of irritating the inner coat of the ſtomach to a certain degree, and occaſions a contraction of its two orifices. In this membranous bag, ſurrounded by the abdominal viſcera, and with a certain degree of natural heat, the aliment undergoes a conſtant agitation by means of the abdominal muſcles, and of the diaphragm, and likewiſe by a certain contraction or expanſion of the muſcular fibres of the ſtomach itſelf. By this motion, every part of the food is expoſed to the action of the gaſtric juice, which gradually divides and attenuates it, and prepares it for its paſſage into the inteſtines (w).

h, The more the particles of food have imbibed of the gaſtric juice, the leſs obſtacle do they afford to the expanſion of the air which is ſet looſe by the proceſs of digeſtion; and being rarified by the warmth of the ſtomach, tends to complete the perfect diſſolution of the alimentary pulp.

(w) Mr J. Hunter has lately obliged the public with the account of a very ſingular fact in the animal œconomy, which ſeems to throw conſiderable light on the principles of digeſtion: he informs us, that there are few dead bodies in which the ſtomach at its great end, is not found to be in ſome degree digeſted; he obſerves, that animals, or parts of animals, poſſeſſed of the living principle, when taken into the ſtomach, are not in the leaſt affected by the action of that viſcus; but that the moment they loſe the living principle, they become ſubject to its digeſtive powers. This he ſuppoſes to be the caſe with the ſtomach, which is enabled to reſiſt the action of its juices in the living body, but when deprived of the living principle, is then no longer able to reſiſt the power of that menſtruum, which it had itſelf formed for the digeſtion of its contents; the proceſs of digeſtion appearing to be continued after death. Mr Hunter was confirmed in his ideas on this ſubject by obſerving what happens in the ſtomachs of fiſhes: they frequently ſwallow without maſtication, fiſh which are larger than the digeſting parts of their ſtomach can contain, and in ſuch caſes that part which is taken into the ſtomach, is more or leſs diſſolved; while that part which remains in the oeſophagus, is perfectly ſound; and here, as well as in the human body, the digeſting part of the ſtomach is often reduced to the ſame ſtate as the digeſted part of the food. Theſe appearances the ingenious writer imagines, lead to prove that digeſtion is not effected by a mechanical power, by contractions of the ſtomach, or by heat; but by a fluid ſecreted in the coats of the ſtomach, which is poured into its cavity, and there animalizes the food, or aſſimilates it to the nature of blood.------*Philoſ. Tranſ.* Vol. 62.

i, The food, after having remained during one, two, or three hours in the ſtomach, is converted into a greyiſh pulp, which is uſually called *chymus*, a word of Greek etymology, ſignifying *juice;* and ſome few milky or chylous particles begin to appear; but the term of its reſidence in this bag is proportioned to the nature of the aliment, and to the ſtate of the ſtomach and its juices. The thinner and more perfectly digeſted parts of the food, paſs by a little at a time, into the duodenum, through the pylorus, the fibres of which relax to afford it a paſſage: and the groſſer and leſs digeſted particles remain in the ſtomach till they acquire a ſufficient fluidity to paſs into the inteſtines, where the nature of the *chymus* is perfectly changed. The bile and pancreatic juice which flow into the duodenum, and the mucus which is every where diſtilled from the ſurface of the inteſtines, mix themſelves with the alimentary pulp, which they ſtill farther attenuate and diſſolve, and into which they ſeem to infuſe new properties.

k, Two matters very different from each other in their nature and deſtination, are the reſult of this combination. One of theſe which is compoſed of the liquid parts of the aliment, and of ſome of its more ſolid particles, extremely divided and mixed with the juices we have deſcribed, conſtitutes a very mild, ſweet, and whitiſh fluid, reſembling milk, and diſtinguiſhed by the name of *chyle*. This fluid is abſorbed by the lacteal veins, which convey it into the circulation, where by being aſſimilated into the nature of blood, it affords that ſupply of nutrition which the continual waſte of the body is found to require. The other is the remains of the alimentary maſs deprived of all its nutritious particles, and containing only ſuch parts, as by their acrimony or their coheſion, were rejected by the abſorbing mouths of the lacteals. This groſſer part called the *fæces*, paſſes on through the courſe of the inteſtines to be voided at the anus, as will be explained hereafter, for this proceſs in the œconomy cannot well be underſtood till the motion of reſpiration has been explained. But the ſtructure of the inteſtines is a ſubject which may be properly deſcribed in this place, and deſerves to be attended to.

l, It has been already obſerved, that the inteſtinal canal is five or ſix times as long as the body, and that it forms many circumvolutions, in the cavity of the abdomen, which it traverſes from the right to the left, and again from the left to the right; in one place deſcending, and in another extending itſelf upwards. It was noticed likewiſe, that the inner coat of the inteſtines by being more capacious than their exterior tunics, formed a multitude of plaits placed at a certain diſtance from each other, and called *valvule conniventes*. Now this diſpoſition will be found to afford a farther proof of that divine wiſdom, which the anatomiſt and phyſiologiſt cannot fail to diſcover in all their purſuits; for if the inteſtinal canal was much ſhorter than it naturally is, if inſtead of its preſent circumvolutions it paſſed in a direct courſe from the ſtomach, and if its inner ſurface was ſmooth and deſtitute of valves, the aliment would conſequently paſs with great rapidity to the anus, and ſufficient time would be wanting to aſſimilate the chyle, and for the neceſſary abſorption of it into the lacteals; ſo that the body would be deprived of the ſupply of nutrition, which is ſo eſſential to life and health, but the length and circumvolutions of the inteſtines, the inequality of their internal ſurface, and the courſe of the aliment through them, all concur to perfect the ſeparation of the chyle from the fæces, and to afford the neceſſary nouriſhment to the body.

m, Digeſtion is performed with more or leſs eaſe, according to the temperaments, age, ſex, ſtrength, exerciſe, paſſions, &c. In ſome it is long and difficult, in others quick and eaſy, in its proceſs. Every one ought to adapt the quantity and kind of aliment he takes in, to the ſtate of his ſtomach and the powers of its juices, which can only be learned by experience and attentive obſervation.

n, It ſeems to be very eaſy to demonſtrate, that he who loads his ſtomach with more than he is able to digeſt, will derive from it only a crude and imperfect chyle, by no means calculated to afford a good and wholeſome blood, and to promote a healthy conſtitution of body.

o, In a recovery from ſickneſs, the patient often thinks he is making haſty advances towards health, by eating more than his ſtomach will perhaps allow him to take in with eaſe; and he is led to imagine that his ſtrength will increaſe in proportion to the quantity he eats and drinks; but on this point his notions are erroneous; for the ſtomach, like all other parts impaired by ſickneſs, recovers its tone ſlowly, and is unable to aſſimilate ſuch a load of materials into chyle; ſo that the digeſtion is crude and imperfect, and the blood, as well as the other juices of the body, partaking of the vicious properties of the chyle, the recovery of health is rather retarded than promoted, and ſometimes other diſeaſes are produced. Whereas, by taking in a leſs quantity of food at a time, the ſtomach is enabled to digeſt it perfectly, and to afford that wholeſome and perfect ſupply of chyle, which will not fail to nouriſh the body and reſtore it to health. For it is worthy of obſervation, that nutrition is not derived altogether from the quantity we eat, but from the quantity we digeſt.

CHAP. XIV.

Of the courſe of the CHYLE, and of the LYMPHATIC SYSTEM.

369 Of the lacteals.

a, AN infinite number of very minute veſſels called the *lacteal veins*, ariſe like net-work from the inner ſurface of the inteſtines, but principally from the *jejunum* and *ilium*, which are deſtined to imbibe the nutritious fluid or chyle. Theſe veſſels paſs obliquely thro' the coats of the inteſtine, and, running along the meſentery, unite as they advance, and form larger branches, all which paſs through the meſenteric or conglobate glands, which are very numerous in the human ſubject. As they run between the inteſtines and theſe glands, they are ſtyled *venæ lacteæ primi generis;* but after leaving theſe glands, they are found to be leſs numerous, and being increaſed in ſize, are then called *venæ lacteæ ſecundi generis*, which go to depoſit their contents in the *thoracic duct*, thro' which the chyle is conveyed into the blood.

b, This *thoracic* duct begins about the lower part of the firſt vertebra lumborum, from whence it paſſes up by the ſide of the aorta, between that and the vena azygos cloſe to the vertebræ, being covered by the pleura. Sometimes it is found divided into two branches, but they uſually unite again into one canal, which opens into the left ſubclavian vein, after having run a little way in an oblique courſe between its coats. The ſubclavian vein communicates with the vena cava, which paſſes to the right auricle of the heart.

c, The lower part of this duct being uſually larger than any other part of it, has been named *receptaculum chyli*, or *Pecquet's receptacle*, in honour of the anatomiſt who firſt diſcovered it in 1651. In ſome quadrupeds, in turtle, and in fiſh, this enlargement is more conſiderable in proportion to the ſize of the duct, than it uſually is in the human ſubject, where it is not commonly found large enough to merit the name of *receptaculum.*

d, The opportunities of obſerving the lacteals in the human ſubject, do not often occur; but they may eaſily be demonſtrated in a dog or any other quadruped that is killed two or three hours after feeding upon milk, for then they appear filled with white chyle.

e, But theſe *lacteals* which we have deſcribed as paſſing from the inteſtines through the meſentery to the thoracic duct, compoſe only a part of a ſyſtem of veſſels which perform the office of *abſorption*, and which conſtitute with their common trunk the thoracic duct, and the conglobate glands which are diſperſed through the body, what may be ſtyled the *lymphatic ſyſtem.* So that what is ſaid of the ſtructure of one of theſe ſeries of veſſels, may very properly be applied to that of the other.

370 Of the lymphatic veſſels.

a, The *lymphatic veins* (x) are minute pellucid tubes, which, like the lacteals, direct their courſe towards the centre of the body, where they pour a colourleſs fluid into the thoracic duct. The lymphatics from all the lower parts of the body, gradually unite as they approach this duct, into which they enter by three or four very large trunks, which ſeem to form the lower extremity of this canal, or *receptaculum chyli.* The lacteals open into it near the ſame place, and the lymphatics from all the upper parts of the body, pour their lymph into different parts of this duct as it runs upwards to terminate in the left ſubclavian vein.

b, As the lymphatics commonly lie cloſe to the large blood veſſels, as a ligature paſſed round the crural artery in a living animal, by including the lymphatics, will occaſion a diſtenſion of theſe veſſels below the ligature ſo as to demonſtrate them with eaſe; and a ligature paſſed round the thoracic duct, inſtantly after killing an animal, will, by ſtopping the courſe of its contents into the ſubclavian vein, diſtend not only the lacteals, but alſo the lymphatics in the abdomen and lower extremities with their natural fluids (y).

c, The coats of theſe veſſels are too thin to be ſeparated from each other; but the mercury they are capable of ſuſtaining, proves them to be very ſtrong; and their great power to contract after undergoing conſiderable diſtenſion, together with the irritability with which Baron Haller found them to be endued, ſeems to render it probable, that, like the blood-veſſels, they have a muſcular coat.

d, The lymphatics are nouriſhed after the ſame manner as all the other parts of the body. For even the moſt minute of theſe veſſels are probably ſupplied with ſtill more minute arteries and veins. This ſeems to be proved by the inflammation of which they are ſuſceptible; and the painful ſwellings which ſometimes take place in lymphatic veſſels, prove that they have nerves as well as blood veſſels.

e, Both the lacteals, lymphatics, and thoracic duct, are furniſhed with valves which are much more common in theſe veſſels than in the red veins. Theſe valves are uſually in pairs, and ſerve to promote the courſe of the chyle and lymph towards the thoracic duct, and to prevent its return. Mention has been made of the glands, through which the lacteals paſs in their courſe thro' the meſentery; and it is to be obſerved, that the lymphatics paſs through ſimilar glands in their way to the thoracic duct. Theſe glands are all of the conglobate kind, but the changes which the chyle and lymph undergo in their paſſage through them have not yet been aſcertained.

f, The *lymphatic veſſels* begin from ſurfaces and cavities in all parts of the body as *abſorbents* (z). This is a fact now univerſally allowed; but how the fluids they abſorb are poured into thoſe cavities, is a ſubject of controverſy among the anatomiſts of theſe times. The contents of the abdomen, for inſtance, were deſcribed as being conſtantly moiſtened by a very thin watery fluid. The ſame event takes place in the pericardium, pleura, and all the other cavities of the body, and this watery fluid is the *lymph.* But whether it is exhaled into thoſe cavities through the minute ends of arteries, or tranſuded through their coats, are the points in diſpute. We cannot here be permitted to relate the many ingenious arguments that have been advanced in favour of each of theſe opinions; nor is it perhaps of conſequence to our preſent purpoſe, to enter into the diſpute. It will be ſufficient if the reader can form an idea of what the lymph is, and of the manner in which it is abſorbed.

g, The *lymph*, from its tranſparency and want of colour, would ſeem to be nothing but water; and hence the firſt diſcoverers of theſe veſſels ſtyled them *ductus aquoſi;* but experiments prove that the lymph of an healthy animal coagulates by being expoſed to the air, or a certain degree of heat, and likewiſe by being ſuffered to reſt; ſeeming to agree in this property with that part of the blood called the *coagulable lymph*. This property of the lymph leads to determine its uſe in moiſtening and lubricating the ſeveral cavities of the body, in which it is found; and for which, by its gelatinous principle, it ſeems to be much better calculated than a pure watery fluid would be, for ſuch it has been ſuppoſed to be by ſome anatomiſts.

(x) The arteries in their courſe through the body becoming gradually too minute to admit the red globules of the blood, have then been ſtyled *capillary* or *lymphatic arteries.* The veſſels which are here deſcribed as conſtituting the lymphatic ſyſtem, were at firſt ſuppoſed to be continued from thoſe arteries, and intended to convey back the lymph either into the red veins or the thoracic duct, the office of abſorption having been attributed to the *red veins.* But ſucceeding anatomiſts have clearly demonſtrated, that the *lymphatic veins* are not continuations of the *lymphatic arteries*, but that they conſtitute the *abſorbent ſyſtem.* There are ſtill however ſome very reſpectable names among the anatomiſts of the preſent age, who contend, that the red veins act likewiſe as abſorbents; but it ſeems to have been clearly proved, that the red veins do abſorb no where but in the cavernous cells of the penis, the erection of which is occaſioned by a diſtenſion of thoſe cells with arterial blood.

(y) In the dead body they may be eaſily demonſtrated by opening the artery ramifying through the viſcus, as in the ſpleen for inſtance, and then throwing in air; by which the lymphatics will be diſtended. One of them may then be punctured, and mercury introduced into it through a blow pipe.

(z) Lymphatics have never yet been diſcovered in the brain; though it would ſeem probable from analogy, that this organ is not deſtitute of them.

h, The mouths of the *lymphatics* and *lacteals*, by acting as capillary tubes, ſeem to abſorb the *lymph* and *chyle*, in the ſame manner as a capillary tube of glaſs, when put into a baſon of water, will be enabled to attract the water into it to a certain height. In the opinion of moſt natural philoſophers, the *lymph* or the *chyle* is conveyed upon this principle, as far as the firſt pair of valves, which ſeem to be placed not far from the orifice of the abſorbing veſſel, whether *lymphatic* or *lacteal;* and the fluid will then be propelled forwards by a continuation of the abſorption at the orifice. But this does not ſeem to be the only inducement to its progreſs towards the thoracic duct; theſe veſſels have probably a muſcular coat, which may ſerve to preſs the fluid forwards from one pair of valves to another; and as the large lymphatic veſſels and the thoracic duct are placed cloſe to the large arteries, which have a conſiderable pulſation, it is reaſonable to ſuppoſe that they derive ſome advantages from this ſituation.

CHAP. XV.

Of the GENERATIVE ORGANS.

371 The male organs.

a, THE *male organs of generation* have been uſually divided into the parts which ſerve to prepare the ſemen from the blood, and thoſe which are deſtined to convey it into the womb. But it ſeems to be more proper to diſtinguiſh them into the *preparing*, the *containing*, and the *expelling* parts, which are the different offices of the *teſtes*, the *veſiculæ ſeminales*, and the *penis;* and this is the order in which we propoſe to deſcribe them.

b, The teſtes are two glandular bodies ſerving to ſecrete the ſemen from the blood. They are originally formed and lodged within the cavity of the abdomen, and it is not till after the child is born, or very near that time, that they begin to paſs into the groin, and from thence into the ſcrotum. By this diſpoſition they are very wiſely protected from the injuries to which they would be liable to be expoſed, from the different poſtures and diſpoſitions of the child at the time of parturition.

c, The teſticles in this ſtate are looſely attached to the *pſoæ muſcles* by means of the peritonæum by which they are covered; and they are at this time of life connected in a very particular manner to the parietes of the abdomen, and likewiſe to the ſcrotum, by means of a ſubſtance which Mr Hunter calls the *ligament*, or *gubernaculum teſtis;* becauſe it connects the teſtis with the ſcrotum; and directs its courſe in its deſcent; this *gubernaculum* he deſcribes, as being of a pyramidal form, with its bulbous head fixed to the lower end of the *teſtis* and *epididymis*, and as loſing its lower and ſlender extremity in the cellular membrane of the ſcrotum. Mr Hunter ſays, it is difficult to aſcertain what the ſtructure and compoſition of this gubernaculum is; but he thinks it is certainly vaſcular and fibrous; and from certain circumſtances is led to ſuſpect, that it is in part compoſed of the cremaſter muſcle running upwards to join the lower end of the teſtis.

d, We are not to ſuppoſe that the teſticle when deſcended into the ſcrotum, is to be ſeen looſe as a piece of gut or omentum would be in a common hernial ſac. We have already obſerved, that during its reſidence in the cavity of the abdomen, it is attached to the peritonæum, which deſcends with it; ſo that when the ſac is completed in the ſcrotum, the teſticle is at firſt attached only to the *poſterior* part of it, while the *fore* part lies looſe, and for ſome time affords a communication with the abdomen. The *ſpermatic chord*, which is made up of the *ſpermatic artery* and *vein*, and of the *vas deferens* or *excretory duct of the teſtis*, is cloſely attached behind to the poſterior part of this elongation of the peritonæum. But the *fore* part of the peritonæal ſac, which is at firſt looſe, and not attached to the teſticle, cloſes after a certain time, and becomes united to the *poſterior* part, and thus perfectly ſurrounds the teſticle as it were in a purſe.

e, The teſticles of the fœtus differ only in their ſize and ſituation from thoſe of the adult; in their paſſage from the abdomen they deſcend through the abdominal rings into the ſcrotum, where they are ſupported and defended by various integuments.

f, What the immediate cauſe of this deſcent is, has not yet been ſatisfactorily determined. It has been aſcribed to the effects of reſpiration, but the teſticles have ſometimes been found in the ſcrotum before the child has breathed; and it does not ſeem to be occaſioned by the action of the cremaſter muſcle, becauſe the ſame effect would be liable to happen in the hedgehog, and ſome other quadrupeds, whoſe teſticles remain in the abdomen during life.

g, The *ſcrotum*, which is the external or common covering of both teſticles, is a kind of ſac formed by the common integuments; and externally divided into two equal parts by a prominent line, called *raphe*.

h, In the inner part of the ſcrotum we meet with a cellular coat called *dartos*, which by its duplicature, divides the ſcrotum into two equal parts, and forms what is called *ſeptum ſcroti*, which correſponds with the raphe. The collapſion which is ſo often obſerved to take place in the ſcrotum of the healthy ſubject, when excited by cold or by the ſtimulus of venery, is by ſome attributed to the contractile motion of the ſkin, and not to any muſcular fibres, as is the caſe in dogs and ſome other quadrupeds.

i, The ſcrotum then, by means of its ſeptum, is found to make two diſtinct bags in which the teſticles, inveſted by their proper tunics, are ſecurely lodged and ſeparated from each other. Theſe coats are the *cremaſter*, the *tunica vaginalis*, and the *tunica albuginea*. The firſt of theſe is compoſed of muſcular fibres, and is to be conſidered only as a partial covering of the teſtis; for it ſurrounds only the ſpermatic chord, and terminates upon the upper and external parts of the tunica vaginalis teſtis; ſerving to draw up and ſuſpend the teſticle. The *tunica vaginalis teſtis* has already been deſcribed, as being originally a thin production of the peritonæum, looſely adhering every where to the teſticle, which it includes as it were in a bag. The *tunica albuginea*, is a firm, white, and very compact membrane, of a gliſtening appearance; which immediately inveſts the body of the teſtis and the epididymis; ſerving in ſome meaſure to connect them to each other, but without extending itſelf at all to the ſpermatic chord. This tunica albuginea ſerves to confine the growth of the teſtis and epididymis within certain limits, and by giving them a due degree of firmneſs, enables them to perform their proper functions.

k, Having removed this laſt tunic, we diſcover the ſubſtance of the teſticle itſelf, which appears to be made up of an infinite number of very elaſtic filaments, which may be beſt diſtinguiſhed after macerating the teſticle in water. Each teſticle is made up of the ſpermatic artery and vein, and the excretory veſſels or tubuli ſeminiferi. There are likewiſe a great number of abſorbent veſſels, and ſome branches of nerves to be met with in the teſticles.

l, The *ſpermatic arteries* ariſe one on each ſide from the aorta, generally about an inch below the emulgents. The *right ſpermatic vein* commonly paſſes into the *vena cava;* but the *left ſpermatic vein* uſually empties itſelf into the *emulgent* on that ſide; and it is ſuppoſed to take this courſe into the emulgent, that it may avoid paſſing over the aorta, which it would be obliged to do in its way to the vena cava.

m, The blood is circulated very ſlowly through the ſpermatic artery, which makes an infinite number of circumvolutions in the ſubſtance of the teſticle, where it depoſits the ſemen, which paſſes through the *tubuli ſeminiferi.* Theſe *tubuli ſeminiferi* are ſeen running in ſhort waves from the tunica albuginea to the axis of the teſticle; and are divided into diſtinct portions by certain thin membranous productions, which originate from the tunica albuginea. They at length unite, and by an infinite number of convolutions form a ſort of appendix to the teſtis, called *epididymis;* which is a vaſcular body of an oblong ſhape, ſituate upon the ſuperior part of each teſticle. Theſe tubuli of the epididymis, at length form an excretory duct, called *vas deferens;* which aſcends towards the abdominal rings, with the other parts that make up the ſpermatic chord, and then a ſeparation takes place; the nerves and blood veſſels paſſing on to their ſeveral terminations, and the *vas deferens* going to depoſit its ſemen in the *veſiculæ ſeminales,* which are two ſoft bodies of a white and convoluted appearance externally, ſituated obliquely between the rectum and the lower part of the bladder, and uniting together at their lower extremity. From theſe reſervoirs, which are plentifully ſupplied with blood-veſſels and nerves, the ſemen is occaſionally diſcharged thro' two ſhort paſſages, which open into the urethra, cloſe to a little eminence called *verumontanum.*

n, Near this eminence we meet with the *proſtate,* which is ſituated at the neck of the bladder, and is deſcribed as being of a glandular ſtructure. It is ſhaped ſomewhat like a heart with its ſmall end foremoſt, and inveſts the origin of the *urethra.* It is ſuppoſed to ſecrete a whitiſh and cream-like liquor, which is diſcharged into the urethra on each ſide of the openings of the veſiculæ ſeminales, at the ſame time, and from the ſame cauſes that the ſemen is expelled, to which it ſeems to give a white colour and conſiderable viſcidity; the ſemen we meet with in the veſiculæ ſeminales of the dead ſubject being exceedingly limpid.

o, The *penis* which is to be conſidered as the vehicle, or active organ of procreation; is compoſed of two columns, the *corpora cavernoſa,* and *corpus ſpongioſum.* The *corpora cavernoſa,* which conſtitute the greateſt part of the penis, may be deſcribed as two cylindrical, ligamentous tubes, each of which is compoſed of an infinite number of minute cells of a ſpongy texture, which communicate with each other. Theſe two bodies are of a very pliant texture, and capable of conſiderable diſtention; and being united laterally to each other, occaſion by this union, a ſpace above, and another below. The uppermoſt of theſe ſpaces is filled by the blood-veſſels, and the lower one which is larger than the other by the urethra. Theſe two cavernous bodies are at firſt only ſeparated by a partition of tendinous fibres, which allow them to communicate with each other; but they afterwards divaricate from each other like the branches of the letter Y, and diminiſhing gradually in ſize, are attached, one on each ſide, by means of the *ligamentum ſuſpenſorium penis,* to the *ramus iſchii,* and to the inferior portion of the os pubis.

p, The *corpus ſpongioſum penis* or *corpus ſpongioſum urethræ,* as it is ſtyled by ſome authors, begins as ſoon as the urethra has paſſed the *proſtate,* with a thick origin almoſt like a heart, firſt under the urethra, and afterwards above it, becoming gradually thinner; and ſurrounding the whole canal of the urethra, till it terminates in a conſiderable expanſion, and conſtitutes what is called the *glans penis,* which is exceedingly vaſcular, and covered with papillæ like the tongue. The cuticle which lines the inner ſurface of the urethra, is continued over the *glans* in the ſame manner as it is ſpread over the lips.

q, The penis is inveſted by the common integuments, but the cutis is reflected back every where from the glans as it is in the eye lids, ſo that it covers this part when the penis is in a relaxed ſtate as it were with a hood, and from this uſe is called *prepuce.*

r, The *prepuce* is tied down to the under part of the *glans* by a ſmall ligament called *frænum,* which is in fact only a continuation of the cuticle and cutis. There are many ſimple ſebaceous follicles called *glandulæ odoriferæ,* placed round the baſis of the *glans;* and the fluid they ſecrete ſerves to preſerve the exquiſite ſenſibility of this part of the penis, and to prevent the ill effects of attrition from the prepuce.

ſ, The *urethra* may be defined to be a membraneous canal paſſing from the bladder through the whole extent of the penis. Several very ſmall openings called *lacunæ,* communicate with this canal, through which a mucus is ſuppoſed to be diſcharged into it; and beſides theſe, there are other glands firſt deſcribed by Cowper, as ſecreting a fluid for lubricating the urethra, and called *Cowper's glands;* and M. Littre ſpeaks of a gland ſituated near the proſtate, as being deſtined for the ſame uſe.

t, The urethra being continued from the neck of the bladder, is to be conſidered as making part of the urinary paſſage; and it likewiſe affords a conveyance to the ſemen, which we have obſerved is occaſionally diſcharged into it from the veſiculæ ſeminales. The direction of this canal being firſt under, and then before the pubis, occaſions a winding in its courſe from the bladder to the penis, not unlike the turns of the letter S.

u, The penis has three pair of muſcles, the *erectores, acceleratores,* and *tranſverſales.* The firſt originate from the tuberoſity of the iſchium, and terminate in the corpora

pora cavernoſa. The *acceleratores* ariſe from the ſphincter, and by their inſertion ſerve to compreſs the bulbous part of the urethra; and the *tranſverſales* are deſtined to afford a paſſage to the ſemen, by dilating the canal of the urethra.

v, The arteries of the penis are chiefly derived from the internal iliacs. Some of them are ſuppoſed to terminate by pabulous orifices within the corpora cavernoſa, and corpus ſpongioſum; and others terminate in veins, which at laſt make up the *vena magna dorſi penis*, and other ſmaller veins which are in general diſtributed in like order with the arteries.

w, Its nerves are large and numerous; they ariſe from the great ſciatic nerve, and accompany the arteries in their courſe through the penis.

x, We have now deſcribed the anatomy of this organ, and there only remains to be explained, how it is enabled to attain that degree of firmneſs and diſtention which is eſſential to the great work of generation.

y, The greateſt part of the penis has been ſpoken of, as being of a ſpongy and cellular texture plentifully ſupplied with blood veſſels and nerves; and as having muſcles to move it in different directions: now, the blood is conſtantly paſſing into its cells through the ſmall branches of the arteries which open into them, and is from thence as conſtantly abſorbed by the pabulous orifices of ſome of its veins, ſo long as the corpora cavernoſa and corpus ſpongioſum continue to be in a relaxed and pliant ſtate. But when from any nervous influence or other means, which it is not neceſſary here to define or explain, the erectores or other muſcles of the penis, are induced to contract; the veins undergo a certain degree of compreſſion, and the paſſage of the blood through them is ſo much impeded that it collects in them a greater proportion than they are enabled to carry off: ſo that the penis gradually enlarges, and being more and more forcibly drawn up againſt the os pubis, the vena magna itſelf is at length compreſſed, and the penis becomes fully diſtended. But as the cauſes which firſt occaſioned this diſtention ſubſide, the penis gradually returns to its ſtate of relaxation.

372 Female organs.

a, Anatomical writers uſually divide the female organs of generation into *external* and *internal*. In the firſt diviſion they include the *mons veneris*, *labia pudendi*, *perinæum*, *clitoris*, *nymphæ*, and *carunculæ myrtiformes*; and in the latter, the *vagina*, with the *uterus* and its appendages.

b, The *mons veneris* which is placed on the upper part of the ſymphyſis pubis, is internally compoſed of adipoſe membrane which makes it ſoft and prominent: it divides into two parts called *labia pudendi*, which deſcending towards the rectum, from which they are divided by the perinæum, form what is called the *fourchette*. The perinæum is that fleſhy ſpace which extends about an inch and a half from the *fourchette* to the anus, and from thence about two inches to the coccyx.

c, The labia pudendi being ſeparated, we obſerve a ſulcus called *foſſa magna*; in the upper part of which is placed the clitoris, a ſmall round ſpongy body, in ſome meaſure reſembling the male penis, but impervious, compoſed of two *corpora cavernoſa* ariſing from the tuberoſities of the oſſa iſchii; furniſhed with two pair of muſcles, the *erectores clitoridis*, and the *ſphincter vaginæ* (A); and terminating in a *glans* which is covered with its prepuce. From the lower part, on each ſide of the foſſa, paſs the *nymphæ*, two membranous and ſpongy folds which ſeem deſtined for uſeful purpoſes in parturition, by tending to enlarge the volume of the vagina as the child's head paſſes through it. Between theſe, about the middle of the foſſa magna, we perceive the orifice of the *vagina* or *os externum*, cloſed by folds and wrinkles; and about half an inch above this, and about an inch below the clitoris, appears the *meatus urinarius* or orifice of the *urethra*, much ſhorter, tho' ſomewhat larger than in men, with a little prominence at its lower edge, which facilitates the introduction of the catheter.

d, In children the orifice of the vagina is found partly cloſed by a thin membrane called *hymen*; the form of which is different in different ſubjects, being in ſome ſhaped like a creſcent, and in others of a circular form. In general, it is ſufficiently open to admit the paſſage of the menſes if it exiſts at the time of their appearance; but inſtances are related of its having been found perfectly cloſed, in which caſe it is to be divided longitudinally. When this membrane is ruptured by the venereal congreſs or any other cauſes, it recedes and forms (it is thought) the *carunculæ myrtiformes*, which are ſometimes totally effaced in women who have had many children.

e, The *vagina*, ſituated between the urethra and the rectum, is compoſed of two membranes, one of which is muſcular and the other a continuation of that which covers the foſſa magna, ſurrounded with a ſpongy cellular ſubſtance. It terminates in the uterus about half an inch above the os tincæ, and is wider and ſhorter in women who have had children than in virgins.

f, All theſe parts are plentifully ſupplied with blood-veſſels, and nerves. Around the nymphæ, there are ſebaceous follicles which pour out a fluid to lubricate the inner ſurface of the vagina; and the meatus urinarius, like the urethra in the male ſubject, is conſtantly moiſtened by a ſecreted mucus, which defends it againſt the acrimony of the urine.

g, The *uterus* is a hollow viſcus, ſituated in the hypogaſtric region between the rectum and the bladder. It is deſtined to receive the firſt rudiments of the fœtus, and to aſſiſt in the the developement of all its parts till it arrives at a ſtate of perfection and is fitted to enter into the world, at the time appointed by the wiſe author of nature.

h, The uterus in its unimpregnated ſtate, reſembles in ſhape a pear, ſomewhat flattened; with its *fundus* or bottom-part turned towards the abdomen, and its *cervix* or *neck* ſurrounded by the vagina. The entrance into its cavity forms a little protuberance, which has been compared to the mouth of a tench, and is called *os tincæ*.

i, The ſubſtance of the uterus, which is of a conſiderable thickneſs, appears to be compoſed of many glands interwoven with ſmall ligamentous fibres, ſmall branches of nerves, ſome lymphatics, and with arteries and

(A) Although in conformity to the generality of writers, the clitoris is here deſcribed as having two pair of muſcles, the *erectores* alone ſeem ſtrictly to belong to it: the ſphincter vaginæ having no connection with the clitoris.

and veins innumerable. Its nerves are chiefly derived from the intercoſtal, and its arteries and veins from the hypogaſtric and hemorrhoidal. The membrane which lines its cervix, is a continuation of the inner membrane of the vagina; but the outer ſurface of the body of the uterus is covered with the peritonæum, which is reflected over it, and deſcends from thence to the inteſtinum rectum. This duplicature of the peritonæum, by paſſing off from the ſides of the uterus to the ſides of the pelvis, is there firmly connected, and forms what are called *ligamenta uteri lata;* which ſerve not only to ſupport the uterus, but to convey nerves and blood-veſſels to it.

k, The *ligamenta uteri rotunda* ariſe from the ſides of the fundus uteri, and paſſing along within the fore-part of the ligamenta lata, deſcend through the abdominal rings, and terminate in the ſubſtance of the mons veneris. The ſubſtance of theſe ligaments is vaſcular: and although both they and the ligamenta lata admit the uterus, in the virgin ſtate, to move only about an inch up and down; yet in the courſe of pregnancy they admit of conſiderable diſtenſion, and after parturition return nearly to their original ſtate with ſurpriſing quickneſs.

l, On each ſide of the inner ſurface of the uterus, in the angle near the fundus, a ſmall orifice is to be diſcovered, which is the beginning of one of the *tubæ fallopianæ*. Each of theſe tubes, which are two in number, paſſing through the ſubſtance of the uterus, is extended along the broad ligaments, till it reaches the edge of the pelvis, from whence it reflects back; and turning over behind the ligaments, about an inch of its extremity is ſeen hanging looſe in the pelvis, near the ovarium. Theſe extremities having a jagged appearance, are called *fimbriæ* or *morſus diaboli*. Each tuba fallopiana is uſually about three inches long. Their cavities are at firſt very ſmall, but become gradually larger, like a trumpet, as they approach the fimbriæ.

m, Near the fimbriæ of each tuba fallopiana, about an inch from the uterus, is ſituated an oval body called *ovarium*, of about half the ſize of the male teſticle. Each of theſe *ovaria* is covered by a production of the peritonæum, and hangs looſe in the pelvis. They are of a flat and angular form; and appear to be compoſed of a white and cellullar ſubſtance, in which we are able to diſcover ſeveral minute veſicles filled with a coagulable lymph, of an uncertain number, but not often exceeding twelve in each ovary. In the female of riper years, theſe veſicles become exceedingly turgid; and a kind of yellow coagulum is gradually formed within one of them, which increaſes till its coat diſappears; and it then changes into an hemiſpherical body, called *corpus luteum*, which reſembles a bunch of currants, and is deſcribed as being hollow, and containing within its cavity the very minute membranes or eggs, each of which may become the ſeat of a fœtus. In conception *, one of theſe mature ova is ſuppoſed to be impregnated with the male ſemen, and to be ſqueezed out of its nidus into the fallopian tube; and Baron Haller obſerves, that the number of ſcars or fiſſures in the ovarium conſtantly correſponds with the number of fœtuſes excluded by the mother.

* See *Conception* and *Generation*.

PART V. OF THE THORAX.

73. [375.] f the cheſt.

a, THE *thorax*, or cheſt, is that cavity of the trunk which extends from the clavicles, or lower part of the neck, to the diaphragm; and includes the vital organs, which are the heart and lungs; and likewiſe the trachea and œſophagus. This cavity is formed by the ribs and vertebræ of the back, covered by a great number of muſcles, and by the common integuments, and anteriorly by two glandular bodies called the *breaſts*. The ſpaces between the ribs are filled up by muſcular fibres, which from their ſituation are called *intercoſtal muſcles*.

CHAP. I.

Of the BREASTS (B).

376

a, THE *breaſts* may be defined to be two large conglomerate glands mixed with a good deal of adipoſe membrane. The glandular part is compoſed of an infinite number of minute arteries, veins, and nerves.

b, The arteries are derived from two different trunks; one of which is called the *internal*, and the other the *external, mammary artery*. The firſt of theſe ariſes from the ſubclavian, and the latter from the axillary.

c, The veins every where accompany the arteries, and are diſtinguiſhed by the ſame name. The nerves are chiefly from the vertebral pairs. Like all other conglomerate glands, the breaſts are made up of a great many ſmall diſtinct glands, in which the milk is ſecreted from the ultimate branches of arteries. The excretory ducts of theſe ſeveral glands, gradually uniting as they approach the nipple, form the *tubuli lactiferi*, which are uſually about ſeven or eight in number, and open at its apex. Theſe ducts, in their courſe from the glands, are ſurrounded by a ligamentary elaſtic ſubſtance, which terminates with them in the nipple. Both this ſubſtance, and the ducts which it contains, are capable of conſiderable extenſion and contraction; but in their natural ſtate are moderately corrugated, ſo as to prevent an involuntary flow of milk, unleſs the diſtending force be very great, from the accumulation of too great a quantity.

d, The whole ſubſtance of the nipple is very ſpongy and elaſtic; its external ſurface is uneven, and full of ſmall tubercles. The nipple is ſurrounded with a diſk or circle of a different colour, called the *areola;* and on the inſide of the ſkin, under the areola, are many ſebaceous glands, which pour out a mucus to defend the areola and nipple; for the ſkin upon theſe parts is very thin, and the nervous papillæ lying very bare are much expoſed to irritation.

e, The breaſts are formed for the ſecretion of milk, which is deſtined for the nouriſhment of the child for ſome time after its birth. This ſecretion begins to take place ſoon after delivery, and continues to flow for many

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(B) What is here ſaid is to be conſidered as being applicable only to the female breaſts, thoſe of the male ſubject not ſeeming to need a particular deſcription.

many months in very large quantities, if the woman ſuckles her child.

f, The operation of ſuction depends on the principles of the air-pump, and the flow of milk through the lactiferous tubes is facilitated by their being ſtretched out.

g, The milk, in its properties, ſeems to reſemble the chyle. It appears to be compoſed of oil, mucilage, and water, with a conſiderable quantity of ſugar; and, like the chyle, frequently retains the nature of the aliments and medicines taken into the ſtomach.

CHAP. II.

Of the PLEURA.

377 a, The cavity of the thorax is every where lined by a membrane of a firm texture, called *pleura*. It is compoſed of two diſtinct portions or bags, which, by being applied to each other laterally, form a ſeptum called *mediaſtinum;* which divides the cavity into two parts; and is attached to the vertebræ of the back behind, and before to the ſternum. But the two laminæ of which this ſeptum is formed, do not every where adhere to each other: for at the lower part of the thorax they are ſeparated, to afford a lodgement to the heart; and at the upper part of the cavity they receive between them the thymus.

b, The pleura is plentifully ſupplied with arteries and veins from the intercoſtals; and its nerves are derived from the vertebral pairs. This membrane is exceedingly ſenſible; and it is to this ſenſibility we owe the painful ſtitch we ſometimes feel in the ſide, and which, when in a certain degree, conſtitutes a very acute diſeaſe, called the *pleuriſy*, which is occaſioned by an inflammation of this membrane.

c, The inner ſurface of the pleura is ſmooth; and, like all the other cavities, is conſtantly moiſtened by the lymph (c).

d, The mediaſtinum (d), by dividing the breaſt into two cavities, obviates many inconveniences to which we ſhould otherwiſe be liable. It prevents the two lobes of the lungs from compreſſing each other when we lie on one ſide; and conſequently contributes to the freedom of reſpiration, which is diſturbed by the leaſt preſſure on the lungs. If the point of a ſword penetrates between the ribs into the cavity of the thorax, the lungs on that ſide ceaſe to perform their office; becauſe the air being admitted through the wound, prevents the dilatation of that lobe; while the other lobe, which is ſeparated from it by the mediaſtinum, remains unhurt, and continues to perform its function as uſual.

CHAP. III.

Of the THYMUS.

378 a, The *thymus* is a glandular ſubſtance, the uſe of which is not yet perfectly aſcertained. It is of an oblong figure; and is larger in the fœtus and in young children than in adults, being ſometimes nearly effaced in very old ſubjects. It is placed in the upper part of the thorax, between the two laminæ of the mediaſtinum; but at firſt is not altogether contained within the cavity of the cheſt, being found to border upon the upper extremity of the ſternum.

CHAP. IV.

Of the DIAPHRAGM.

379 a, The cavity of the thorax is ſeparated from that of the abdomen, by a fleſhy and membranous ſeptum called the *diaphragm* or *midriff*. The greateſt part of it is compoſed of muſcular fibres; and, on this account, ſyſtematic writers uſually place it very properly among the muſcles. Its middle part is tendinous; and it is covered by the pleura above, and by the peritonæum below. It ſeems to have been improperly named *ſeptum tranſverſum;* as it is does not make a plain tranſverſe diviſion of the two cavities, but forms a kind of vault, the fore-part of which is attached to the ſternum. Laterally it is fixed to the laſt of the true ribs, and to all the falſe ribs; and its lower and poſterior part is attached to the vertebræ lumborum, where it may be ſaid to be divided into two portions or *crura*.

b, The principle arteries of the diaphragm are derived from the aorta; and its veins paſs into the vena cava. Its nerves are chiefly derived from the cervical pairs. It affords a paſſage to the vena cava through its tendinous part, and to the œſophagus through its fleſhy portion. The aorta paſſes down behind it, between its *crura*.

c, The diaphragm not only ſerves to divide the thorax from the abdomen, but by its muſcular ſtructure is rendered one of the chief agents in reſpiration. When its fibres contract, its convex ſide, which is turned towards the thorax, becomes gradually flat, and, by increaſing the cavity of the breaſt, affords room for a complete dilatation of the lungs, by means of the air which is then drawn into them by the act of *inſpiration*. The fibres of the diaphragm then relax; and as it reſumes its former ſtate, the cavity of the thorax becomes gradually diminiſhed, and the air is driven out again from the lungs by a motion contrary to the former one, called *exſpiration*.

d, It is in ſome meaſure by means of the diaphragm that we void the fæces at the anus, and empty the urinary bladder. Beſides theſe offices, the acts of coughing, ſneezing, ſpeaking, laughing, gaping, and ſighing, could not take place without its aſſiſtance; and the gentle preſſure, which all the abdominal viſcera receive from its conſtant and regular motion, cannot fail to aſſiſt in the performance of the ſeveral functions which were aſcribed to thoſe viſcera.

CHAP. V.

Of the TRACHEA.

380 a, The *trachea*, or *windpipe*, is a cartilaginous and membranous canal, through which the air paſſes into

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(c) When this fluid is exhaled in too great a quantity, or is not properly carried off, it accumulates and conſtitutes the *hydrops pectoris*.

(d) Sometimes matter collects between the two laminæ of the mediaſtinum; and chirurgical authors, in ſuch caſes, direct to trepan the ſternum. But the diſeaſe does not ſeem often to occur; and when it does happen, cannot be diſtinguiſhed with certainty. In a patient who died of that diſorder of the breaſt named by Dr Heberden *angina pectoris*, Dr Haygarth of Cheſter, found a collection of what appeared to be pus, between theſe laminæ, which had occaſioned ſudden death by breaking into the trachea, and thus producing ſuffocation.

the lungs. Its upper part, which is called the *larynx*, is compoſed of five cartilages. The uppermoſt and ſmalleſt of theſe cartilages is placed over the *glottis* or mouth of the larynx, and is called *epiglottis;* which has been before ſpoken of, as cloſing the paſſage to the lungs in the act of ſwallowing. The ſides of the larynx are compoſed of the *arytenoide* cartilages, which are of a very complex figure, not eaſy to be deſcribed. The anterior and larger part of the larynx is made up 379 of two cartilages; one of which is called *thyroides*, or *ſcutiformis*, from its being ſhaped like a buckler; and the other *cricoides*, or *annularis*, from its reſembling a ring. Both theſe cartilages may be felt immediately under the ſkin, in the fore-part of the throat; and the *thyroides*, by its convexity, forms an eminence called *pomum adami*, which is uſually more conſiderable in the male than in the female ſubject.

b, All theſe cartilages are united to each other by means of very elaſtic, ligamentous fibres; and are enabled, by the aſſiſtance of ſeveral muſcles, to dilate or contract the paſſage of the larynx, and to perform that variety of motion which ſeems to point out the larynx as being the principal organ of the voice; for when the air paſſes out through a wound in the trachea, it produces no ſound.

c, Theſe cartilages are moiſtened by a mucus, which ſeems to be ſecreted by minute glands ſituated near them. The upper part of the trachea, and the cricoid and thyroid cartilages, are in ſome meaſure covered anteriorly by a conſiderable body, which is ſuppoſed to be of a glandular ſtructure, and from its ſituation is called the *thyroid gland;* though its excretory duct has not yet been diſcovered, or its real uſe aſcertained.

d, The inſide of the glottis is covered by a very fine membrane, which is moiſtened by a conſtant ſupply of watery lymph. From the larynx, the canal begins to take the name of *trachea*, or *aſpera arteria;* and extends from thence as far down as the fourth or fifth vertebra of the back, where it divides into two branches, which are the right and left bronchial tube. Each of theſe *bronchi* ramifies through the ſubſtance of that lobe of the lungs, to which it is diſtributed, by an infinite number of branches, which are formed of cartilages ſeparated from each other, like thoſe of the trachea, by an intervening membranous and ligamentary ſubſtance. Each of theſe cartilages is of an angular figure; and as they become gradually leſs and leſs in their diameter, the lower ones are in ſome meaſure received into thoſe above them, when the lungs, after being inflated, gradually collapſe by the air being puſhed out from them in exſpiration. As the branches of the bronchi become more minute, their cartilages become more and more angular and membranous, till at length they are found to be perfectly membranous, and at laſt become inviſible.

e, The trachea is furniſhed with fleſhy or muſcular 380 fibres, ſome of which paſs through its whole extent longitudinally, while the others are carried round it in a circular direction; ſo that, by the contraction or relaxation of theſe fibres, it is enabled to ſhorten or lengthen itſelf, and likewiſe to dilate or contract the diameter of its paſſage.

f, The trachea, and the bronchi, in all their ramifications, are furniſhed with very minute glands, which diſcharge a pellucid lymph on the inner ſurface of theſe tubes.

g, The trachea appears to be formed with infinite wiſdom for the uſes it is intended to ſerve. Its cartilages, by keeping it conſtantly open, afford a free paſſage to the air, which we are obliged to be inceſſantly reſpiring; and its membranous part, by being capable of contraction and dilatation, enables us to receive and expel the air in a greater or leſs quantity, and with more or leſs velocity, as may be required in ſinging or in declamation.

h, The generality of anatomiſts deſcribe the trachea as being ſimply membranous at its poſterior part, that it may give way to the aliment as it deſcends through the œſophagus, and not impede its paſſage; as it would be liable to do, if the trachea was cartilaginous here, as it is in the ſides and fore-part (E). But there are arguments brought to prove that this is not its uſe; and theſe are, That the œſophagus, as Mr Winſlow obſerves, does not deſcend immediately behind it, but ſomewhat laterally to the left: that the bronchi, at their upper part, are likewiſe ſimply membranous poſteriorly where the œſophagus no longer accompanies them: and that it would perhaps be dangerous if the trachea was permitted to give way to the aliment in its deſcent; as the reſpiration would be by this means impeded, and this function ſeems to be too eſſential to life to be expoſed to any ſuch interruption.

i, The trachea receives its arteries from the carotids, and its veins paſs into the jugulars; its nerves ariſe from the recurrent and from the cervical plexus.

CHAP. VI.

Of the LUNGS.

a, The lungs fill the greater part of the cavity of 381 the breaſt. They are of a ſoft and ſpongy texture; and are divided into two lobes, which are ſeparated from each other by the mediaſtinum, and are externally covered by a production of the pleura. Each of theſe is divided into two or three leſſer lobes; and we commonly find three in the right ſide of the cavity, and two in the left.

b, To diſcover the ſtructure of the lungs, it is required to follow the ramifications of the bronchi, which were deſcribed in the laſt ſection. Theſe becoming gradually more and more minute, at length terminate in the cellular ſpaces or veſicles, which make up the greateſt part of the ſubſtance of the lungs, and readily communicate with each other.

c, The mucus, which was mentioned as paſſing into the bronchi, conſtitutes what we expectorate; and the moſt frequent cauſe of cough, ſeems to depend on the abundance or the tenacity of this ſecretion. Every thing we throw off by hawking or ſpitting, is derived either from the lungs, the noſtrils, or the ſalival glands; and, on the contrary, all that we bring up by vomiting comes from the ſtomach.

d, The lungs receive nerves from the intercoſtals, but chiefly

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(E) The firſt of theſe opinions appears now to be the moſt generally adopted; for although the membranous ſtructure of the trachea and bronchi may aſſiſt in ſhortening the canal, yet it ſeems likewiſe to aſſiſt in the deſcent of the food.

chiefly from the eighth pair or par vagum. This laſt pair, having reached the thorax, ſends off a branch on each ſide of the trachea, called the *recurrent;* which re-aſcend, and go to diſtribute themſelves to the larynx and its muſcles, and likewiſe to the œſophagus.

e, There are two ſeries of arteries which carry blood to the lungs: theſe are the *arteriæ bronchiales Ruyſchii*, and the pulmonary artery.

f, The *arteriæ bronchiales* begin uſually by two branches; one of which commonly ariſes from the intercoſtal, and the other from the trunk of the aorta: but ſometimes there are three of theſe arteries, and in ſome ſubjects only one. The uſe of theſe arteries is to ſerve for the nouriſhment of the lungs, and their ramifications are ſeen creeping every where on the branches of the bronchi. The blood is brought back from them by the bronchial vein into the vena azygos.

g, The pulmonary artery and vein are not intended for the nouriſhment of the lungs; but the blood in its paſſage through them is deſtined to undergo ſome changes, or to acquire certain eſſential properties (probably from the action of the air), which it has loſt in its circulation through the other parts of the body. The pulmonary artery receives the blood from the right ventricle of the heart; and dividing into two branches, accompanies the bronchi every where, by its ramifications through the lungs; and the blood is afterwards conveyed back by the pulmonary vein, which gradually forming a conſiderable trunk, goes to empty itſelf into the left ventricle of the heart; ſo that the quantity of blood which enters into the lungs, is perhaps greater than that which is ſent in the ſame proportion of time, through all the other parts of the body.

CHAP. X.

Of the PERICARDIUM, and of the HEART and its AURICLES.

382, [385.] Pericardium.

a, THE two membranous bags of the pleura, which were deſcribed as forming the mediaſtinum, recede one from the other, ſo as to form a complete ſac, in which the heart is ſecurely lodged; and this ſac is the *pericardium* (G), which appears to be compoſed of two tunics, united to each other by cellular membrane: the outer coat is a production of the mediaſtinum; and the inner tunic appears to adhere to the great veſſels of the heart, on which it gradually diſappears.

b, This bag is attached to the tendinous part of the diaphragm, and contains a coagulable lymph, the *liquor pericardii*, which ſerves to lubricate the heart and facilitate its motions, and is probably ſecreted and abſorbed in the ſame manner as it is in the other cavities of the body.

c, The arteries of the pericardium are derived from the phrenic, and its veins paſs into veins of the ſame name; its nerves are likewiſe branches of the phrenic.

d, The ſize of the pericardium is adapted to that of the heart, being uſually large enough to contain it looſely. As its cavity does not extend to the ſternum, the lungs cover it in inſpiration; and as it every where inveſts the heart, it effectually ſecures it from being injured by lymph, pus, or any other fluid, extravaſated into the cavities of the thorax.

386 Heart, and its auricles.

a, The heart is a hollow muſcle of a conical ſhape, ſituated tranſverſely between the two laminæ of the mediaſtinum, at the lower part of the thorax; having its *baſis* turned towards the right ſide, and its point or *apex* towards the left. Its lower ſurface is ſomewhat flattened where it is attached to the diaphragm. Its baſis, from which the great veſſels originate, is covered with fat; and has two hollow and fleſhy appendages, called the *auricles*. Round theſe ſeveral openings, the heart ſeems to be of a firm, ligamentous texture, from which all its fibres ſeem to originate; and as they advance from thence towards the apex, the ſubſtance of the heart ſeems to become thinner.

b, The heart includes two cavities, or *ventricles*, which are ſeparated from each other by a fleſhy ſeptum: one of theſe is called the *right*, and the other the *left ventricle*; though perhaps with reſpect to their ſituation, it would be more proper to diſtinguiſh them into the *anterior* and *poſterior ventricles*.

c, The outſide of the heart is covered by a very fine membrane; and its ſtructure is perfectly muſcular or fleſhy, being compoſed of fibres which are deſcribed as paſſing in different directions; ſome as being extended longitudinally from the baſis to the apex; others, as taking an oblique or ſpiral courſe; and a third ſort, as being placed in a tranſverſe direction. Within the two ventricles we obſerve ſeveral furrows, and there are likewiſe tendinous ſtrings, which ariſe from fleſhy *columnæ* in the two cavities, and are attached to the valves of auricles. That the uſe of theſe and of the other valves of the heart may be underſtood, it muſt be obſerved, that four large veſſels paſs out from the baſis of the heart, *viz.* two arteries and two veins; and that each of theſe veſſels is furniſhed with a thin membranous production, which is attached all round to the borders of their ſeveral orifices, from whence hanging looſely down, they appear to be divided into two or three diſtinct portions. But as their uſes in the arteries and veins are different, ſo are they differently diſpoſed. Thoſe of the arteries are intended to give way to the paſſage of the blood into them from the ventricles, but to oppoſe its return: and on the contrary, the valves of the veins are conſtructed ſo as to allow the blood only to paſs into the heart. In conſequence of theſe different uſes, we find the valves of the pulmonary artery and of the aorta attached to the orifices of thoſe veſſels, ſo as to have their concave ſurfaces turned towards the artery; and their convex ſurfaces, which mutually meet together, being placed towards the ventricle, only permit the blood to paſs one way, which is into the arteries. There are uſually three of theſe valves belonging to the pulmonary artery, and as many to the aorta, and from their figure they are called *valvulæ ſemilunares*. The communication between the two great veins and the ventricles, is by means of the two appendages or auricles into which the blood is diſcharged; ſo that the other valves, which may be ſaid to belong to the veins, are placed in each ventricle, where the auricle opens into it. The valves in-

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(F) The pericardium, though placed between the two laminæ of the mediaſtinum, appears to be a diſtinct bag, very different in its ſtructure from the pleura, being of a firm and ſomewhat tendinous complexion.

in the right ventricle are uſually three in number, and are named *valvulæ tricuſpides;* but in the left ventricle we commonly obſerve only two, and theſe are the *valvulæ mitrales*. The membranes which form theſe valves in each cavity are attached ſo as to project ſomewhat forward; and both the *tricuſpides* and the *mitrales* are connected with the tendinous ſtrings which were deſcribed as ariſing from the fleſhy *columnæ*. By the contraction of either ventricle, the blood is driven into the artery which communicates with that ventricle; and theſe tendinous ſtrings being gradually relaxed, as the ſides of the cavity are brought nearer to each other, the valves naturally cloſe the opening into the auricle, and the blood neceſſarily directs its courſe into the then only open paſſage, which is into the artery: but after this contraction, the heart becomes relaxed; the tendinous ſtrings are again ſtretched out; and drawing the valves of the auricle downwards, the blood is poured by the veins into the ventricle; from whence, by another contraction, it is again thrown into the artery, as will be deſcribed hereafter. The right ventricle is not quite ſo long, though ſomewhat larger than the left, but the latter has more ſubſtance than the other; and this ſeems to be becauſe it is intended to tranſmit the blood to the moſt diſtant parts of the body, whereas the right ventricle diſtributes it only to the lungs.

d, The heart receives its nerves from the par vagum and the intercoſtals. The arteries which ſerve for its nouriſhment are two in number, and ariſe from the aorta. They ſurround in ſome meaſure the baſis of the heart, and from this courſe are called the *coronary arteries*. From theſe arteries the blood is returned by veins of the ſame name into the auricles, and even into the ventricles.

e, The muſcular bags called the *auricles* are ſituated at the baſis of the heart, by the ſides of each other; and, correſponding with the two ventricles, are, like thoſe two cavities, diſtinguiſhed into *right* and *left*. Theſe ſacs, which are interiorly unequal, have externally a jagged appendix, which, from its having been compared to the extremity of an ear, has given them their name of *auricles*.

CHAP. XI.

Deſcription of the BLOOD-VESSELS.

387 a, THE heart has been deſcribed as contracting itſelf, and throwing the blood from its two ventricles into the pulmonary artery and the aorta; and then as relaxing itſelf, and receiving a freſh ſupply from two large veins, which are the pulmonary veins, and the vena cava. We will now point out the principal diſtributions of theſe veſſels.

b, The pulmonary artery ariſes from the right ventricle by a large trunk, which ſoon divides into two conſiderable branches, which paſs to the right and left lobes of the lungs: each of theſe branches is afterwards divided and ſubdivided into an infinite number of branches and ramifications, which extend through the whole ſubſtance of the lungs; and from theſe branches the blood is returned by the veins, which, contrary to the courſe of the arteries, begin by very minute canals, and gradually become larger, forming at length four large trunks called the *pulmonary veins*, which terminate in the *left auricle* by one common opening, from whence the blood paſſes into the *left ventricle*. From this ſame ventricle ariſes the *aorta*, or *great artery*, which at its begining is nearly an inch in diameter. It ſoon ſends off two branches, the *coronaries*, which go to be diſtributed to the heart and its auricles. After this, at or about the third or fourth vertebra of the back, it makes a conſiderable curvature. From this curvature (G) ariſe three arteries; one of which ſoon divides into two branches. The firſt two are the left ſubclavian, and the left carotid; and the third is a common trunk to the right ſubclavian and right carotid; though ſometimes both the carotids ariſe diſtinctly from the aorta.

c, The two *carotids* aſcend within the ſubclavians, along the ſides of the trachea; and when they have reached the larynx, divide into two principal branches the *internal* and *external carotid*. The firſt of theſe runs a little way backwards in a bending direction; and, having reached the under part of the ear, paſſes through the canal in the os petroſum, and entering into the cavity of the cranium is diſtributed to the brain and the membranes which envelope it. The *external carotid* divides into ſeveral branches, which are diſtributed to the larynx, pharynx, and other parts of the neck, and to the jaws, lips, tongue, eyes, temples, and all the external parts of the head.

d, Each *ſubclavian* is likewiſe divided into a great number of branches. It ſends off the *vertebral artery*, which paſſes through the openings we ſee at the bottom of the tranſverſe proceſſes of the vertebræ of the neck, and in its courſe ſends off many ramifications to the neighbouring parts. Some of its branches are diſtributed to the ſpinal marrow; and, after a conſiderable inflection, it enters into the cranium, and is diſtributed to the brain. The *ſubclavian* likewiſe ſends off branches to the muſcles of the neck and ſcapula: and the mediaſtinum, thymus, pericardium, diaphragm, the breaſts, and the muſcles of the thorax, and even of the abdomen, derive branches from the ſubclavian; which are diſtinguiſhed by different names, alluding to the parts to which they are diſtributed, as the *mammary*, the *phrenic*, the *intercoſtal*, &c. But, notwithſtanding the great number of branches which have been deſcribed as ariſing from the ſubclavian, it is ſtill a conſiderable artery when it reaches the *axilla*, where it drops its former name, which alluded to its paſſage under the clavicle, and is called the *axillary* artery; from which a variety of branches are diſtributed to the muſcles of the breaſt, ſcapula, and arm. But its main trunk taking the name of *brachialis*, runs along within ſide the arm near the os humeri, till it reaches the joint of the fore-arm, and then it divides into two branches. This diviſion, however, is different in different ſubjects; for in ſome it takes place higher up, and in others lower down. When it happens to divide above the joint, it may be conſidered as a happy diſpoſition in caſe of an accident by bleeding; for ſuppoſing the artery to be unfortunately punctured by the lancet,

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(G) Anatomiſts uſually call the upper part of this curvature, *aorta aſcendens;* and the other part of the artery to its diviſion at the iliacs, *aorta deſcendens:* but they differ about the place where this diſtinction is to be introduced; and it ſeems ſufficiently to anſwer every purpoſe, to ſpeak only of the aorta and its curvature.

lancet, and that the hemorrhage could only be ſtopt by making a ligature on the veſſel, one branch would remain unhurt, through which the blood would paſs uninterrupted to the fore arm and hand. One of the two branches of the *brachialis* plunges down under the flexor muſcles, and runs along the edge of the ulna; while the other is carried along the outer ſurface of the radius, and is eaſily felt at the wriſt, where it is only covered by the common integuments. Both theſe branches commonly unite in the palm of the hand, and form an arterial arch from whence branches are detached to the fingers.

e, The *aorta*, after having given off at its curvature the *carotids* and *ſubclavians*, which convey blood to all the upper parts of the body, deſcends upon the bodies of the vertebræ a little to the left, as far as the os ſacrum, where it drops the name of *aorta*, and divides into two conſiderable branches. In this courſe, from its curvature to its bifurcation, it ſends off ſeveral arteries, in the following order.

f, 1. Two little arteries, and ſometimes only one, firſt demonſtrated by Ruyſch as going to the bronchi, and called *arteriæ bronchiales Ruyſchii*. 2. The *inferior, intercoſtal arteries* which are diſtributed between the ribs in the ſame manner as the arteries of the three or four ſuperior ribs are, which are derived from the ſubclavian. Theſe arteries ſend off branches to the medulla ſpinalis. 3. The *phrenic*, which goes to the diaphragm, and the arteries which are diſtributed to the œſophagus. 4. The *celiac*, which ariſes from the aorta, under the diaphragm, and is diſtributed to the ſtomach, omentum, duodenum, pancreas, ſpleen, liver, and gall-bladder. 5. The *ſuperior meſenteric artery*, which is diſtributed to the meſentery and ſmall inteſtines. 6. The *emulgents*, which go to the kidneys. 7. The arteries which are diſtributed to the *glandulæ renales*. 8. The *ſpermatic*. 9. The *inferior meſenteric artery*, which ramifies through the lower portion of the meſentery and the large inteſtines. A branch of this artery which goes to the rectum is called the *internal hemorrhoidal*. 10. The lumbar arteries, and a very ſmall branch called the *ſacra*; which are diſtributed to the muſcles of the loins and abdomen, and to the os ſacrum and medulla ſpinalis.

g, The trunk of the aorta, when it has reached the laſt vertebra lumborum, or the os ſacrum, drops the name of *aorta*, and ſeparates into two forked branches, called the *iliacs*. Each of theſe ſoon divides into two branches; one of which is called the *internal iliac*, or *hypogaſtric artery*; and is diſtributed to the urinary bladder, inteſtinum rectum, and the neighbouring parts. That branch which goes to the *rectum* is called the *external hemorrhoid*. The *external iliac*, after having given off the *umbilical* artery, and the *epigaſtric*, which is diſtributed to the recti muſcles, paſſes out of the abdomen, under Poupart's ligament, and takes the name of *crural artery*. It deſcends on the inner part of the thigh cloſe to the os femoris, ſending off branches to the muſcles; and then ſinking deeper in the hind part of the thigh, reaches the ham, where it takes the name of *popliteal*. After this it ſeparates into two conſiderable branches; one of which is called the anterior tibial artery; the other divides into two branches; and theſe arteries all go to be diſtributed to the leg and foot.

h, The blood, which is thus diſtributed by the aorta to all parts of the body, is brought back by the veins, which are ſuppoſed to be continued from the ultimate branches of arteries, and, uniting together as they approach the heart, at length form two large trunks, the *vena cava aſcendens* and *vena cava deſcendens*.

i, All the veins which bring back the blood from the upper extremites, and from the head and breaſt, paſs into the *vena cava deſcendens*; thoſe which return it from the lower parts of the body, terminate in the *vena cava aſcendens*; and theſe two *cavas*, uniting together as they approach the heart, open by one common orifice into the left auricle.

k, It does not here ſeem to be neceſſary to follow the different diviſions of the veins as we did thoſe of the arteries; and it will be ſufficient to remark, that, in general, every artery is accompanied by its vein, and that both are diſtinguiſhed by the ſame name. But like many other general rules, this too has its exceptions (H). The veins, for inſtance, which accompany the external and internal *carotid*, are not called the *carotid veins*, but the *external* and *internal jugular*. In the thorax there is a vein diſtinguiſhed by a proper name, and this is the *azygos* or *vena ſine pari*. This vein, which is a pretty conſiderable one, runs along by the right ſide of the vertebræ of the back, and is chiefly deſtined to receive the blood from the intercoſtals on that ſide, and to convey it into the vena cava deſcendens. In the abdomen, we meet with a vein which is ſtill a more remarkable one; and this is the *vena porta*, which performs the office both of an artery and a vein. It is formed by a reunion of all the veins which come from the ſtomach, inteſtines, omentum, pancreas, and ſpleen, ſo as to compoſe one great trunk, which goes to ramify through the liver; and after having depoſited the bile, its ramifications unite and bring back into the *vena cava*, not only the blood which the *vena porta* had carried into the liver, but likewiſe the blood from the hepatic artery. Every artery has a vein which correſponds with it; but the trunks and branches of the veins are more numerous than thoſe of the arteries. The reaſons for this diſpoſition are perhaps not difficult to be explained. The blood, in its courſe through the veins, is much farther removed from the ſource and cauſe of its motion which are in the heart, than it was when in the arteries: ſo that its courſe is conſequently leſs rapid, and enough of it could not poſſibly be brought back to the heart, in the moment of its dilatation, to equal the quantity which is driven into the arteries from the two ventricles at the time they contract; and the equilibrium, which is ſo eſſential to the continuance of life and health, would conſequently be deſtroyed if the capacity of the veins did not exceed that of the arteries, in the ſame proportion that the rapidity of the blood's motion through the arteries exceeds that of its return through the veins.

l, A large artery ramifying through the body, and continued to the minute branches of veins, which gradually unite together to form a large trunk, may be compared to two trees united to each other at their tops; or rather as having their ramifications ſo diſpoſed, that the two trunks terminate in one common point: and if

(H) In the extremities, ſome of the deep ſeated veins, and all the ſuperficial ones, take a courſe different from that of the arteries.

if we farther ſuppoſe that both theſe trunks and their branches are hollow, and that a fluid is inceſſantly circulated through them, by entering into one of the trunks and returning through the other, we ſhall be enabled to conceive how the blood is circulated thro' the veſſels of the human body.

m, Every trunk of an artery, before it divides, is nearly cylindrical, or of equal diameter thro' its whole length, and ſo are all its branches when examined ſeparately. But every trunk ſeems to contain leſs blood than the many branches do into which that trunk ſeparates; and each of theſe branches probably contains leſs blood than the ramifications do into which it is ſubdivided: And it is the ſame with the veins; the volume of their ſeveral ramifications, when conſidered together, being found to exceed that of the great trunk which they form by their union.

n, The return of the blood through the veins to the heart is promoted by the action of the muſcles and the pulſation of the arteries. This return is likewiſe greatly aſſiſted by the *valves* which are to be met with in the veins, and which conſtitute one of the great diſtinctions between them and the arteries. Theſe valves (I), which are ſuppoſed to be formed by the inner coat of the veins, permit the blood to flow from the extremities towards the heart, but oppoſe its return.

o, Both the arteries and veins are membranous canals which are compoſed of three tunics (K); and even the moſt minute branches of both theſe ſeries of veſſels are nouriſhed by ſtill more minute arteries and veins, which are ſeen creeping over their coats, and ramifying through their whole ſubſtance, and are called *vaſa vaſorum:* they have likewiſe many minute branches of nerves.

p, The arteries are much ſtronger than the veins; and they ſeem to require this force to be enabled to reſiſt the impetus with which the blood circulates thro' them, and to impel it on towards the veins.

q, When the heart contracts, it impels the blood into the arteries, and ſenſibly diſtends them; and theſe veſſels again contract, as the heart becomes relaxed to receive more blood from the auricles. So that the cauſe of the contraction and dilatation of the *arteries*, ſeems to be eaſy to be underſtood, being greatly dependent on the motion of the heart: but, in the *veins*, where the effects of this impulſe are not ſo ſenſibly felt, the blood ſeems to flow in a conſtant and equal ſtream; and this, together with its paſſing gradually from a ſmall channel into a larger one, ſeems to be the reaſon why the *veins* have no pulſatory motion (L).

CHAP. XII.

Of the Action of the HEART, AURICLES, and ARTERIES.

a, The *heart*, at the time it contracts, drives the blood from its ventricles into the arteries; and the arteries, being thus filled and diſtended, are naturally inclined to contract, the moment the heart begins to dilate, and ceaſes to ſupply them with blood. Theſe alternate motions of contraction and dilatation of the heart and arteries are diſtinguiſhed by the names of *ſyſtole* and *diaſtole*. When the heart is in a ſtate of contraction or *ſyſtole*, the arteries are at that inſtant diſtended with blood and in their *diaſtole;* and it is in this ſtate we feel their pulſatory motion, which we call the *pulſe*. When the heart dilates, and the arteries contract, the blood is impelled onwards into the veins, thro' which it is returned back into the heart. While the heart, however, is in its *ſyſtole*, the blood cannot paſs from the veins into the ventricles; but is detained in the auricles, which are two reſervoirs formed for this uſe, till the *diaſtole* or dilatation of the heart takes place; and then the diſtended auricles contract, and drive the blood into the ventricles: ſo that the auricles have an alternate *ſyſtole* and *diaſtole*, as well as the heart. 388

b, Altho' both the ventricles of the heart contract at the ſame time, yet the blood paſſes from one to the other. In the ſame moment, for inſtance, that the left ventricle drives the blood into the aorta, the right ventricle impels it into the pulmonary artery, which is diſtributed through all the ſubſtance of the lungs. The blood is afterwards brought back into the left ventricle by the pulmonary vein, at the ſame time that the blood is returned by the cavas, into the right ventricle, from all the other parts of the body.

c, This ſeems to be the mode of action of the heart and its veſſels: but the cauſe of this action, has like all other intricate and intereſting ſubjects, been differently explained; often with much ingenuity, though perhaps not yet with ſufficient certainty to be eſtabliſhed as a phyſical truth. It is probably occaſioned by the influence of the nerves, excited in conſequence of an impreſſion made on the heart by the blood itſelf, which by its quantity and heat (M), or other properties (N), is perhaps capable of firſt exciting that motion,

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(I) The valves are moſt frequent in the ſmaller veins. As the column of blood is increaſed, they ſeem to become leſs neceſſary; and, therefore in the vena cava aſcendens we meet with only one valve, which is near its origin.

(K) There are writers who deſcribe the arteries as having five tunics; while others ſpeak only of four; and many will allow them only three, which are the *nervous*, *muſcular*, and *cuticular tunics*. The *veins* are by many writers ſuppoſed to conſiſt of the ſame number of coats as the *arteries;* but that, by being thinner, they do not eaſily admit of ſeparation. That they have no muſcular coat, however, ſeems now to be pretty generally allowed; and there are eminent anatomiſts who contend, (and ſeemingly with good reaſon), that no muſcular fibres are to be demonſtrated even in the coats of arteries.

(L) Many modern writers allow, that there is a pulſatory motion in the great veins near the heart; but it there ſeems to be occaſioned by the motion of the diaphragm, and by the regurgitation of the blood in the *cavas*.

(M) Dr Hales obſerved, that the pulſe is quicker in ſmall animals, than in large ones; and this ſeems to be, becauſe their heat is proportionably greater. The velocity of the blood's motion ſeems likewiſe to depend on the greater or leſs degree of irritability of the body through which it circulates. In people of weak habits, it is conſtantly more rapid than in robuſt ſubjects. In new-born infants, the pulſe uſually beats 120. As we approach to old age, and the irritability of the body decreaſes, it gradually becomes ſlower; and in advanced life, is found to beat only 60, 50, or 40, and ſometimes not ſo often, in a minute.

(N) Dr Harvey long ago ſuggeſted, that the blood is poſſeſſed of a living principle; and Mr J. Hunter has lately endeavoured to revive this doctrine, in ſupport of which he has adduced many ingenious arguments. The ſubject is a curious one, and deſerves to be proſecuted as an inquiry which cannot but be intereſting to phyſiologiſts.

tion, which is afterwards continued through life, independent of the will, by a regular return of blood to the auricles in a quantity proportioned to that which is thrown into the arteries.

Chap. XIII.

Of the Circulation.

389 a, After what has been obſerved of the ſtructure and action of the heart and its auricles, and likewiſe of the arteries and veins; there ſeem to be but very few arguments required to demonſtrate the *circulation of the blood*, which has been long ſince eſtabliſhed as a medical truth. This circulation may be defined to be a perpetual motion of the blood, in conſequence of the action of the heart and arteries, which impel it thro' all the parts of the body, from whence it is brought back by the veins to the heart (o).

b, A very ſatisfactory proof of this circulation, and a proof eaſy to be underſtood, may be deduced from the different effects of preſſure on an artery and a vein. If a ligature, for inſtance, is paſſed round an artery, the veſſel ſwells conſiderably between the ligature and the heart; whereas, if we tie up a vein, it only becomes filled between the extremity and the ligature: and this is what we every day obſerve in bleeding. The ligature we paſs round the arm on theſe occaſions compreſſes the ſuperficial veins; and, the return of the blood thro' them being impeded, they become diſtended. When the ligature is too looſe, the veins are not ſufficiently compreſſed, and the blood continues its progreſs towards the heart; and on the contrary, when it is made too tight, the arteries themſelves become compreſſed, and the flow of blood through them being impeded, the veins cannot be diſtended.

c, Another phenomenon which effectually proves the circulation, is the loſs of blood that every living animal ſuſtains by opening only a ſingle artery of a moderate ſize; for it continues to flow from the wounded veſſel till the equilibrium is deſtroyed which is eſſential to life. This truth was not unknown to the ancients; and it ſeems ſtrange that it did not lead them to a knowledge of the circulation, as it ſufficiently proves that all the other veſſels muſt communicate with that which is opened. Galen, who lived more than 1500 years ago, drew this concluſion from it; and if we farther obſerve, that he deſcribes (after Eraſiſtratus who flouriſhed about 450 years before him) the ſeveral valves of the heart, and determines their diſpoſition and uſes, it will appear wonderful, that a period of near 2000 years ſhould afterwards elapſe before the true courſe of the blood was aſcertained. This diſcovery, for which we are indebted to the immortal Harvey, has thrown new lights on phyſiology and medicine, and conſtitutes one of the moſt important periods of anatomical hiſtory.

Chap. XIV.

Of the Nature of the Blood.

a, Blood recently drawn from a vein into a baſon, would ſeem to be an homogeneous fluid of a red colour (p); but, when ſuffered to reſt, it ſoon coagulates, and divides into two parts, which are diſtinguiſhed by the names of *craſſamentum* and *ſerum*. The *craſſamentum* is the red coagulum, and the *ſerum* is the water in which it floats.

b, Each of theſe may be again ſeparated into two others. For the *craſſamentum*, by being repeatedly waſhed in warm water, gives out all its red globules; and what remains appears to be compoſed of the *coagulable lymph* (q), which is a gelatinous ſubſtance, capable of being hardened by fire till it becomes perfectly horny: and if we expoſe the *ſerum* to a certain degree of heat, part of it will be found to coagulate like the white of an egg, and there will remain a clear and limpid water, reſembling urine both in its appearance and ſmell. The moſt remarkable property of the ſerum is its being pervious to the common air. See Air, n° 48.

c, The *ſerum* and *craſſamentum* differ in their proportion in different conſtitutions; in a ſtrong perſon the craſſamentum is in a greater proportion to the ſerum, than in a weak one; and the ſame difference is found to take place in diſeaſes (r).

EXPLANATION of PLATES XVII. XIX. XX.

Plate XVII.

This plate repreſents the heart in ſitu, all the large arteries and veins, with ſome of the muſcles, *&c*.

Muscles, &c.—Superior Extremity.—a, Maſſeter. b, Complexus. c, Digaſtricus. d, Os hyoides. e, Thyroid gland. f, Levator ſcapulæ. g, Cucullaris. h h, The clavicles cut. i, The deltoid muſcle. k, Biceps

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(o) The motion of the blood, and its paſſage from the arteries into the veins, may be perceived, with the aſſiſtance of a microſcope, in the tails of fiſhes and in frogs.

(p) The blood, as it flows through the arteries, is obſerved to be more florid than it is in the veins; and this redneſs ſeems to be acquired in its paſſage through the lungs.

(q) It may not be improper to obſerve, that till of late the *coagulable lymph* has been confounded with the *ſerum* of the blood, which contains a ſubſtance that is likewiſe coagulable though only when expoſed to heat, or certain chemical ſubſtances, whereas the other coagulates ſpontaneouſly when expoſed to the air or to reſt.

(r) When the blood ſeparates into *ſerum* and *craſſamentum*, if the latter be covered with a cruſt of a whitiſh or buff colour, it has been uſually conſidered as a certain proof of the blood's being in a ſtate of too great viſcidity. This appearance commonly taking place in inflammatory diſeaſes, has long ſerved to confirm the theory which aſcribes the cauſe of inflammations to lentor and obſtructions. But Dr Fordyce accounts in a different manner for the formation of the buff. He aſſerts, that when the action of the arteries is increaſed, the blood, inſtead of being more viſcid, is on the contrary more fluid, than in the ordinary ſtate, previous to inflammation: and that, in conſequence of this, the *coagulable lymph* ſuffers the red globules, which are the heavieſt part of the blood, to fall down to the bottom before it coagulates: ſo that the craſſamentum is divided into two parts; one of which is found to conſiſt of the coagulable lymph alone, (in this caſe termed the *buff*); and the other, partly of this and partly of the red globules.

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Plate XIX.

Fig. 1.

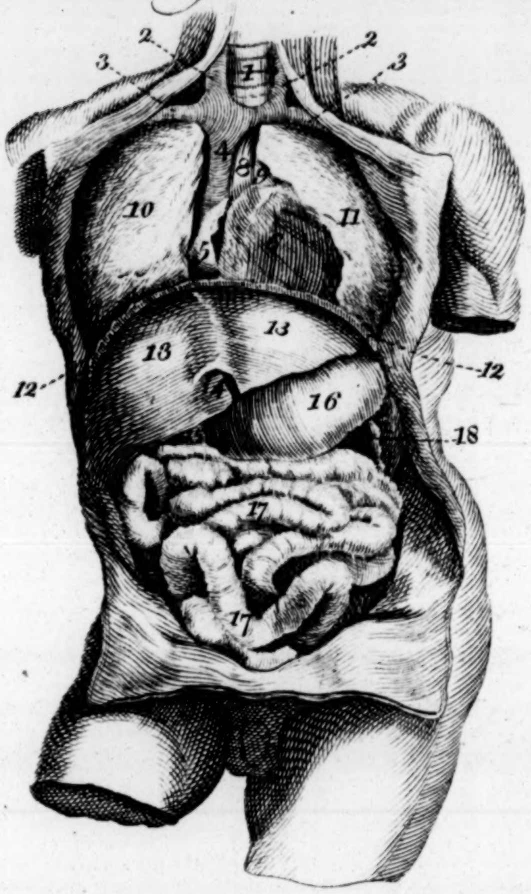
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Fig. 2.

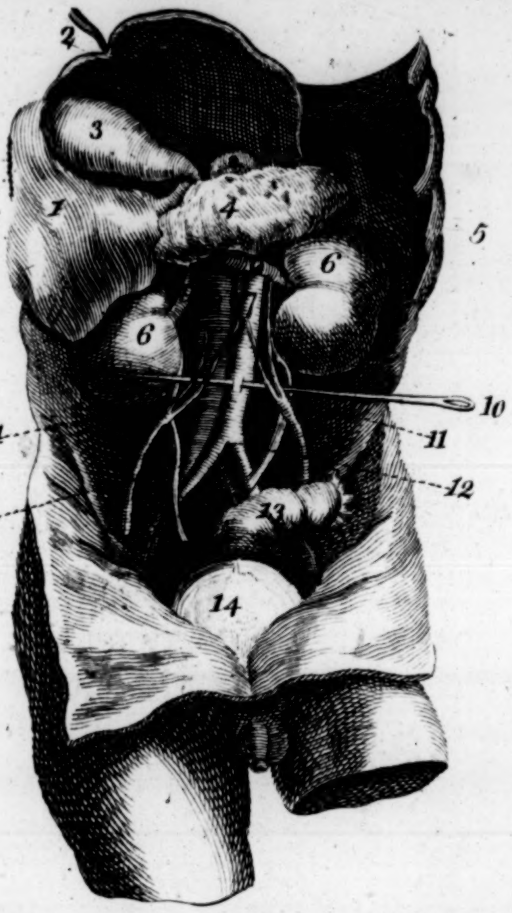
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Fig. 3.

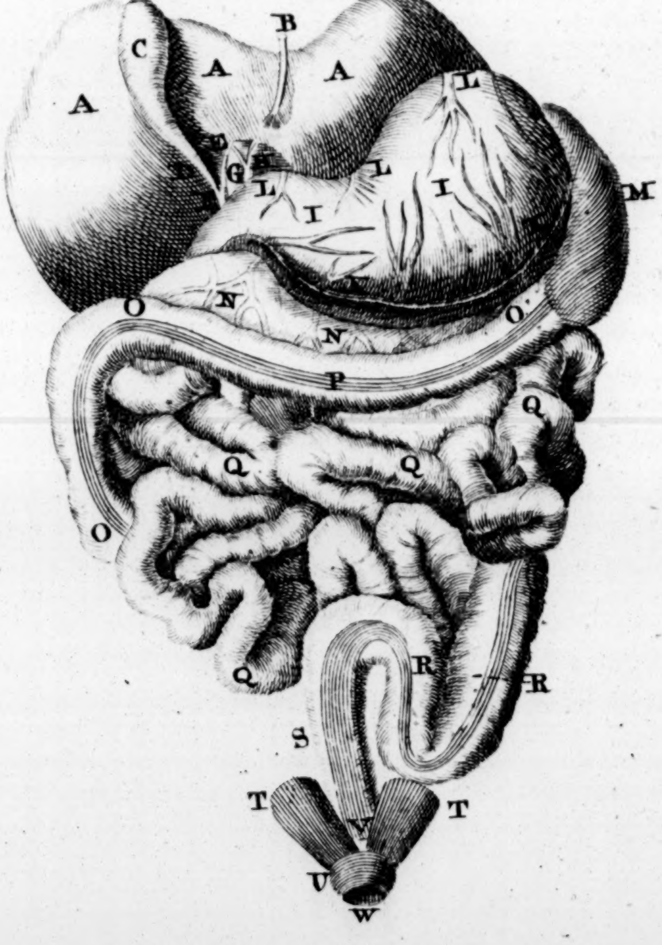
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Fig. 4.

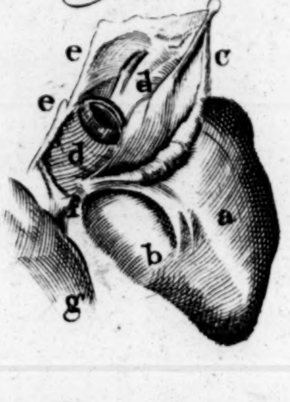
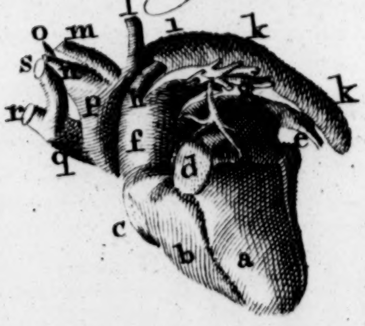


Fig. 5.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A Bell Sculpt

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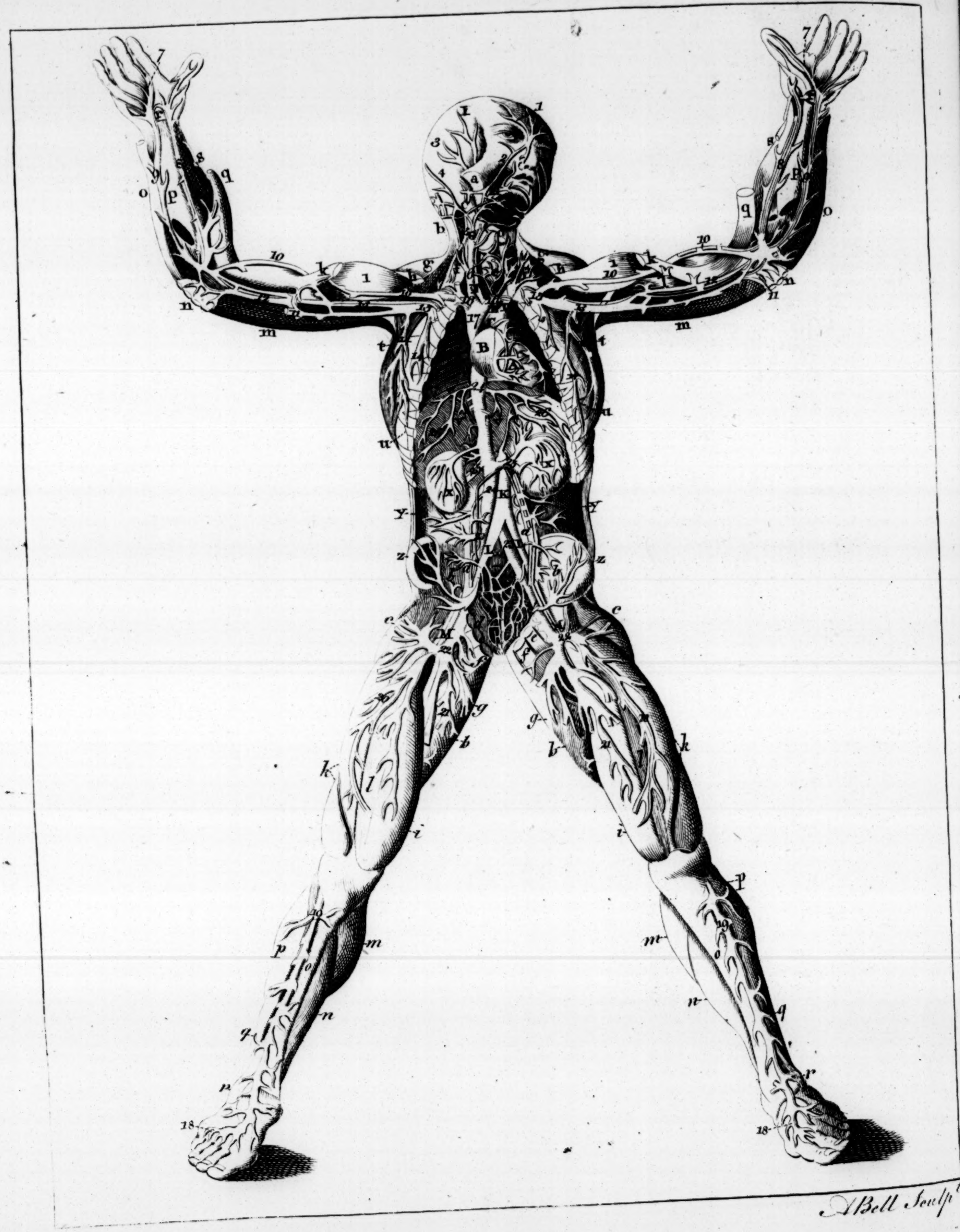
Plate XVII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A. Bell Sculp^t.

k, Biceps flexor cubiti cut. l, Coraco-brachialis. m, Triceps extenſor cubiti. n, The heads of the pronator teres, flexor carpi radialis, and flexor digitorum ſublimis, cut. o, The flexor carpi ulnaris, cut at its extremity. p, Flexor digitorum profundus. q, Supinator radii longus, cut at its extremity. r, Ligamentum carpi tranſverſale. s, Extenſores carpi radiales. t, Latiſſimus dorſi. u, Anterior edge of the ſerratus anticus major. v, v, The inferior part of the diaphragm. w w, Its anterior edge cut. x, x, The kidneys. y, Tranſverſus abdominis. z, Os ilium.

INFERIOR EXTREMITY.—*a*, Pſoas magnus. *b*, Iliacus internus. *c*, The fleſhy origin of the tenſor vaginæ femoris. *d d*, The oſſa pubis cut from each other. *e*, Muſculus pectineus cut from its origin. *f*, Short head of the triceps adductor femoris cut. *g*, The great head of the triceps. *h*, The long head cut. *i*, Vaſtus internus. *k*, Vaſtus externus. *l*, Crureus. *m*, Gemellus. *n*, Soleus. *o*, Tibia. *p*, Peronæus longus. *q*, Peronæus brevis. *r*, Fibula.

HEART and BLOOD-VESSELS.—A, The heart, with the coronary arteries and veins. B, The right auricle of the heart. C, The aorta aſcendens. D, The left ſubclavian artery. E, The left carotid artery. F, The common trunk which ſends off the right ſubclavian and right carotid arteries. G, The carotis externa. H, Arteria facialis, which ſends off the coronary arteries of the lips. I, Arteria temporalis profunda. K, Aorta deſcendens. L L, The iliac arteries,—which ſend off M M, The femoral or crural arteries. *N. B.* The other arteries in this figure have the ſame diſtribution as the veins of the ſame name:—And generally, in the anatomical plates, the deſcription to be found on the one ſide, points out the ſame parts in the other. 1. The frontal vein. 2, The facial vein. 3, Vena temporalis profunda. 4, Vena occipitalis. 5, Vena jugularis externa. 6, Vena jugularis interna, covering the arteria carotis communis. 7, The vaſcular arch on the palm of the hand, which is formed by 8, the radial artery and vein, and 9, the ulnar artery and vein. 10 10, Cephalic vein. 11, Baſilic vein, that on the right ſide, cut. 12, Median vein. 13, The humeral vein, which, with the median, covers the humeral artery. 14 14, The external thoracic or mammary arteries and veins. 15, The axillary vein, covering the artery. 16 16, The ſubclavian veins, which, with (6 6) the jugulars, form, 17, The vena cava ſuperior. 18, The cutaneous arch of veins on the fore-part of the foot. 19, The vena tibialis antica, covering the artery. 20, The vena profunda femoris, covering the artery. 21, The upper part of the vena ſaphena major. 22, The femoral vein. 23 23, The iliac veins. 24, 24, Vena cava inferior. 25 25, The renal veins covering the arteries. 26 26, The diaphragmatic veins.

PLATE XIX.

FIGURE 1. Shews the contents of the thorax and abdomen in ſitu.

1, Top of the trachea, or wind-pipe. 2 2, The internal jugular veins. 3 3, The ſubclavian veins. 4. The vena cava deſcendens. 5, The right auricle of the heart, 6, The right ventricle 7, Part of the left ventricle. 8, The aorta aſcendens. 9, The pulmonary artery. 10, The right lung, part of which is cut off to ſhew the great blood-veſſels. 11, The left lung entire. 12 12, The anterior edge of the diaphragm. 13 13, The two great lobes of the liver. 14, The ligamentum rotundum. 15, The gall-bladder. 16, The ſtomach. 17 17, The jejunum and ilium. 18, The ſpleen.

FIG. 2. Shews the organs ſubſervient to the chylopoietic viſcera,—with thoſe of urine and generation.

1 1, The under ſide of the two great lobes of the liver. a, Lobulus Spigelii. 2, The ligamentum rotundum. 3, The gall-bladder. 4, The pancreas. 5, The ſpleen. 6 6, The kidneys. 7, The aorta deſcendens. 8, Vena cava aſcendens. 9 9, The renal veins covering the arteries. 10, A probe under the ſpermatic veſſels and a bit of the inferior meſenteric artery, and over the ureters. 11 11, The ureters. 12 12, The iliac arteries and veins. 13, The rectum inteſtinum. 14, The bladder of urine.

FIG. 3. Shews the chylopoietic viſcera, and organs ſubſervient to them, taken out of the body entire.

A A, The under ſide of the two great lobes of the liver. B, Ligamentum rotundum. C, The gall-bladder. D, Ductus cyſticus. E, Ductus hepaticus. F, Ductus communis choledochus. G, Vena portarum. H, Arteria hepatica. I I, The ſtomach. K K, Venæ & arteriæ gaſtro-epiploicæ, dextræ & ſiniſtræ. L L, Venæ & arteriæ coronariæ ventriculi. M, The ſpleen. N N, Meſocolon, with its veſſels. O O O, Inteſtinum colon. P, One of the ligaments of the colon, which is a bundle of longitudinal muſcular fibres. Q Q Q Q, Jejunum and ilium. R R, Sigmoid flexure of the colon with the ligament continued, and over S, The rectum inteſtinum. T T, Levatores ani. U, Sphincter ani. V, The place to which the proſtate gland is connected. W, The anus.

FIG. 4. Shews the heart of a fœtus at the full time, with the right auricle cut open to ſhew the foramen ovale, or paſſage between both auricles.

a, The right ventricle. b, The left ventricle. c c, The outer ſide of the right auricle ſtretched out. d d, The poſterior ſide, which forms the anterior ſide of the ſeptum. e, The foramen ovale, with the membrane or valve which covers the left ſide. f, Vena cava inferior paſſing through g, A portion of the diaphragm.

FIG. 5. Shews the Heart and large veſſels of a fœtus at the full time.

a, The left ventricle. b, The right ventricle. c, A part of the right auricle. d, Left auricle. e e, The right branch of the pulmonary artery. f, Arteria pulmonalis. g g, The left branch of the pulmonary artery, with a number of its largeſt branches diſſected from the lungs. h, The canalis arterioſus. i, The arch of the aorta. k k, The aorta deſcendens. l, The left ſubclavian artery. m, The left carotid artery. n, The right carotid artery. o, The right ſubclavian artery. p, The origin of the right carotid and right ſubclavian arteries in one common trunk. q, The vena cava ſuperior or deſcendens. r, The right common ſubclavian vein. s, The left common ſubclavian vein.

N. B. All the parts deſcribed in this figure are to be found in the adult, except the canalis arterioſus.

PLATE XX.

Fig. 1. Repreſents the under and poſterior ſide of the bladder of urine, &c.

a, The bladder. b b, The inſertion of the ureters. c c, The vaſa deferentia, which convey the ſemen from the teſticles to d d, The veſiculæ ſeminales,—and paſs through e, The proſtate gland, to diſcharge themſelves into f, The beginning of the urethra.

Fig. 2. A tranſverſe ſection of the penis.

g g, Corpora cavernoſa penis. h, Corpus cavernoſum urethræ. i, Urethra. k, Septum penis. l l, The ſeptum between the corpus cavernoſum urethræ, and that of the penis.

Fig. 3. A longitudinal ſection of the penis.

m m, The corpora cavernoſa penis, divided by o, The ſeptum penis. n, The corpus cavernoſum glandis, which is the continuation of that of the urethra.

Fig. 4. Repreſents the female organs of generation.

a, That ſide of the uterus which is next the os ſacrum. 1, Its fundus. 2, Its cervix. b b, The Fallopian or uterine tubes, which open into the cavity of the uterus;—but the other end is open within the pelvis, and ſurrounded by c c, The fimbriæ. d d, The ovaria. e, The os internum uteri, or mouth of the womb. f f, The ligamenta rotunda, which paſſes without the belly, and is fixed to the labia pudendi. g g, The cut edges of the ligamenta lata, which connects the uterus to the pelvis. h, The inſide of the vagina. i, The orifice of the urethra. k, The clitoris ſurrounded by (l,) the præputium. m m, The labia pudendi. n n, The nymphæ.

Fig. 5. Shews the ſpermatic ducts of the teſticle filled with mercury.

A, The vas deferens. B, Its beginning, which forms the poſterior part of the epididymis. C, The middle of the epididymis, compoſed of ſerpentine ducts. D, The head or anterior part of the epididymis unravelled. e e e e, The whole ducts which compoſe the head of the epididymis unravelled. f f, The vaſa deferentia. g g, Rete teſtis. h h, Some rectilineal ducts which ſend off the vaſa deferentia. i i, The ſubſtance of the teſticle.

Fig. 6. The right teſticle entire, and the epididymis filled with mercury.

A, The beginning of the vas deferens. B, The vas deferens aſcending towards the abdomen. C, The poſterior part of the epididymis, named *globus minor*. D, The ſpermatic veſſels incloſed in cellular ſubſtance. E, The body of the epididymis. F, Its head, named *globus major*. G, Its beginning from the teſticle. H, The body of the teſticle, incloſed in the tunica albuginea.

CHAP. XV.

Of the GLANDS and SECRETIONS.

391 a, The *glands* are commonly underſtood to be ſmall, roundiſh, or oval bodies, formed by the convolution of a great number of veſſels, and deſtined to ſeparate particular humours from the maſs of blood.

b, They are uſually divided into two claſſes. Of theſe, the ſingle and ſimple glands which are to be met with in different parts of the body, and are either ſolitary or in diſtinct cluſters, are called *conglobate* (T); and the pancreas, the parotids, and other compound glands, which are of a granulated ſubſtance, and appear to be compoſed of leſſer glands, are called *conglomerate*.

c, The principal glands, and the humours they ſecrete, have been already deſcribed in different parts of this treatiſe *; and there only remains for us to examine the general ſtructure of the glands, and to explain the mechaniſm of ſecretion.

* N° 76—78, 361, 378, 371, b, n.

392 Structure of the glands. On the firſt of theſe ſubjects two different ſyſtems have been formed, each of which has had, and ſtill continues to have, its adherents. One of theſe ſyſtems was advanced by Malpighi, who ſuppoſed that an artery, entering into a gland, ramifies very minutely through its whole ſubſtance; and that its branches ultimately terminate in a veſicular cavity or follicle, from whence the ſecreted fluid paſſes out through the excretory duct. This doctrine at firſt met with few opponents: but the celebrated Ruyſch, who firſt attempted minute injections with wax, afterwards diſputed the exiſtence of theſe follicles; and aſſerted, that every gland appears to be a continued ſeries of veſſels, which, after being repeatedly convoluted in their courſe through its ſubſtance, at length terminate in the excretory duct: and this ſecond ſyſtem ſeems now to be the moſt generally adopted.

393 Of ſecretion. a, The mode of ſecretion has been explained in a variety of ways, and they are all perfectly hypothetical. In ſuch an inquiry, it is natural to aſk, how one gland conſtantly ſeparates a particular humour, while another gland ſecretes one of a very different nature, from the blood? The bile, for inſtance, is ſeparated by the liver, and the urine by the kidneys. Are theſe ſecretions to be imputed to any particular diſpoſition in the fluids, or is their cauſe to be looked for in the ſolids?

b, It has been ſuppoſed, that every gland contains within itſelf a fermenting principle, by which it is enabled to change the nature of the blood it receives, and to endue it with a particular property. So that, according to this ſyſtem, the blood, as it circulates thro' the kidneys, becomes mixed with the fermenting principle of thoſe glands, and a part of it is converted into urine; and again, in the liver, in the ſalival and other glands, the bile, the ſaliva, and other juices, are generated from a ſimilar cauſe: but it ſeems to be impoſſible for any liquor to be confined in a place expoſed to the circulation, without being carried away by the torrent of blood, every part of which would be equally affected; and this ſyſtem of fermentation has long been rejected as vague and chimerical. But as the cauſe of ſecretion continued to be looked for in the fluids, the former ſyſtem was ſucceeded by another, in which recourſe was had to the analogy of the humours. It was obſerved,

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(T) The lymphatic and meſenteric glands ſeem now to be conſidered as the only *conglobate* glands, but their uſe has not yet been aſcertained. The veſſels which pour out mucus in different parts of the body are ſuppoſed to be *ſimple follicles*, or ſmall cylindrical tubes, continued from the ends of arteries. The tonſils ſeem to be compoſed of many ſuch ſimple follicles folded together, in one common covering, and opening into one common ſinus. It has already been obſerved in a former note, that it is a ſubject of controverſy how the *liquor pericardii* is ſecreted, and how the vapour which moiſtens the pleura and pericardium is exhaled into thoſe cavities.

Plate XX.

Fig. 1.

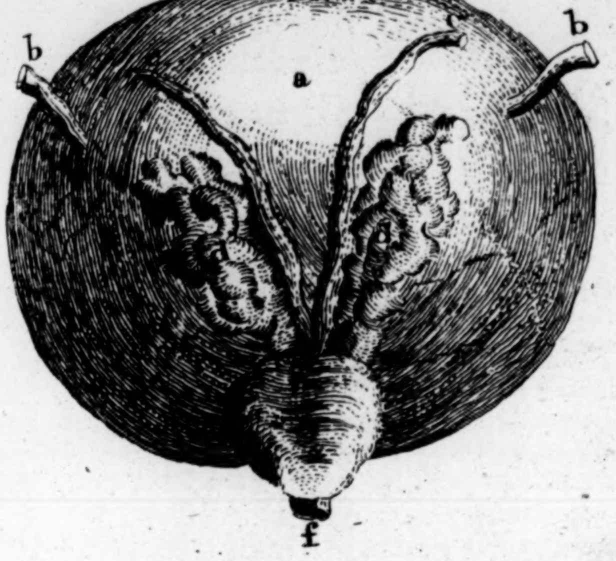

Fig. 4.

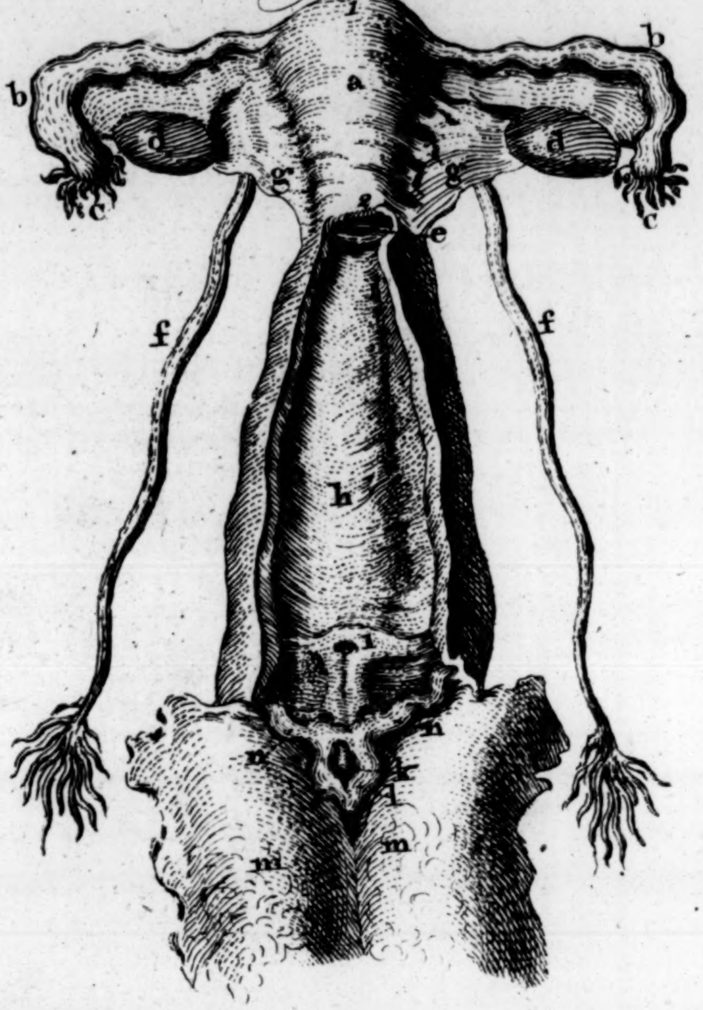
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Fig. 2.

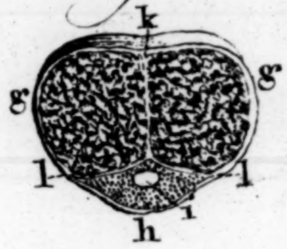

Fig. 5.

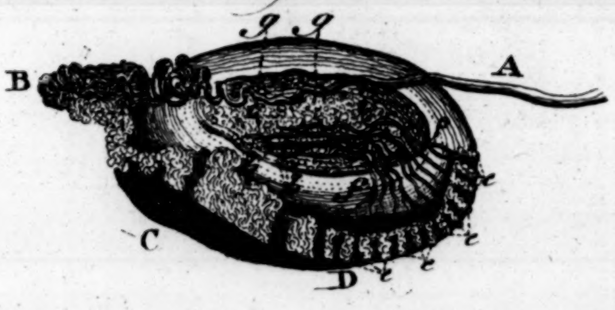
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Fig. 6.

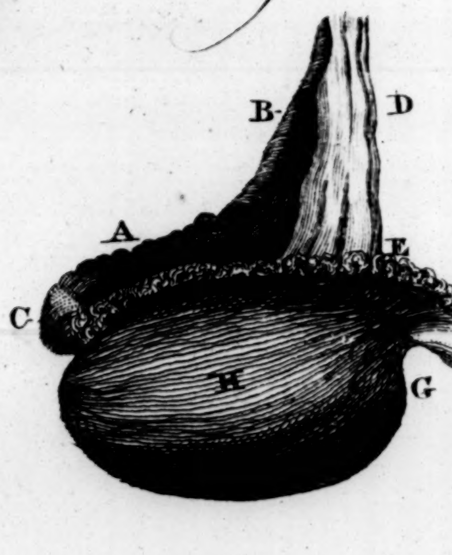
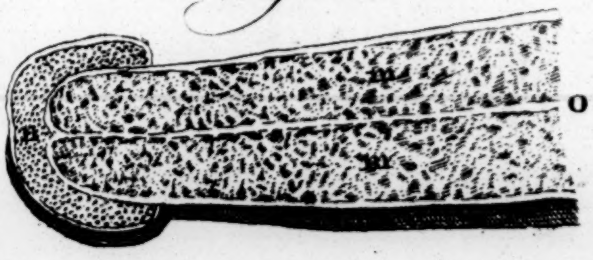


Fig. 3.



A. Bell Sculp.t

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ſerved, that if paper is moiſtened with water, and oil and water are afterwards poured upon it, that the water only will be permitted to paſs through it. But that, on the other hand, if the paper has been previouſly ſoaked in oil inſtead of water, the oil only, and not the water, will be filtered through it. Theſe obſervations led to a ſuppoſition, that every ſecretory organ is originally furniſhed with a humour analogous to that which it is afterwards deſtined to ſeparate from the blood; and that, in conſequence of this diſpoſition, the ſecretory veſſels of the liver, for inſtance, will only admit the bilious particles of the blood, while all the other humours will be excluded. This ſyſtem is an ingenious one, but the difficulties with which it abounds are unanſwerable. For oil and water are immiſcible; whereas the blood, as it is circulated through the body, appears to be an homogeneous fluid. Every oil will paſs through a paper moiſtened only with one kind of oil; and wine or ſpirits mixed with water will eaſily be filtered through a paper previouſly ſoaked in water. Upon the ſame principle, all our humours, though differing in their other properties, yet agreeing in that of being perfectly miſcible with each other, will all eaſily paſs through the ſame filtre. But theſe are not all the objections to this ſyſtem. The humours which are ſuppoſed to be placed in the ſecretory veſſels, for the determination of ſimilar particles from the blood, muſt be originally ſeparated without any analogous fluid; and that which happens once, may as eaſily happen always. Again, it ſometimes happens, from a vicious diſpoſition, that humours are filtered through glands which are naturally not intended to afford them a paſſage; and when this has once happened, it ought, according to this ſyſtem, to be expected always to do ſo; whereas this is not the caſe, and we are after all naturally led to ſeek for the cauſe of ſecretion in the ſolids. It does not ſeem right to aſcribe it to any particular figure of the ſecretory veſſels; becauſe the ſoft texture of thoſe parts does not permit them to preſerve any conſtant ſhape, and our fluids ſeem to be capable of accommodating themſelves to every kind of figure. It will therefore be more reaſonable to impute it to the difference of diameter in the orifices of the different ſecretory veſſels. To this doctrine, objections will likewiſe be raiſed; and it will probably be argued, that the veſſels of the liver, for inſtance, will, upon this principle, afford a paſſage not only to the bile, but to all the other humours of leſs conſiſtence with it. This objection can only be anſwered, by ſuppoſing that ſecondary veſſels exiſt, which originate from the firſt, and permit all the humours thinner than the bile to paſs thro' them. The bile will then be completely ſecreted, and conveyed into the veſſels deſtined for its reception.

c, It ſeems probable, that the degree of diſtance between the ſecretory organ and the heart, the convoluted courſe of the veſſels, and the angles they form in their courſe thro' the glands, together with the different velocity of the blood, all contribute to diſpoſe the humours to ſecretion.

PART VI. OF THE BRAIN AND ITS INTEGUMENTS, AND OF THE NERVES.

CHAP. I.

Of the BRAIN and its INTEGUMETS.

394 THE bones of the *cranium* were deſcribed, in the oſteological part, as incloſing the brain, and defending it from external injury: but they are not its only protection; for when we make an horizontal ſection thro' theſe bones, we find this maſs every where ſurrounded by two membranes (υ), the *dura* and *pia mater*.

395 Integuments of the brain. a, The firſt of theſe lines the interior ſurface of the cranium, to which it adheres ſtrongly at the ſutures, and at the many foramina through which veſſels paſs between it and the pericranium. The *dura mater* is perfectly ſmooth and inelaſtic; and its inner ſurface is conſtantly bedewed with a fine pellucid fluid, which every where ſeparates it from the pia mater. The dura mater ſends off ſeveral conſiderable proceſſes, which divide the brain into ſeparate portions, and prevent them from compreſſing each other. Of theſe proceſſes there is one ſuperior and longitudinal, called the *falx* or *falciform proceſs*, from its reſemblance to a ſythe. It ariſes from the ſpine of the os frontis, near the criſta galli, and extending along in the direction of the ſagittal ſuture, to beyond the lambdoidal ſuture, divides the brain into two hemiſpheres. A little below the lambdoidal ſuture, it divides into two broad wings or expanſions, called the *tranſverſe* or *lateral proceſſes*, which prevent the lobes of the cerebrum from preſſing on the cerebellum. Beſides theſe there is a fourth, which is ſituated under the tranſverſe proceſſes, and, being continued to the ſpine of the occiput, divides the cerebellum into two lobes.

b, The blood, after being diſtributed through the cavity of the cranium by means of the arteries, is returned as in the other parts of the body by veins which all paſs on to certain channels ſituated behind theſe ſeveral proceſſes.

c, Theſe canals or ſinuſes communicate with each other, and empty themſelves into the internal jugular veins, which convey the blood into the vena cava. They are in fact triangular veins, and like the proceſſes are diſtinguiſhed into *longitudinal* and *lateral*; and where theſe three meet, and where the fourth paſſes off, we obſerve a fourth ſinus, which is called *torcular*; Herophilus, who firſt deſcribed it, having ſuppoſed that the blood at the union of theſe two veins is as it were in a preſs. Within the ſinuſes we obſerve minute filaments, the *chordæ Williſii*, which ſeem to add to their ſtrength, and prevent their being to much dilated.

d, The *pia mater* is a much tenderer and finer membrane than the *dura mater*; being exceedingly delicate and vaſcular. It inveſts every part of the brain

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(υ) The Greeks call theſe membranes, *meninges*; but the Arabians, ſuppoſing them to be the ſource of all the other membranes of the body, afterwards gave them the names of *dura* and *pia mater*, by which they are now uſually diſtinguiſhed.

and ſends off an infinite number of elongations, which inſinuate themſelves between the convolutions, and even into the ſubſtance of the brain. This membrane is uſually deſcribed as being compoſed of two laminæ, of which the exterior one is named *tunica arachnoides*, from its ſuppoſed reſemblance to a ſpider's web.

396 The brain. There are ſeveral parts included under the general denomination of *brain*. One of theſe, which is of the ſofteſt conſiſtence, and fills the greateſt part of the cavity of the cranium, is the *cerebrum*, or *brain properly ſo called;* another portion, which is ſeated in the inferior and poſterior part of the head, is the *cerebellum;* and a third, which derives its origin from both theſe, is the *medulla oblongata*.

397 Cerebrum. a, The *cerebrum* is a medullary maſs of a moderate conſiſtence, filling up exactly all the ſuperior part of the cavity of the cranium, and divided into two hemiſpheres by the *falx* of the dura mater. Each of theſe hemiſpheres is diſtinguiſhed into an *anterior*, a *middle* and a *poſterior* lobe. The firſt of theſe is lodged on the orbital proceſſes of the os frontis; the middle lobes lie in the middle of the foſſæ of the baſis of the cranium; and the poſterior lobes are placed on the tranſverſe ſeptum of the os occipitis, immediately over the cerebellum, from which they are ſeparated by the lateral proceſſes of the dura mater.

b, The cerebrum appears to be compoſed of two diſtinct ſubſtances. Of theſe the exterior one, which is of a greyiſh or aſh-colour, is called the *cortex*, and is ſomewhat ſofter than the other, which is very white, and is called *medulla* or *ſubſtantia alba*.

c, After having removed the falx, and ſeparated the two hemiſpheres from each other, we perceive a white convex body, the *corpus calloſum*, which is a portion of the medullary ſubſtance, uniting the two hemiſpheres to each other, and not inveſted by the cortex. By making an horizontal inciſion in the brain, on a level with this *corpus calloſum*, we diſcover two oblong cavities, named the *anterior* or *lateral ventricles*, one in each hemiſphere. Theſe two ventricles, which communicate with each other poſteriorly, are ſeparated from each other throughout the greateſt part of their extent, by a very fine medullary partition, called *ſeptum lucidum*, from its delicacy and tranſparency. This ſeptum is attached ſuperiorly to a production of the corpus calloſum, called the *fornix*. When we have removed this fornix, we diſcover ſeveral eminences, four pair of which follow each other very regularly; and theſe are the *corpora ſtriata*, the *thalami nervorum opticorum*, and four others which M. Winſlow has named *tubercula quadrugemina*. The *corpora ſtriata* derive their name from their ſtriated appearance, which ſeems to be occaſioned by an intermixture of the cortical and medullary ſubſtances of the brain. The *thalami nervorum opticorum* are ſo called becauſe the optic nerves ariſe chiefly from them; and they are likewiſe compoſed both of the cortex and medulla. The *tubercula quadrugemina* are four ſmaller eminences, ſituated behind the two other pair we juſt now deſcribed. The *pineal gland*, rendered ſo famous by Deſcartes, who ſuppoſed it to be the ſeat of the ſoul, is a ſmall, ſoft, and oval body, about the ſize of a pea, ſituated behind the *thalami*, immediately above the *tubercula*. Under the thalami, we obſerve another cavity, which conſtitutes the third ventricle of the brain, and communicates with the anterior ventricles, with the glandula pituitaria, and likewiſe with the fourth ventricle. Its communication with the anterior ventricles is by means of a very narrow opening or *rima*, which extends from the anterior portion of the third ventricle, to the poſterior portion of the two others, where they communicate with each other, and with the *glandula pituitaria*, by a canal, which from its form is called *infundibulum*. The *glandula pituitaria* is a ſoft and ſpongy body, placed upon the *ſella turcica*. The third ventricle communicates with the fourth ventricle, which is placed between the cerebellum and medulla oblongata, by means of a groove or channel, which is the aquæductus Sylvii. The anterior ventricles, the thalami nervorum opticorum, the pineal gland, the tubercula quadrugemina, and other parts near theſe, are covered by an exceeding fine delicate and vaſcular membrane called *plexus choroides*.

398 Cerebellum. The *cerebellum*, which is divided into two lobes, is of a more firm and compact ſubſtance than the cerebrum; but, like that, is compoſed of the cortical and medullary ſubſtances. From each ſide of the fourth ventricle of the brain, there ariſes a medullary trunk, which is diſtributed through the medullary ſubſtance of the cerebellum, by an infinite number of ramifications, which may be obſerved by making a vertical ſection of the cerebellum, where they conſtitute what is called *arbor vitæ*. The reunion of the medullary ſubſtance of the cerebrum and cerebellum, at the baſis of the cranium, forms the *medulla oblongata*, which extends to the great foramen of the occipital bone.

399 Medulla ſpinalis. The *medulla ſpinalis*, which fills the vertebral canal from this foramen to the inferior portion of the os ſacrum, is a continuation of the medulla oblongata, but with ſome little difference in its compoſition; the latter being altogether made up of the medullary ſubſtance; whereas the medulla ſpinalis appears to have its middle part compoſed of a browniſh maſs, reſembling the cortical ſubſtance of the brain. The medulla ſpinalis is inveſted by a continuation of the membranes of the brain (v); and the pia mater, by ſending off productions into its ſubſtance, affords a ſupport to the blood-veſſels as they ramify through it.

CHAP. II.

Of the NERVES.

400 a, THE *nerves* are white and gliſtening chords, differing from each other in ſize, colour, and conſiſtence, and deriving their origin from the medulla oblongata and medulla ſpinalis. Anatomiſts deſcribe forty pair of theſe nerves; ten of which originate from the medulla oblongata, and thirty from the medulla ſpinalis.

b, By carefully and gently elevating the brain from the baſis of the cranium, we find the firſt ten pair ariſing in the following order: 1. The *nervi olfactorii*, diſtributed thro' the pituitary membrane, which conſtitutes the organ of ſmell. 2. The *optici*, which go to the eyes, where they receive the impreſſions of viſible objects. 3. The *oculorum motores* ſo called, becauſe they are diſtributed to the muſcles of the eye. 4. The *pathetici*, diſtributed to the ſuperior oblique muſcles of the eyes, the motion of which is expreſſive of certain paſſions of the ſoul. 5. The nerves of this pair ſoon divide into three principal branches, and each of theſe has a different name. Its upper diviſion is the *opthalmicus*, which is diſtributed to various parts of the eyes, eye-lids, forehead, noſe, and integuments of the face. The ſecond is called the *maxillaris ſuperior*, and the third *maxillaris inferior*, both which names allude to their diſtribution. 6. The *abductores*; each of theſe nerves is diſtributed to the abductor muſcle of the eye, ſo called becauſe it helps to draw the globe of the eye from the noſe. 7. The *auditorii* (w), which are diſtributed through the organs of hearing. 8. The *par vagum*, which derives its name from the great number of parts to which it gives branches, both in the thorax and abdomen. 9. The *linguales*, or *hypogloſſi*, which are diſtributed to the tongue, and appear to contribute both to the organ of taſte, and to the motions of the tongue. 10. A pair which is diſtributed to the muſcles of the head and neck.

(v) The diſſection of the brain requires conſiderable dexterity; and the reader, till he has ſeen ſuch a diſſection performed, will perhaps not be able to derive very clear ideas of its anatomy, from any deſcription he can meet with of it in books. The uſes of its ſeveral parts have never yet been aſcertained.

c, It has been already obſerved, that the ſpinal marrow ſends off thirty pair of nerves, and theſe are chiefly diſtributed to the exterior parts of the trunk, and to the extremities. They are commonly diſtinguiſhed into the *cervical*, *dorſal*, *lumbar*, and *ſacral nerves*. The *cervical*, which paſs out from between the ſeveral vertebræ of the neck, are ſeven in number; the *dorſal*, twelve; the *lumbar*, five; and the *ſacral*, five (x).

d, In the following courſe of the nerves both of the medulla oblongata and medulla ſpinalis, we obſerve, in many of them, irregular enlargements of their ſubſtance, which are called *ganglions*. Theſe knots or tumours are not the effects of diſeaſe, but are to be met with in the ſame parts of the ſame nerves both in the fœtus and the adult.

e, Some writers have conſidered them as ſo many little brains; and many other theories have been formed concerning them; none of which, however, have as yet led to aſcertain their uſe.

f, The nerves, like the blood-veſſels, in their courſe through the body, communicate with each other; and each of theſe communications conſtitutes what is called a *plexus*, from whence branches are again detached to different parts of the body. Some of theſe are conſtant, and conſiderable enough to be diſtinguiſhed by particular names, as the *ſemilunar plexus*, the *pulmonary plexus*, the *hepatic*, the *cardiac*, &c.

g, It would be foreign to the purpoſe of this article to follow the nerves through all their diſtributions; but it may be remembered, that, in deſcribing the different viſcera, mention was made of the nerves diſtributed to them. There is one pair, however, called the *intercoſtal*, or *great ſympathetic nerve*; which ſeems to deſerve a particular deſcription, becauſe it has an almoſt univerſal connection and correſpondence with all the other nerves of the body. Authors are not perfectly agreed about the origin of the *intercoſtal*: but it may perhaps not improperly be deſcribed as beginning from filaments of the fifth and ſixth pair; it then paſſes out of the cranium, through the bony canal of the carotid; from whence it deſcends laterally cloſe to the bodies of the vertebræ, and receives branches from almoſt all the vertebral nerves; forming almoſt as many *ganglions* in its courſe through the thorax and abdomen. It ſends off an infinite number of branches to the viſcera in thoſe cavities, and forms ſeveral *plexus* with the branches of the eighth pair or par vagum.

h, That the nerves are deſtined to convey the principles of motion and ſenſibility to the brain from all parts of the ſyſtem, there can be no doubt; but how theſe effects are produced, no one has ever yet been able to determine. The inquiry has been a conſtant ſource of hypotheſis in all ages; and has produced ſome ingenious ideas, and many erroneous poſitions, but without having hitherto afforded much ſatisfactory information.

i, The nerves appear to be perfectly inelaſtic, and are covered by the dura and pia mater; ſeeming to owe their firmneſs to the former of theſe tunics.

k, Some phyſiologiſts have conſidered a trunk of nerves as a ſolid cord, capable of being divided into an infinite number of filaments, by means of which the impreſſions of feeling are conveyed to the ſenſorium commune. Others have ſuppoſed it to be a canal, which afterwards ſeparates into more minute channels; or, perhaps, as being an aſſemblage of many very ſmall and diſtinct tubes, connected to each other, and thus forming a cylindrical cord. They who contend for their being ſolid bodies, are of opinion, that feeling is occaſioned by vibration: ſo that, for inſtance, according to this ſyſtem, by pricking the finger, a vibration would be occaſioned in the nerve diſtributed through its ſubſtance; and the effects of this vibration, when extended to the ſenſorium, would be an excital of pain. But the inelaſticity, the ſoftneſs, the connection, and the ſituation of the nerves, are ſo many proofs that vibration has no ſhare in the cauſe of feeling.

l, Others have ſuppoſed, that in the brain and ſpinal marrow a very ſubtile fluid is ſecreted, and from thence conveyed through the imperceptible tubes which they conſider as exiſting in the nerves. They have farther ſuppoſed, that this very ſubtile fluid, to which they have given the name of *animal ſpirits*, is ſecreted in the cortical ſubſtance of the brain and ſpinal marrow, from whence it paſſes through the medullary ſubſtance. This, like the other ſyſtem, is founded altogether on hypotheſis; but it ſeems to be an hypotheſis derived from much more probable principles, and there are many ingenious arguments to be brought in its ſupport.

EX-

(w) This pair, ſoon after its entrance into the meatus auditorius internus, ſeparates into two branches. One of theſe is of a very ſoft and pulpy conſiſtence, is called the *portio mollis* of the ſeventh pair, and is ſpread over the inner part of the ear. The other paſſes out through the aqueduct of Fallopius in a firm chord, which is diſtinguiſhed as the *portio dura*, and is diſtributed to the external ear, and other parts of the neck and face.

(x) The reader will obſerve, that the amount of theſe ſeveral diviſions is only 29 pair. But there is another pair called the *ſpinal*, which ariſes from the medulla ſpinalis at its beginning, and, aſcending through the great foramen of the os occipitis into the cranium, paſſes out again cloſe to the eighth pair, with which however it does not unite; and it is afterwards diſtributed chiefly to the muſcles of the neck, back, and ſcapula. In this courſe it ſends off filaments to different parts, and likewiſe communicates with ſeveral other nerves.

EXPLANATION OF PLATE XVIII.

Fig. 1. Repreſents the inferior part of the brain;—the anterior part of the whole ſpine, including the medulla ſpinalis;—with the origin and large portions of all the Nerves.

AA, The anterior lobes of the cerebrum. BB, The lateral lobes of the cerebrum. CC, The two lobes of the cerebellum. D, Tuber annulare. E, The paſſage from the third ventricle to the infundibulum. F, The medulla oblongata, which ſends off the medulla ſpinalis through the ſpine. G G, That part of the os occipitis which is placed above (H H), the tranſverſe proceſſes of the firſt cervical vertebra. II, &c. The ſeven cervical vertebræ, with their intermediate cartilages. KK, &c. The twelve dorſal vertebræ, with their intermediate cartilages. LL, &c. The five lumbar vertebræ, with their intermediate cartilages. M, The os ſacrum. N, The os coccygis.

Nerves.—1 1, The firſt pair of nerves, named *olfactory*, which go to the noſe. 2 2, The ſecond pair, named *optic*, which goes to form the tunica retina of the eye. 3 3, The third pair, named *motor oculi;* it ſupplies moſt of the muſcles of the eye-ball. 4 4, The fourth pair, named *pathetic*,—which is wholly ſpent upon the muſculus trochlearis of the eye. 5 5, The fifth pair divides into three branches.—The firſt, named *ophthalmic*, goes to the orbit, ſupplies the lachrymal gland, and ſends branches out to the forehead and noſe.—The ſecond, named *ſuperior maxillary*, ſupplies the teeth of the upper jaw, and ſome of the muſcles of the lips.—The third, named *inferior maxillary*, is ſpent upon the muſcles and teeth of the lower jaw, tongue, and muſcles of the lips. 6 6, The ſixth pair, which, after ſending off the beginning of the intercoſtal or great ſympathetic, is ſpent upon the abductor oculi. 7 7, The ſeventh pair, named *auditory*, divides into two branches.—The largeſt, named *portio mollis*, is ſpent upon the internal ear.—The ſmalleſt, *portio dura*, joins to the fifth pair within the internal ear by a reflected branch from the ſecond of the fifth; and within the tympanum, by a branch from the third of the fifth, named *chorda tympani*.—Vid. fig. 3. near B. 8 8, &c. The eighth pair, named *par vagum*,—which accompanies the intercoſtal, and is ſpent upon the tongue, larynx, pharynx, lungs, and abdominal viſcera. 9 9, The ninth pair, which are ſpent upon the tongue. 10 10, &c. The intercoſtal, or great ſympathetic, which is ſeen from the ſixth pair to the bottom of the pelvis on each ſide of the ſpine, and joining with all the nerves of the ſpine;—in its progreſs ſupplying the heart, and, with the par vagum, the contents of the abdomen and pelvis. 11 11, The acceſſorius, which is ſpent upon the ſterno-cleido-maſtoidæus and trapezius muſcles. 12 12, The firſt cervical nerves;—13 13, The ſecond cervical nerves;—both ſpent upon the muſcles that lie on the neck, and teguments of the neck and head. 14 14, The third cervical nerves, which, after ſending off (15 15, &c.) the phrenic nerves to the diaphragm, ſupply the muſcles and teguments that lie on the ſide of the neck and top of the ſhoulder. 16 16, The brachial plexus, formed by the fourth, fifth, ſixth, ſeventh cervicals, and firſt dorſal nerves,—which ſupply the muſcles and teguments of the ſuperior extremity. 17 17, The twelve dorſal, or proper intercoſtal nerves, which are ſpent upon the intercoſtal muſcles and ſome of the large muſcles which lie upon the thorax. 18 18, The five lumbar pairs of nerves, which ſupply the lumbar and abdominal muſcles, and ſome of the teguments and muſcles of the inferior extremity. 19 19, The ſacro-ſciatic, or poſterior crural nerve, formed by the two inferior lumbar, and three ſuperior of the os ſacrum. This large nerve ſupplies the greateſt part of the muſcles and teguments of the inferior extremity. 20, The ſtomachic plexus, formed by the eighth pair. 21 21, Branches of the ſolar or cæliac plexus, formed by the eighth pair and intercoſtals, which ſupply the ſtomach and chylopoietic viſcera. 22 22, Branches of the ſuperior and inferior meſenteric plexuſes, formed by the eighth pair and intercoſtals, which ſupply the chylopoietic viſcera, with part of the organs of urine and generation. 23 23, Nerves which accompany the ſpermatic cord. 24 24, The hypogaſtric plexus, which ſupplies the organs of urine and generation within the pelvis.

Fig. 2, 3, 4, 5. Shew different views of the inferior part of the brain, cut perpendicularly through the middle,—with the origin and large portions of all the nerves which paſs out through the bones of the cranium,—and the three firſt cervicals.

A, The anterior lobe. B, The lateral lobe of the cerebrum. C, One of the lobes of the cerebellum. D, Tuber annulare. E, Corpus pyramidale, in the middle of the medulla oblongata. F, The corpus olivare, in the ſide of the medulla oblongata. G, The medulla oblongata. H, The medulla ſpinalis.

Nerves.—1 2 3 4 5 6 7 8 and 9, Pairs of nerves. 10 10, Nervus acceſſorius, which comes from—11, 12 and 13, the three firſt cervical nerves.

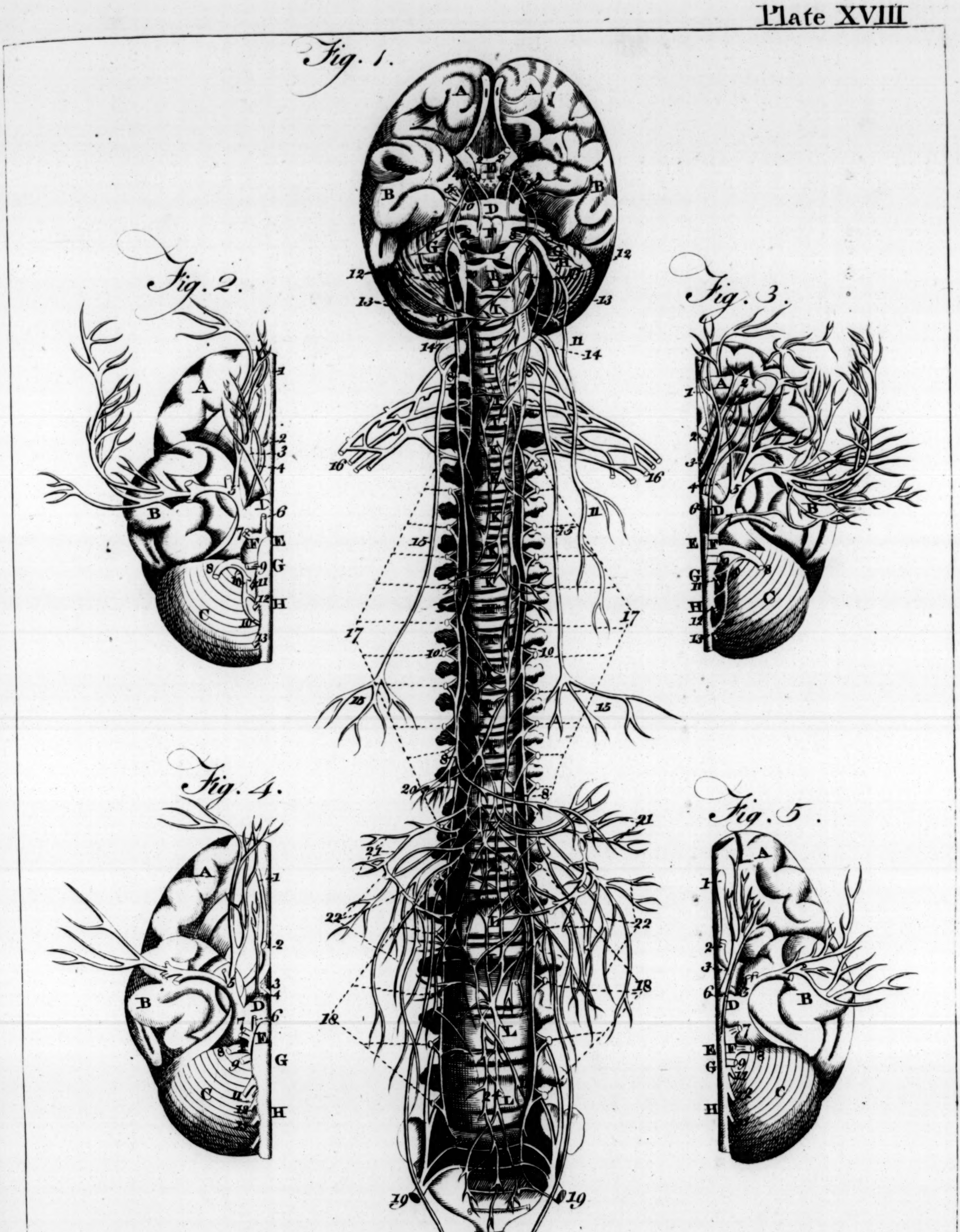
PART VII. OF THE SENSES AND THEIR ORGANS.

Chap. I.

Of the Senses in General.

401 a, THE word *ſenſe*, among phyſiologiſts, ſeems to imply, not only the ſenſation excited in the mind by certain impreſſions made on the body, but likewiſe the organ deſtined to receive and tranſmit theſe impreſſions to the ſenſorium.

b, The ſenſes are uſually deſcribed as being only five in number; but a very little attention only ſeems to be required to perceive, that a greater number may very properly be admitted. *Hunger* and *thirſt* are ſenſations which have each their peculiar organ; and that of *pain* ſeems to be extended through all the parts endued with ſenſibility. But the five ſenſes here to be deſcribed, are the exterior ſenſes of *touch*, *taſte*, *ſmelling*, *viſion*, and *hearing*. Each of theſe organs being of a peculiar ſtructure, is ſuſceptible only of particular impreſſions, which will be pointed out as we proceed to deſcribe each of them ſeparately.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Chap. II.

Of the Senſe of Feeling.

402 a, The *ſenſe* of feeling is perhaps ſeated in all parts of the body, but is commonly ſaid to be confined to the nervous papillæ of the *cutis* or true ſkin, which, with their appendages and their ſeveral uſes, have been already deſcribed.

b, The exterior properties of bodies, ſuch as their ſolidity, their humidity, their inequality, their ſmoothneſs, dryneſs, or fluidity, and likewiſe their degree of heat, ſeem all to be capable of making different impreſſions on the papillæ, and conſequently of exciting different ideas in the ſenſorium commune. But the organ of touch, like all the other ſenſes, is not equally delicate in every part of the body, or in every ſubject; being in ſome much more exquiſite than in others.

Chap. III.

Of the Taste.

403 a, The *ſenſe* of taſte is ſeated chiefly in the tongue, the ſituation and figure of which are ſufficiently known. The tongue is divided into its *baſis* and *apex*; is thinner at its edges than it is in its middle part; and has a line extending from its *baſis* to its *apex*, which divides it as it were into two equal portions, and is called *linea linguæ mediana*. The tongue is compoſed of muſcular fibres, which are diſpoſed in every direction. Some of theſe fibres paſs out from it in different ways, and form three muſcles on each ſide; while others are confined altogether to the tongue, and terminate chiefly on its ſurface.

b, From its ſuperior ſurface ariſe an infinite number of *papillæ*; which may be divided into three claſſes, the *capitatæ*, *ſemi-lenticulares*, and *pyramidales*. The firſt of theſe are the largeſt and moſt eaſy of demonſtration. They are ſituated towards the baſis of the tongue; and are deſcribed as reſembling muſhrooms, which are connected to the tongue only by a very ſmall neck. The *ſemi-lenticulares* differ only from the *capitatæ* in having the whole ſurface of their baſis attached to the tongue, of which they occupy the middle portion. The pyramidales are more minute papillæ, of a conical ſhape, very numerous on the apex and borders of the tongue.

c, Towards the baſis of the tongue, we meet with a little cavity named by Morgagni *foramen cæcum*, the uſe of which has not yet been aſcertained.

d, The tongue is covered by a continuation of the cuticle which lines the inſide of the mouth. This tunic every where exactly embraces the papillæ, and is exceedingly ſoft and pulpy from the perpetual warmth and moiſture of the parts. At the under part of the tongue it makes a reduplication called the *frænum*, which ſerves to prevent the too great motion of the tongue, and to fix it in its ſituation. But beſides this attachment, the tongue is connected, by means of its muſcles and membranous ligaments, to the lower jaw, the os hyoides, and the ſtyloid proceſſes.

e, The tongue receives its arteries and veins from the internal carotids and jugulars. At the ſides of the frænum we obſerve two conſiderable veins called the *ranular veins*; and the arteries which correſpond with them have the ſame name. The tongue receives very conſiderable branches of nerves on each ſide, from the fifth and ninth pair. The former of theſe are loſt at the apex of the tongue, and the latter are ſpread over its baſis.

f, The variety of taſtes ſeems to be occaſioned by the different impreſſions made on the papillæ by the principles of our aliment; but the mechanical reaſon of this diverſity, has not yet been determined. It has been looked for in the ſaline particles of our food; and, in general, whatever contains leſs ſalt than the ſaliva is found to be inſipid.

g, The different ſtate of the papillæ with reſpect to their moiſture, their figure, or their covering, ſeems to produce a conſiderable difference in the taſte, not only in different people, but in the ſame ſubject in ſickneſs and in health. The great uſe of the taſte ſeems to be to enable us to diſtinguiſh wholeſome and ſalutary food from that which is unhealthy; and we obſerve that many quadrupeds, by having their papillæ very large and long, have the faculty of diſtinguiſhing flavours with infinite accuracy.

Chap. IV.

Of Smelling.

a, This, like the ſenſe of taſte, ſeems intended to direct us to a proper choice of aliment; and is chiefly ſeated in the noſe, which is diſtinguiſhed into its external and internal parts. The ſituation and figure of the former of theſe do not ſeem to require a definition. It is compoſed of bones and cartilages, covered by muſcular fibres and by the common integuments. The bones make up the upper portion, and the cartilages the lower one. The *ſeptum narium*, like the noſe, is likewiſe in part bony, and in part cartilaginous. Theſe bones and their connections were deſcribed in the oſteology. 404

b, The *internal* part of the noſe, beſides the oſſa ſpongioſa, has ſix cavities or ſinuſes, the *maxillary*, the *frontal*, and the *ſphenoid*, which were all deſcribed with the bones of the head. They all open into the noſtrils; and the noſe likewiſe communicates with the mouth, larynx, and pharynx, behind the velum palati.

c, All theſe ſeveral parts, which are included in the internal diviſion of the noſe, *viz.* the inner ſurface of the noſtrils, the lamellæ of the oſſa ſpongioſa, and the ſinuſes, are lined by a thick and very vaſcular membrane, which is the *membrana pituitaria Schneideri*. This membrane is truly the organ of ſmelling, but its real ſtructure does not yet ſeem to be perfectly underſtood. It appears to be a continuation of the cuticle, which lines the inner ſurface of the mouth. In ſome parts of the noſe it is ſmooth and firm, and in others it is looſe and ſpongy. It is conſtantly moiſtened by a mucilaginous lymph, of which the finer parts are carried off probably by the air we breathe; and the remainder, by being retained in the ſinuſes, acquires conſiderable conſiſtence (y).

d, The arteries and veins, which are diſtributed to this membrane, are branches from the external carotids and jugulars. The firſt pair of nerves, the *olfactory*, are ſpread over every part of it, and it likewiſe receives a branch from the fifth pair.

(y) The manner in which this mucus is ſecreted, is not determined. Some writers have deſcribed this membrane as being glandular; but no glands appear to exiſt in it.

e, After what has been ſaid of the pituitary membrane, it will not be difficult to conceive how the air we draw in at the noſtrils, being impregnated with the effluvia of bodies, excites in us that kind of ſenſation we call *ſmelling*. As theſe effluvia, from their being exceedingly light and volatile, cannot be capable in a ſmall quantity of making any great impreſſion on the extremities of the olfactory nerves, it was neceſſary to give conſiderable extent to the pituitary membrane, that by this means a greater number of odoriferous particles might be admitted at the ſame time. When we wiſh to take in much of the effluvia of any thing, we naturally cloſe the mouth, that all the air we inſpire, may paſs through the noſtrils; and at the ſame time, by means of the muſcles of the noſe, the noſtrils are dilated, and a greater quantity of air is drawn into them.

f, In many quadrupeds, the ſenſe of ſmelling is much more extenſive and delicate than it is in the human ſubject; and in the human ſubject, it ſeems to be more perfect, the leſs it is vitiated by a variety of ſmells. It is not always in the ſame ſtate of perfection, being naturally affected by every change in the pituitary membrane, and of the lymph with which that membrane is moiſtened.

CHAP. V.

Of the EAR, and HEARING.

405 a, THE *ear* is commonly diſtinguiſhed into external and internal. The former includes all that we are able to diſcover without diſſection, and the meatus auditorius, as far as the tympanum; and the latter, all the other parts of the ear.

b, The *external ear* is a cartilaginous funnel, covered by the common integuments, and attached, by means of its ligaments and muſcles, to the temporal bone. Although capable only of a very obſcure motion, it is found to have two muſcles. Different parts of it are diſtinguiſhed by different names. All its cartilaginous part is called *ala* or *wing*, to diſtinguiſh it from the ſoft and pendent part below, called the *lobe*. Its outer circle, or border, is called *helix;* and the ſemicircle within this, *antihelix*. The moveable cartilage placed immediately before the meatus auditorious, which it may be made to cloſe exactly, is named *tragus;* and an eminence oppoſite to this at the extremity of the *antihelix*, is called *antitragus*. The *concha* is a conſiderable cavity formed by the extremities of the *helix* and *antihelix*. The *meatus auditorius*, which at its opening is cartilaginous, is covered by a very thin membrane, which is a continuation of the cuticle from the ſurface of the ear.

c, In this canal we find a yellow wax, which is ſuppoſed to be ſecreted by very minute glands or follicles at the beginning of the meatus. This ſecretion, which is at firſt of an oily conſiſtence, defends the membrane of the tympanum from the injuries of the air, and by its bitterneſs prevents minute inſects from entering into the ear. But, when from neglect or diſeaſe it accumulates in too great a quantity, it ſometimes occaſions deafneſs. The inner extremity of the meatus is cloſed by a very thin, tranſparent membrane, the *membrana tympani*, which is ſet in a bony circle like the head of a drum. The upper edge of this membrane not being always cloſe to the bone, affords a paſſage to the air between the external and internal ear. Under the membrana tympani runs a branch of the fifth pair of nerves, called *chorda tympani;* and beyond this membrane is the cavity of the tympanum, which is about ſeven or eight lines wide, and half ſo many in depth; it is irregular, and every where lined by a very fine membrane. There are four openings to be obſerved in this cavity. It communicates with the mouth by means of the *Euſtachian tube*. This canal, which is in part bony and in part cartilaginous, begins by a very narrow opening at the anterior and almoſt ſuperior part of the tympanum, increaſing in ſize as it advances towards the palate of the mouth, where it terminates by an oval opening. This tube is every where lined by the ſame membrane that covers the inſide of the mouth. The real uſe of this canal does not ſeem to have been hitherto ſatisfactorily aſcertained; but ſound would ſeem to be conveyed through it to the membrana tympani, deaf perſons being often obſerved to liſten attentively with their mouths open. Oppoſite to this is a minute paſſage, which leads to the ſinuoſities of the maſtoid proceſs; and the two other openings, which are in the internal proceſs of the os petroſum, are the *feneſtra ovalis* and *feneſtra rotunda*, both which are covered by a very fine membrane.

d, There are three diſtinct bones in the cavity of the tympanum; and theſe are the *malleus*, *incus*, and *ſtapes*. Beſides theſe, there is a fourth, which is the *os orbiculare*, conſidered by ſome anatomiſts as a proceſs of the *ſtapes*, which is neceſſarily broken off by the violence we are obliged to uſe in getting at theſe bones; but, when accurately conſidered, it ſeems to be a diſtinct bone.

e, The *malleus* is ſuppoſed to reſemble a *hammer*, being larger at one extremity, which is its *head*, than it is at the other, which is its *handle*. The latter is attached to the membrana tympani, and the head of the bone is articulated with the *incus*.

The *incus*, as it is called from its ſhape, though it ſeems to have leſs reſemblance to an *anvil* than to one of the dentes molares with its roots widely ſeparated from each other, is diſtinguiſhed into its body and its legs. One of its legs is placed at the entry of the canal which leads to the maſtoid proceſs; and the other, which is ſomewhat longer, is articulated with the *ſtapes*, or rather with the *os orbiculare*, which is placed between them.

g, The third bone is very properly named *ſtapes*, being perfectly ſhaped like a ſtirrup. Its baſis is fixed into the *feneſtra ovalis*, and its upper part is articulated with the *os orbiculare*. What is called the *feneſtra rotunda*, though perhaps improperly, as it is more oval than round, is obſerved a little above the other, in an eminence formed by the os petroſum, and is cloſed by a continuation of the membrane that lines the inner ſurface of the tympanum. The ſtapes and malleus are each of them furniſhed with a little muſcle (z) See *Acou-* *ſti*, nº 19.

h, The *labyrinth*, is the only part of the ear which remains to be deſcribed. It is ſituated in the os petroſum,

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(z) Anatomiſts have uſually deſcribed three muſcles of the malleus; the *externus*, *obliquus*, and *internus*. Others ſpeak only of two; but the *internus* only ſeems to deſerve the name of muſcle, the others being truly ligaments.

ſum, and is ſeparated from the tympanum by a partition which is every where bony, except at the two feneſtræ. It is compoſed of three parts; and theſe are the *veſtibulum*, the *ſemicircular canals*, and the *cochlea*.

i, The *veſtibulum* is an irregular cavity, much ſmaller than the tympanum, ſituated nearly in the centre of the os petroſum, between the tympanum, the cochlea, and the ſemicircular canals. It is open on the ſide of the tympanum by means of the feneſtra ovalis, and communicates with the upper portion of the cochlea by an oblong foramen, which is under the feneſtra ovalis, from which it is ſeparated only by a very thin partition.

k, Each of the three *ſemicircular canals* forms about half a circle of nearly a line in diameter; and running each in a different direction, they are diſtinguiſhed into *vertical*, *oblique*, and *horizontal*. Theſe three canals open by both their extremities into the veſtibulum; but the *vertical* and the *oblique* being united together at one of their extremities, there are only five orifices to be ſeen in the veſtibulum.

l, The *cochlea* is a canal which takes a ſpiral courſe, not unlike the ſhell of a ſnail. From its baſis to its apex it makes two turns and a half; and is divided into two canals by a very thin lamina or ſeptum, which is in part bony, and in part membranous, in ſuch a manner, that theſe two canals only communicate with each other at the point. One of them opens into the veſtibulum, and the other is covered by the membrane that cloſes the *feneſtra rotunda*. The bony lamella which ſeparates the two canals, is exceedingly thin, and fills about two thirds of the diameter of the canal. The reſt of the ſeptum is compoſed of a moſt delicate membrane, which lines the whole inner ſurface of the cochlea, and ſeems to form this diviſion in the ſame manner as the two membranous bags of the pleura, by being applied to each other, form the mediaſtinum.

m, The arteries of the external ear come from the temporal and occipital, and its veins paſs into the jugular. The internal ear receives branches of arteries from the baſilary and internal carotid; and its veins empty themſelves into the ſinuſes of the dura mater, and into the internal jugular.

n, The *portio mollis* of the ſeventh pair is diſtributed through the *cochlea*, the *veſtibulum*, and the *ſemicircular canals*; and the *portio dura* ſends off a branch to the tympanum, and other branches to the external ear and parts near it.

o, The *ſenſe of hearing*, in producing which all the parts we have deſcribed aſſiſt, is occaſioned by a certain modulation of the air collected by the funnel-like ſhape of the external ear, and conveyed through the meatus auditorius to the membrana tympani. That ſound is propagated by means of the air, is very eaſily proved by ringing a bell under the receiver of an air-pump: the ſound it affords being found to diminiſh gradually as the air becomes exhauſted, till at length it ceaſes to be heard at all. Sound moves through the air with great velocity; but the ſtrength of the ſound ſeems to depend on the ſtate of the air, as it is greater in a cold and denſe, than in a warm and rarefied air*.

* See *Acou-* *ſt*, nº 19.

p, That the air vibrating in the membrana tympani communicates its vibration to the different parts of the labyrinth, and thus affects the auditory nerve ſo as to produce ſound, ſeems to be very probable; and it is imagined, that the malleus, by means of its muſcle, ſerves to increaſe or diminiſh the tenſion of the membrana tympani; but the ſituation, the minuteneſs, and the variety of the parts which compoſe the ear, do not permit much to be advanced with certainty concerning their mode of action.

q, Some of theſe parts ſeem to conſtitute the immediate organ of hearing, and theſe are all the parts of the *veſtibulum*: but there are others which ſeem intended for the perfection of this ſenſe, without being abſolutely eſſential to it. It has happened, for inſtance, that the membrana tympani, and the little bones of the ear, have been deſtroyed by diſeaſe, without depriving the patient of the ſenſe of hearing (A).

r, Before we conclude this article, it will be right to explain certain phenomena which will be found to have a relation to the organ of hearing.

s, Every body has, in conſequence of particular ſounds, occaſionally felt that diſagreeable ſenſation which is uſually called *ſetting the teeth on edge*; and the cauſe of this ſenſation is to be traced to the communication which the portio dura of the auditory nerve has with the branches of the fifth pair, which are diſtributed to the teeth, being probably occaſioned by the violent tremor produced in the membrana tympani by theſe very acute ſounds. Upon the ſame principle we may explain the ſtrong idea of ſound which a perſon has who holds a vibrating ſtring between his teeth.

t, The humming which is ſometimes perceived in the ear, without any exterior cauſe, is perhaps occaſioned by an increaſed pulſation of the arteries in conſequence of obſtructions in ſome of the parts of the ear. This pulſation, which in a natural and healthy ſtate is ſlight and regular, may by diſeaſe be increaſed ſo as to affect the auditory nerve in a manner ſufficient to produce the idea of ſound.

CHAP. VI.

Of VISION *.

* See *Optics*.

406 a, THE *eyes*, which conſtitute the *organ of viſion*, are ſituated in two bony cavities, named *orbits*, where they are ſurrounded by ſeveral parts, which are either intended to protect them from external injury, or to aſſiſt in their motion.

b, The globe of the eye is immediately covered by two *eye-lids* or *palpebræ*, which are compoſed of muſcular fibres covered by the common integuments, and lined by a very fine and ſmooth membrane, which is from thence extended over part of the globe of the eye, and is called *tunica conjunctiva*. Each eye-lid is cartilaginous at its edge; and this border, which is called *tarſus*, is furniſhed, as we all know, by a row of hairs named *cilia* or *eye-laſhes*.

c, The *cilia* ſerve to protect the eye from inſects and minute bodies floating in the air, and likewiſe to moderate the action of the rays of light in their paſſage to the retina. At the roots of theſe hairs there are ſe-

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(A) This obſervation has led to a ſuppoſition, that a perforation of this membrane may, in ſome caſes of deafneſs, be uſeful; and Mr Cheſelden relates, that ſome years ago a malefactor was pardoned on condition that he ſhould ſubmit to this operation; but the public clamour raiſed againſt it was ſo great, that it was thought right not to perform it.

baceous follicles, firſt noticed by *Meibomius*, which diſcharge a glutinous liniment. Sometimes the fluid they ſecrete has too much viſcidity, and the eye-lids become glued to each other.

d, The upper border of the orbit is covered by the *eye-brows* or *ſupercilia*, which by means of two muſcles are capable of being brought towards each other, or of being carried upwards. They have been conſidered as ſerving to protect the eyes, but they are probably intended more for ornament than utility (B).

e, The orbits in which the eyes are placed, are furniſhed with a good deal of fat, which affords a ſoft bed on which the eye performs its ſeveral motions. The inner angle of each orbit, or that part of it which is near the noſe, is called *canthus major*, or the *great angle*; and the outer angle, which is on the oppoſite ſide of the eye, is the *canthus minor*, or *little angle*.

f, The little reddiſh body which we obſerve in the great angle of the eye-lids, and is called *caruncula lachrymalis*, is ſuppoſed to be of a glandular ſtructure, and, like the follicles of the eye-lids, to ſecrete an oily humour. But its ſtructure and uſe do not ſeem to have been hitherto accurately determined. The ſurface of the eye is conſtantly moiſtened by a very fine limpid fluid called the *tears*, which is chiefly, and perhaps wholly, derived from a large gland of the conglomerate kind, ſituated in a ſmall depreſſion of the os frontis near the outer angle of the eye. Its excretory ducts pierce the *tunica conjunctiva*, juſt above the cartilaginous borders of the upper eye-lids. When the tears were ſuppoſed to be ſecreted by the caruncle, this gland was called *glandula innominata*; but now that its ſtructure and uſes are aſcertained, it very properly has the name of *glandula lachrymalis*. The tears poured out by the ducts of this gland are, in a natural and healthy ſtate, inceſſantly ſpread over the ſurface of the eye, to keep it clear and tranſparent, by means of the eye-lids, and as conſtantly paſs out at the oppoſite corner of the eye or inner angle, through two minute orifices, the *puncta lachrymalia* (C); being determined into theſe little openings by a reduplication of the tunica conjunctiva, ſhaped like a creſcent, the two points of which anſwer to the *puncta*. This reduplication is named *membrana* or *valvula ſemilunaris*. Each of theſe *puncta* is the beginning of a ſmall excretory tube through which the tears paſs into a little pouch or reſervoir, the *ſacculus lachrymalis*, which lies in an excavation formed partly by the naſal proceſs of the os maxillare ſuperius, and partly by the os unguis. The lower part of this ſac forms a duct, called the *ductus ad nares*, which is continued through a bony channel, and opens into the noſe, through which the tears are occaſionally diſcharged (D).

g, The motions of the eye are performed by ſix muſcles; four of which are *ſtraight*, and two *oblique*. The *ſtraight* muſcles are diſtinguiſhed by the names of *elevator*, *depreſſor*, *adductor*, and *abductor*, from their ſeveral uſes in elevating or depreſſing the eye, drawing it towards the noſe, or carrying it from the noſe towards the temple. All theſe four muſcles ariſe from the bottom of the orbit, and are inſerted by flat tendons into the globe of the eye. The *oblique* muſcles are intended for the more compound motions of the eye. The firſt of theſe muſcles, the *obliquus ſuperior*, does not, like the other four muſcles we have deſcribed, ariſe from the bottom of the orbit, but from the edge of the foramen that tranſmits the optic nerve, which ſeparates the origin of this muſcle from that of the others. From this beginning it paſſes in a ſtriaght line towards a very ſmall cartilaginous ring, the ſituation of which is marked in the ſkeleton by a little hollow in the internal orbitar proceſs of the os frontis. The tendon of the muſcle paſſing through this ring, is inſerted into the upper part of the globe of the eye, which it ſerves to draw forwards, at the ſame time turning the pupil downwards.

h, The *obliquus inferior* ariſes from the edge of the orbit, under the opening of the ductus lachrymalis, and is inſerted ſomewhat poſteriorly into the outer ſide of the globe, ſerving to draw the eye forwards and turn the pupil upwards. When either of theſe two muſcles act ſeparately, the eye is moved on its axis; but when they act together, it is compreſſed both above and below.

i, The eye itſelf, which is now to be deſcribed with its tunics, humours, and component parts, is of a ſpherical figure. Of its tunics, two are only partial coverings; and theſe are the *tunica conjunctiva* and *tunica albuginea*. The former has been already deſcribed as being reflected from the inner ſurface of the eye-lids over the anterior portion of the eye. The *tunica albuginea* is placed immediately under the tunica conjunctiva, and appears to be a continuation of the membrane that inveſts the tendons of the muſcles which are inſerted into the globe of the eye (E).

k, The immediate tunics of the eye, which are to be demonſtrated when its partial coverings and all the other parts with which it is ſurrounded are removed, are the *ſclerotica*, *choroides*, and *retina*.

l, The *ſclerotica*, which is the exterior coat, is every where white and opaque, except at its anterior part, where it has more of convexity than any other part of the globe, and, being exceedingly tranſparent, is called *cornea* (F).

m, The

(B) It is obſervable, that the eye-brows are peculiar to the human ſpecies.

(C) It ſometimes happens, that this very pellucid fluid which moiſtens the eye, being poured out through the excretory ducts of the lachrymal gland faſter than it can be carried off through the puncta, trickles down the cheek, and is then ſtrictly and properly called *tears*. When this ſecretion is conſtantly too copious, it conſtitutes a diſeaſe called *epiphora*; but we all know, that the application of any irritating particles to the eye, and ſometimes the paſſions of the mind, will occaſion a temporary increaſe of this lymph.

(D) When the ductus ad nares becomes obſtructed, in conſequence of diſeaſe, the tears are no longer able to paſs into the noſtrils; the ſacculus lachrymalis becomes diſtended; and inflammation, and ſometimes ulceration, taking place, conſtitute the diſeaſe called *fiſtula lachrymalis*.

(E) The tunica albuginea ſeems to be formed in this manner, and not by an expanſion of the tendons themſelves as it has been generally ſuppoſed.

(F) Some writers, who have given the name of *cornea* to all this outer coat, have named what is here and moſt commonly called *ſclerotica*, *cornea opaca*; and its anterior and tranſparent portion, *cornea lucida*. The optic nerve enters m, The *choroides*, or *uvea*, has been conſidered as an expanſion of the pia matral coat of the optic nerve. In its fore part we obſerve a circular hole, called the *pupil* or *ſight of the eye*, which affords a paſſage to the rays of light. The choroides is compoſed of two laminæ (G); the outermoſt of which is continued no farther than the edge of the *cornea*, to which it is attached all round, being obſerved to form a little whitiſh areola at the place of this union, which is named *ligamentum ciliare* (H). The inner lamina extends farther to form what is called the *iris* (I), which is the part we are able to ſee through the cornea. It derives its name from the difference of its colours, and is perforated in its middle. This perforation is called *pupil* or *ſight of the eye*. On the under ſide of the iris we obſerve many minute fibres called *proceſſus ciliares*, which paſs in *radii* or parallel lines from the circumference to the center; and the contraction and dilatation of the pupil are ſuppoſed to depend on the action of theſe ciliary proceſſes (K).

n, The poſterior ſurface of the iris, the proceſſus ciliares, and a part of the tunica choroides, are covered by a black mucus, for the purpoſes of accurate and diſtinct viſion; but the manner in which it is ſecreted, has not been determined.

o, Immediately under the tunica choroides we find the third and inner coat, called the *retina*, which is ſuppoſed to be merely an expanſion of the pulpy ſubſtance of the optic nerve, extending to the borders of the cryſtalline humour.

p, The greateſt part of the globe of the eye, within theſe ſeveral tunics, is filled by a very tranſparent and gelatinous humour, of conſiderable conſiſtence, which, from its ſuppoſed reſemblance to fuſed glaſs, is called the *vitreous humour*. It is inveſted by a very fine and delicate membrane, called *tunica vitrea*, and ſometimes *arachnoides*. It is ſuppoſed to be compoſed of two laminæ, one of which dips into its ſubſtance, and by dividing the humour into cells adds to its firmneſs. The fore-part of the vitreous humour is a little hollowed, to receive a very white and tranſparent ſubſtance of a firm texture, and of a lenticular and ſomewhat convex ſhape, named the *cryſtalline humour*. It is included in a *capſula*, which ſeems to be formed by a ſeparation of the two laminæ of the *tunica vitrea*.

q, The fore-part of the eye is filled by a very thin and tranſparent fluid, named the *aqueous humour*, which occupies all the ſpace between the cryſtalline and the prominent cornea. That part of the choroides which is called the *iris*, and which comes forward to form the pupil, appears to be ſuſpended, as it were, in this humour; and has occaſioned this portion of the eye to be diſtinguiſhed into two parts. One of theſe, which is the little ſpace between the anterior ſurface of the cryſtalline and the iris, is called the *poſterior chamber*; and the other, which is the ſpace between the iris and the cornea, is called the *anterior chamber* of the eye. Both theſe ſpaces are completely filled with the aqueous humour (L).

r, The eye receives its arteries from the internal carotid, and its veins empty themſelves chiefly into the external jugulars. Some of the ramifications of theſe veſſels appear on the inner ſurface of the iris, where they are ſeen to make very minute convolutions, which are ſufficiently remarkable to be diſtinguiſhed by the name of *circulus arterioſus*, though perhaps improperly, as they ſeem to be chiefly branches of veins.

ſ, The optic nerve paſſes in at the poſterior part of the eye, in a conſiderable trunk, to be expanded for the purpoſes of viſion, of which it is now univerſally ſuppoſed to be the immediate ſeat. But Meſſrs Mariotte and Mery contended, that the choroides is the ſeat of this ſenſe; and the ancients ſuppoſed the cryſtalline to be ſo. Beſides the optic, the eye receives branches from other nerves, but chiefly from the third pair.

t, The humours of the eye, together with the cornea, are calculated to refract and converge the rays of light in ſuch a manner as to form at the bottom of the eye a diſtinct image of the object we look at; and the point where theſe rays meet, is called the *focus* of the eye. On the retina, as in a *camera obſcura*, the object is painted in an inverted poſition; and it is only by habit that we are enabled to judge of its true ſituation, and likewiſe of its diſtance and magnitude. To a young gentleman, who was born blind, and who was couched by Mr Cheſelden, every object (as he expreſſed himſelf) ſeemed to touch his eyes, as what he felt did his ſkin; and he thought no objects ſo agreeable as thoſe which were ſmooth and regular, altho' for ſome time he could form no judgment of their ſhape, or gueſs what it was in any of them that was pleaſing to him.

u, In order to paint objects diſtinctly on the retina, the cornea is required to have ſuch a degree of convexity, that the rays of light may be collected at a certain point ſo as to terminate exactly on the retina. If the cornea is too prominent, the rays, by diverging too ſoon, will be united before they reach the retina, as is the caſe with near-ſighted people, or *myopes*: and, on the contrary, if it is not ſufficiently convex, the

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ters into the eye at its poſterior part; and as only its pulpy ſubſtance is ſuppoſed to form the *retina*, the *ſclerotica* has with great probability been aſcribed to the dura matral covering of that nerve.

(G) The inner lamina is exceedingly vaſcular; and having been firſt deſcribed by Ruyſch, is called *Ruyſchiana*.

(H) M. Lieutard ſeems with more propriety to have named it *plexus ciliaris*, as it appears to be formed by very numerous and minute filaments of nerves of the third pair.

(I) The *iris* has been ſometimes deſcribed as a diſtinct coat, and called *uvea*.

(K) Beſides theſe proceſſes, anatomiſts uſually deſcribe the circular fibres of the iris, but they do not ſeem to be capable of demonſtration. The *proceſſus ciliares* have likewiſe been differently ſpoken of, being ſometimes deſcribed as being compoſed of muſcular fibres, and ſometimes as being of a ligamentous texture; but a later and more probable opinion is, that they are neither muſcular nor ligamentary, but filaments of nerves derived from the *plexus ciliaris*.

(L) When the cryſtalline becomes opaque ſo as to prevent the paſſage of the rays of light to the retina, it conſtitutes what is called a *cataract*; and the operation of couching conſiſts in removing the diſeaſed chryſtaline from its bed in the vitreous humour. In this operation, the cornea is perforated, and the aqueous humour eſcapes out of the eye; but it is conſtantly renewed again in a very ſhort time. The manner, however, in which it is ſecreted, has not yet been determined.

rays will not be perfectly united when they reach the back part of the eye; and this happens to long-ſighted people, or *proſbi*, being found conſtantly to take place as we approach to old age, and the eye gradually flattens (M). Theſe defects are to be ſupplied by means of glaſſes. He who has too prominent an eye, will find his viſion improved by means of a concave glaſs; and, upon the ſame principles, a convex glaſs will be found uſeful to a perſon whoſe eye is naturally too flat.

EXPLANATION OF PLATE XXI.

FIGURE I. Shews the lachrymal canals, after the common teguments and bones have been cut away.

a, The lachrymal gland. b, The two puncta lachrymalia, from which the two lachrymal canals proceed to c, the lachrymal ſac. d, The large lachrymal duct. e, Its opening into the noſe. f, The caruncula lachrymalis. g, The eye-ball.

FIG. 2. An anterior view of the coats and humours of the eye.

a a a a, The tunica ſclerotica cut in four angles, and turned back. b b b b, The tunica choroides adhering to the inſide of the ſclerotica, and the ciliary veſſels are ſeen paſſing over—c c, The retina, which covers the vitreous humour. d d, The ciliary proceſſes, which were continued from the choroid coat. e e, The iris. f, The pupil.

FIG. 3. Shews the optic nerves, and muſcles of the eye.

a a, The two optic nerves before they meet. b, The two optic nerves conjoined. c, The right optic nerve. d, Muſculus attollens palpebræ ſuperioris. e, Attollens oculi. f, Abductor. g g, Obliquus ſuperior, or trochlearis. h, Adductor. i, The eye-ball.

FIG. 4. Shews the eye-ball with its muſcles.

a, The optic nerve. b, Muſculus trochlearis. c, Part of the os frontis, to which the trochlea or pully is fixed, through which,—d, The tendon of the trochlearis paſſes. e, Attollens oculi. f, Adductor oculi. g, Abductor oculi. h, Obliquus inferior. i, Part of the ſuperior maxillary bone to which it is fixed. k, The eye-ball.

FIG. 5. Repreſents the nerves and muſcles of the right eye, after part of the bones of the orbit have been cut away.

A, The eye-ball. B, The lachrymal gland. C, Muſculus abductor oculi. D, Attollens. E, Levator palpebræ ſuperioris. F, Depreſſor oculi. G, Adductor. H, Obliquus ſuperior, with its pulley. I, Its inſertion into the ſclerotic coat. K, Part of the obliquus inferior. L, The anterior part of the os frontis cut. M, The criſta galli of the ethmoid bone. N, The poſterior part of the ſphenoid bone. O, Tranſverſe ſpinous proceſs of the ſphenoid bone. P. The carotid artery, denuded where it paſſes thro' the bones. Q, the carotid artery within the cranium. R, The ocular artery.

NERVES.—a a, The optic nerve. b, The third pair.—c, Its joining with a branch of the firſt branch of the fifth pair, to form l, The lenticular ganglion,—which ſends off the ciliary nerves, d. e e, The fourth pair. f, The trunk of the fifth pair. g, The firſt branch of the fifth pair, named ophthalmic.—h, The frontal branch of it. i, Its ciliary branches, along with which the naſal twig is ſent to the noſe. k, Its branch to the lachrymal gland. l, The lenticular ganglion. m, The ſecond branch of the fifth pair, named ſuperior maxillary. n, The third branch of the fifth pair, named inferior maxillary. o, The ſixth pair of nerves,—which ſends off p, The beginning of the great ſympathetic. q, The remainder of the ſixth pair, ſpent on c, The abductor oculi.

FIG. 6. Repreſents the head of a youth, where the upper part of the cranium is ſawed off,—to ſhew the upper part of the brain, covered by the pia mater, the veſſels of which are minutely filled with wax.

A A, The cut edges of the upper part of the cranium. B, The two tables and intermediate diploe. B B, The two hemiſpheres of the cerebrum. C C. The inciſure made by the falx. D, Part of the tentorium cerebello ſuper expanſum. E, Part of the falx, which is fixed to the criſta galli.

FIG. 7. Repreſents the parts of the external ear, with the parotid gland and its duct.

a a, The helix. b, The antihelix. c, The antitragus. d, The tragus. e, The lobe of the ear. f, The cavitas innominata. g, The ſcapha. h, The concha. i i, The parotid gland. k, A lymphatic gland, which is often found before the tragus. l, The duct of the parotid gland. m, Its opening into the mouth.

FIG. 8. A view of the poſterior part of the external ear, meatus auditorius, tympanum, with its ſmall bones, and Euſtachian tube of the right ſide.

a, The back part of the meatus, with the ſmall ceruminous glands. b, The incus. c, Malleus. d, The chorda tympani. e, Membrana tympani. f, The Euſtachian tube. g, Its mouth, from the fauces.

FIG. 9. Repreſents the anterior part of the right external ear, the cavity of the tympanum—its ſmall bones, cochlea, and ſemi-circular canals.

a, The malleus. b, Incus with its long leg, reſting upon the ſtapes. c, Membrana tympani. d, e, The Euſtachian tube, covered by part of—f f, The muſculus circumflexus palati. 1, 2, 3, The three ſemicircular canals. 4, The veſtible. 5, The cochlea. 6, The portio mollis of the ſeventh pair of nerves.

FIG. 10. Shews the muſcles which compoſe the fleſhy ſubſtance of the tongue.

a a, The tip of the tongue, with ſome of the papillæ minimæ. b, The root of the tongue. c, Part of the membrane of the tongue, which covered the epiglottis. d d, Part of the muſculus hyo-gloſſus. e, The lingualis. f, Genio-gloſſus. g g, Part of the ſtylo-gloſſus.

(M) Upon this principle they who in their youth are near-ſighted may expect to ſee better as they advance in life, and their eyes gradually become more flat.

Plate XXI.

Fig. 3.

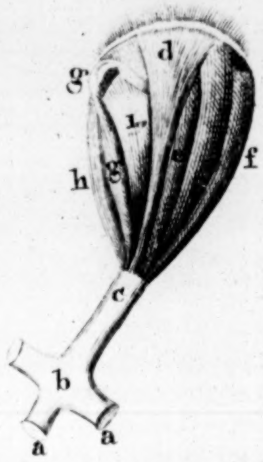
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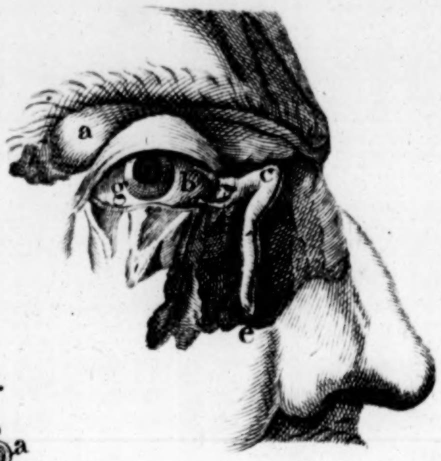
Fig. 1.



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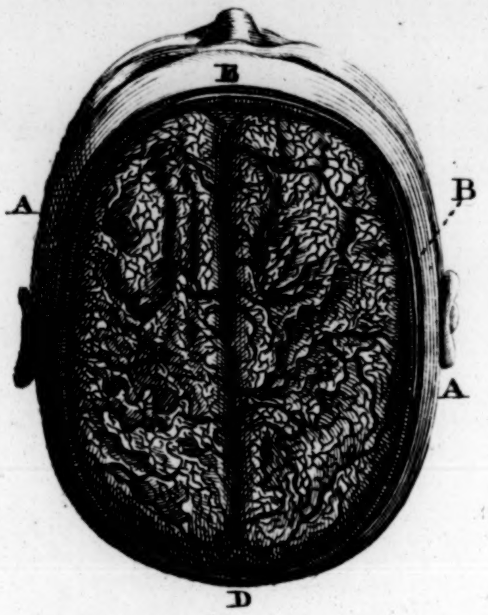

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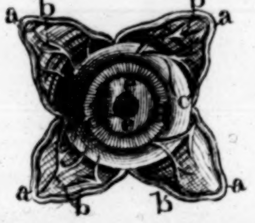

Fig. 7.

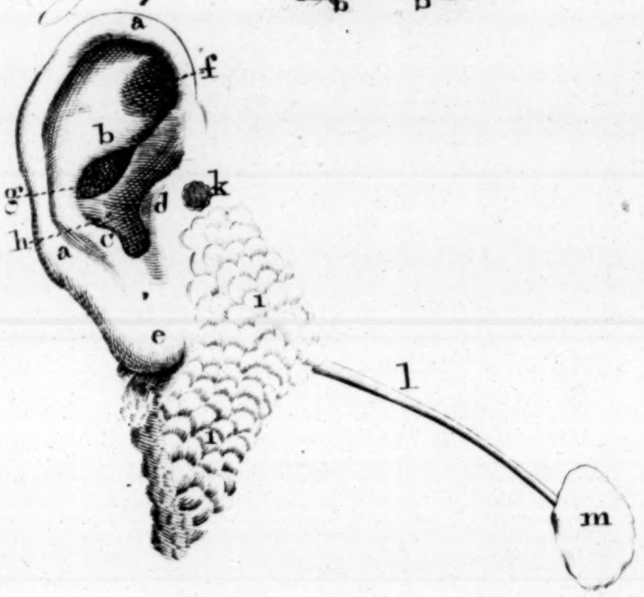
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Fig. 4.

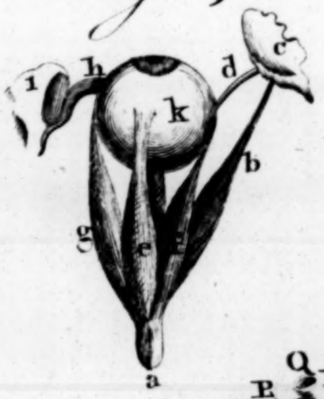

Fig. 5.

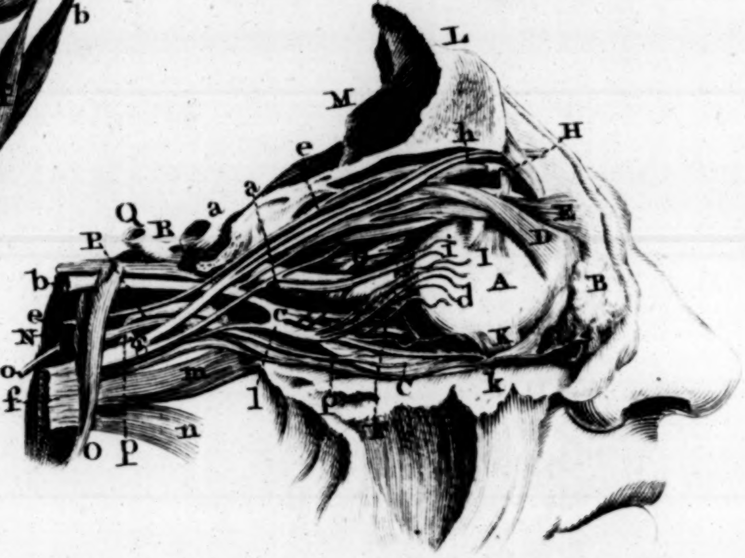
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Fig. 10.

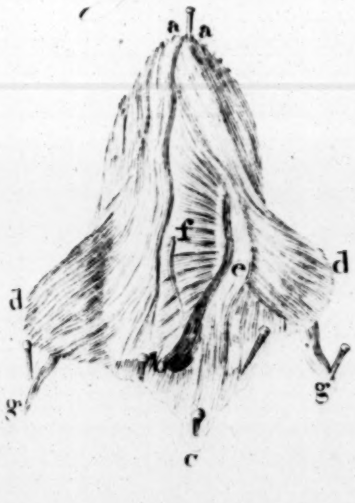

Fig. 9.

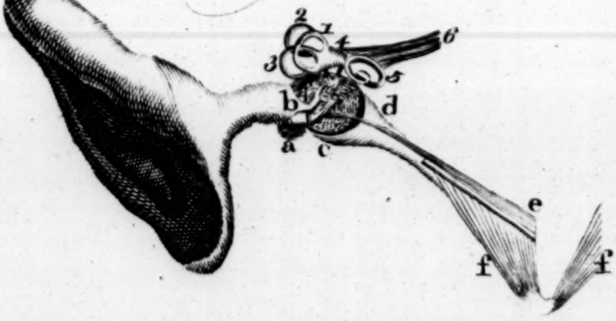
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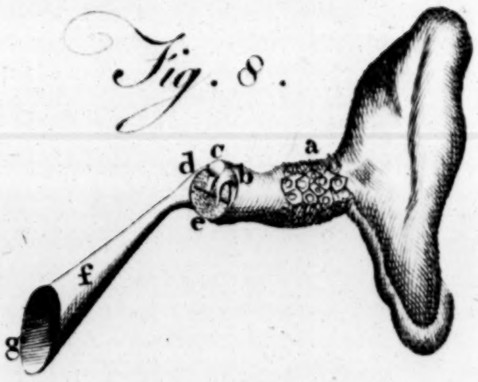
Fig. 8.



A. Bell Sculpt.

3 MA 53

ANATOMY *of Plants*. See PLANTS.

ANATOMY *of Brutes*. See COMPARATIVE *Anatomy*.

ANAXAGORAS, one of the moſt celebrated philoſophers of antiquity, was born at Clazomene in Ionia about the 70th Olympiad. He was diſciple of Anaximenes; and gave up his patrimony, to be more at leiſure for the ſtudy of philoſophy. He went firſt to Athens, and there taught eloquence; after which, having put himſelf under the tuition of Anaximenes, he gave leſſons in philoſophy in the ſame city. Theſe he only gave to ſome particular friends and diſciples, and with extreme caution. This, however, did not prevent, but rather was the cauſe of, his being accuſed of impiety, and thrown into priſon, notwithſtanding the credit and influence of Pericles, who was his diſciple and intimate. Having been condemned to exile, he calmly yielded to the efforts of envy, and opened ſchool at Lampſacum, where he was extremely honoured during the remainder of his life, and ſtill more after his death, having had ſtatues erected to his memory. He is ſaid to have made ſome predictions relative to the phenomena of nature, upon which he wrote ſome treatiſes. His principal tenets may be reduced to the following. All things were in the beginning confuſedly placed together, without order and without motion. The principle of things is at the ſame time one and multiplex, which obtained the name of *homœmeries*, or ſimilar particles, deprived of life. But there is beſide this, from all eternity, another principle, namely an infinite and incorporeal ſpirit, who gave theſe particles a motion; in virtue of which, ſuch as are homogeneal united, and ſuch as were heterogeneal ſeparated according to their different kinds. In this manner all things being put into motion by the ſpirit, and ſimilar things being united to ſuch as were ſimilar, ſuch as had a circular motion produced heavenly bodies, the lighter particles aſcended, thoſe which were heavy deſcended. The rocks of the earth, being drawn up by the force of the air, took fire, and became ſtars, beneath which the ſun and moon took their ſtations. Thus he did not look upon the ſtars as divinities.

ANAXARCHUS, a philoſopher of Abdera, highly eſteemed by Alexander the Great. His end was peculiarly tragical: having the misfortune to fall into the hands of the enemy, they pounded him alive in a mortar.

ANAXIMANDER, a famous Greek philoſopher, born at Miletus in the 42d olympiad, in the time of Polycrates tyrant of Samos. He was the firſt who publicly taught philoſophy, and wrote upon philoſphical ſubjects. He carried his reſearches into nature very far for the time in which he lived. It is ſaid, that he diſcovered the obliquity of the Zodiac, was the firſt who publiſhed a geographical table, invented the gnomon, and ſet up the firſt ſun-dial in an open place at Lacedæmon, He taught, that infinity of things was the principal and univerſal element; that this infinite always preſerved its unity, but that its parts underwent changes; that all things came from it; and that all were about to return into it. According to all appearance, he meant by this obſcure and indeterminate principle the chaos of the other philoſophers. He aſſerted, that there are an infinity of worlds; that the ſtars are compoſed of air and fire, which are carried in their ſpheres, and that theſe ſpheres are gods; and that the earth is placed in the midſt of the univerſe, as in a common centre. He added, that infinite worlds were the product of infinity, and that corruption proceeded from ſeparation.

ANAXIMENES, born at Miletus, an eminent Greek philoſopher, friend, ſcholar, and ſucceſſor of Anaximander. He diffuſed ſome degree of light upon the obſcurity of his maſter's ſyſtem. He made the firſt principle of things to conſiſt in the air, which he conſidered as immenſe or infinite, and to which he aſcribed a perpetual motion. He aſſerted, that all things which proceeded from it, were definite and circumſcribed; and that this air, therefore, was God; ſince the divine power reſided in it and agitated it. Coldneſs and moiſture, heat and motion, rendered it viſible, and dreſſed it in different forms, according to the different degrees of its condenſation. All the elements thus proceed from heat and cold. The earth was, in his opinion, one continued flat ſurface.

ANAXIMENES, the ſon of Ariſtocles of Lampſacus, an orator, the diſciple of Diogenes the Cynic, and of Zoilus the railer againſt Homer. He was preceptor to Alexander of Macedon, and followed him to the wars. Alexander being incenſed againſt the people of Lampſacus, they ſent this philoſopher to intercede for them. Alexander knowing the cauſe of his coming, ſwore that he would do the very reverſe of whatever he deſired of him. Anaximenes begged of him to deſtroy Lampſacus. Alexander, unwilling to break his oath, and not able to elude this ſtratagem, pardoned Lampſacus much againſt his will.

ANAXIMANDRIANS, in the hiſtory of philoſophy, the followers of Anaximander; the moſt ancient of the philoſophical athieſts, who admitted of no other ſubſtance in nature but matter.

ANAZARBUS, (Pliny); ANAZARBA, (Stephanus); a town of Cilicia, on the river Pyramus, the birth place of Dioſcorides, and of the poet Oppian. It was ſometimes called *Cæſarea*, in honour either of Auguſtus or of Tiberius. The inhabitants are called *Anazarbeni*, (Pliny); and on coins *Anazarbeis*, after the Greek idiom. It was deſtroyed by a dreadful earthquake in the year 525, along with ſeveral other important cities: but they were all repaired at a vaſt expence by the emperor Juſtin; who was ſo much affected with their misfortune, that, putting off the diadem and purple, he appeared for ſeveral days in ſackcloth.

ANCARANO, a town of Italy, in the march of Ancona, ſituated in E. Long. 14. 54. N. Lat. 42. 48.

ANCASTER, a town of Lincolnſhire, ſituated in W. Long. 30. N. Lat. 52. 30. It gives the title to a duke.

ANCENIS, a town of France, in the province of Britany. W. Long. 1. 9. N. Lat. 47. 20.

ANCESTORS, thoſe from whom a perſon is deſcended in a ſtraight line.

ANCHILOPS, a ſmall tumour in the great angle of the eye, frequently degenerating into an abſceſs or fiſtula lachrymalis.

ANCHISES in fabulous hiſtory, a Trojan prince, deſcended from Dardanus, and the ſon of Capys. Venus made love to him in the form of a beautiful nymph; and bore him Æneas, the hero of Virgil's Æneid.

ANCHOR, (*anchora*, Lat. from αγκυρα, Greek,) a heavy, ſtrong, crooked inſtrument of iron, dropped from a ſhip into the bottom of the water, to retain her in a convenient ſtation in a harbour, road, or river.

The moſt ancient anchors are ſaid to have been of ſtone; and ſometimes of wood, to which a great quantity of lead was uſually fixed. In ſome places, baſkets full of ſtones, and ſacks filled with ſand, were employed for the ſame uſe. All theſe were let down by cords into the ſea, and by their weight ſtayed the courſe of the ſhip. Afterwards they were compoſed of iron, and furniſhed with teeth, which, being faſtened to the bottom of the ſea, preſerved the veſſel immoveable; whence οδοντες and *dentes* are frequently taken for anchors in the Greek and Latin poets. At firſt there was only one tooth, whence anchors were called ετεροστομοι: but in a ſhort time the ſecond was added by Eupalamus, or Anacharſis, the Scythian philoſopher. The anchors with two teeth were called αμφιβολοι, or αμφιστομοι; and from ancient monuments appear to have been much the ſame with thoſe uſed in our days, only the tranſverſe piece of wood upon their handles (the ſtock) is wanting in all of them. Every ſhip had ſeveral anchors, one of which, ſurpaſſing all the reſt in bigneſs and ſtrength, was peculiarly termed ιερα or *ſacra*, and was never uſed but in extreme danger; whence *ſacram anchoram ſolvere*, is proverbially applied to ſuch as are forced to their laſt refuge.

The anchors now made are contrived ſo as to ſink into the ground as ſoon as they reach it, and to hold a great ſtrain before they can be looſened or diſlodged from their ſtation. They are compoſed of a ſhank, a ſtock, a ring, and two arms with their flukes. The ſtock, which is a long piece of timber fixed acroſs the ſhank, ſerves to guide the flukes in a direction perpendicular to the ſurface of the ground; ſo that one of them ſinks into it by its own weight as ſoon as it falls, and is ſtill preſerved ſteadily in that poſition by the ſtock, which, together with the ſhank, lies flat on the bottom. In this ſituation it muſt neceſſarily ſuſtain a great effort before it can be dragged through the earth horizontally. Indeed this can only be effected by the violence of the wind or tide, or of both of them, ſometimes increaſed by the turbulence of the ſea, and acting upon the ſhip ſo as to ſtretch the cable to its utmoſt tenſion, which accordingly may diſlodge the anchor from its bed, eſpecially if the ground be ſoft and oozy, or rocky. When the anchor is thus diſplaced, it is ſaid, in the ſea-phraſe, to *come home*.

Plate XXII. Fig. 1. nº 1.

That the figure of this uſeful inſtrument may be more clearly underſtood, let us ſuppoſe a long maſſy beam of iron erected perpendicularly, *b*, at the lower end of which are two arms, *d e*, of equal thickneſs with the beam (uſually called the *ſhank*), only that they taper towards the points, which are elevated above the horizontal plane at an angle of thirty degrees, or inclined to the ſhank at an angle of ſixty degrees; on the upper part of each arm (in this poſition) is a fluke or thick plate of iron, *g h*, commonly ſhaped like an iſoſceles triangle whoſe baſe reaches inwards to the middle of the arm. On the upper end of the ſhank is fixed the ſtock tranſverſely with the flukes; the ſtock is a long beam of oak, *f*, in two parts, ſtrongly bolted, and hooped together with iron rings. See alſo Nº 2. Cloſe above the ſtock is the ring *a*, to which the cable is faſtened, or *bent:* the ring is curiouſly covered with a number of pieces of ſhort rope, which are twiſted about it, ſo as to form a very thick texture or covering called the *puddening*, and uſed to preſerve the cable from being fretted or chafed by the iron.

Every ſhip has, or ought to have, three principal anchors, with a cable to each, *viz.* the ſheet, *maitreſſe-ancre*, (which is the *anchora ſacra* of the ancients); the beſt bower, *ſecond ancre;* and ſmall bower, *ancre d'aſſourche*, ſo called from their uſual ſituation on the ſhip's bows. There are beſides ſmaller anchors, for removing a ſhip from place to place in a harbour or river, where there may not be room or wind for ſailing; theſe are the ſtream-anchor, *ancre de toue;* the kedge and grappling, *grapin*: this laſt, however, is chiefly deſigned for boats.

At Anchor, the ſituation of a ſhip which rides by her anchor in a road or haven, &c. Plate XXII, fig. 1. Nº 3. repreſents the fore-part of a ſhip as riding in this ſituation. See alſo Buoy-rope.

To fiſh the Anchor, to draw up the flukes upon the ſhip's ſide after it is catted. See the articles Davit and Fish.

To ſheer the ſhip to her Anchor, is to ſteer the ſhip's head towards the place where the anchor lies when they are heaving the cable into the ſhip; that the cable may thereby enter the hauſe with leſs reſiſtance, and the ſhip advance towards the anchor with greater facility.

Anchor-*Ground* is a bottom which is neither too deep, too ſhallow, nor rocky; as in the firſt the cable bears too nearly perpendicular, and is thereby apt to jerk the anchor out of the ground; in the ſecond, the ſhip's bottom is apt to ſtrike at low water, or when the ſea runs high, by which ſhe is expoſed to the danger of ſinking; and in the third, the anchor is liable to hook the broken and pointed ends of rocks, and tear away its flukes, whilſt the cable, from the ſame cauſe, is conſtantly in danger of being cut through as it rubs on their edges.

Anchor, in architecture, a ſort of carving, ſomewhat reſembling an anchor. It is commonly placed as part of the enrichments of the boultins of capitals of the Tuſcan, Doric, and Ionic orders, and alſo of the boultins of bed-mouldings of the Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately through the whole building.

Anchors, in heraldry, are emblems of hope, and are taken for ſuch in a ſpiritual as well as a temporal ſenſe.

Anchorage, in law, is a duty upon ſhips for the uſe of the port or harbour where they caſt anchor.

ANCHOVY, in ichthyology, the Engliſh name of the clupea encraſicolus. See Clupea.

ANCHUSA, Alkanet, a genus of the monogynia order, belonging to the pentandria claſs of plants; of which there are eight

Species. The officinalis, or greater garden-bugloſs, is a native of France and of the warmer parts of Europe, but will thrive well enough in Britain; but the roots ſeldom continue longer than two years in this country, unleſs they happen to grow in rubbiſh, or out of an old wall, where they will live three or four years. 2. The anguſtifolia, or perennial wild borage, grows to the height of two feet when cultivated in gardens; but in thoſe places where it grows wild is ſeldom more than a foot and an half high. The leaves of this ſort are narrow; the ſpikes of flowers come out double, and have no leaves about them ; the flowers are ſmall, and of a red colour. The roots will continue two years in a poor ſoil. 3. The undulata, or Portugal bugloſs, is a biennial plant, which grows to the height of two feet, and ſends out many lateral branches. The flowers are of a bright blue colour, and grow in an imbricated ſpike. 4. The orientalis, or eaſtern bugloſs, is a native of the Levant ; but hardy enough to bear the open air in Britain, if it hath a dry ſandy ſoil. It is a perennial plant, with long trailing branches which lie on the ground. The flowers are yellow, and about the ſize of the common bugloſs, and there is a ſucceſſion of theſe on the ſame plants great part of the year. 5. The virginiana, or puccoon, grows naturally in the woods of North America ; and being an early plant, generally flowers before the new leaves come out on the trees ; ſo that in ſome woods where it abounds, the ground ſeems entirely covered with its yellow flowers. It is a perennial plant, which ſeldom riſes a foot high in good ground, but not above half that height where the ſoil is poor. The flowers grow in looſe ſpikes upon ſmooth ſtalks. 6. The ſempervirens, or evergreen borage, is a very hardy perennial plant, with weak trailing branches. It grows naturally in ſome parts of Britain and Spain. The flowers are blue, and come out between the leaves on the ſpike, like the fourth ſort. They appear during a great part of the year. 7. The cretica, or warted bugloſs of Crete, is a low trailing annual plant, whoſe branches ſeldom extend more than ſix inches. The flowers are ſmall, of a bright blue colour, and are collected into ſmall bunches at the extremity of the branches. The plants periſh ſoon after their ſeeds are ripe. 8. The tinctoria, or true alkanet, grows naturally in the Levant, but is equally hardy with the firſt ſpecies. The flowers grow in long ſpikes, coming out *imbricatim*, like the tiles of a houſe.

Culture. All the ſpecies of anchuſa may be propagated by ſeeds ; which ſhould be ſown, either in the ſpring or autumn, upon a bed of light ſandy earth ; and when the plants are ſtrong enough to be removed, they muſt be planted on beds at two feet diſtance from one another, and watered, if the ſeaſon requires it, till they have taken root ; after which they will require no other care than to keep them free from weeds.

Medicinal Uſes, &c. The flowers of the firſt ſpecies have obtained the name of *cordial* flowers ; to which they have no other title than that they moderately cool and ſoften, without offending the palate or ſtomach ; and thus, in warm climates, or in hot diſeaſes, may in ſome meaſure refreſh the patient. The root of the tinctoria is likewiſe uſed, not as poſſeſſed of any medicinal virtue, but on account of its imparting an elegant red colour to oily ſubſtances ; ſo is frequently directed as a colouring ingredient for ointments, plaſters, &c. As the colour is confined to the cortical part, the ſmall roots are to be preferred, as having proportionably more bark than the large ones. The alkanet root which grows in England is greatly inferior to what comes from abroad.

ANCIENT, or **Antient**, a term applied to things which exiſted long ago, thus we ſay, ancient nations, ancient cuſtoms, &c.

Ancient, ſometimes denotes elderly, or of long ſtanding, in oppoſition to young, or new ; thus we ſay, an ancient barriſter, ancient buildings.

Ancient, in a military ſenſe, denotes either the enſign or colours.

Ancient, in ſhips of war, the ſtreamer or flag borne in the ſtern.

ANCILLON (David) a miniſter of the reformed church at Metz, where he was born the 17th of March 1617. He ſtudied from the ninth or tenth year of his age in the Jeſuits college, where he gave ſuch proofs of his genius, that the heads of the ſociety tried every means to draw him over to their religion and party ; but he continued firm againſt their attacks. He went to Geneva in 1623 ; and ſtudied divinity under Spanheim, Diodati, and Tronchin, who conceived a very great eſteem for him. He left Geneva in April 1641, and offered himſelf to the ſynod of Charenton in order to take upon him the office of a miniſter : his abilities were greatly admired by the examiners, and the whole aſſembly were ſo highly pleaſed with him, that they gave him the church of Meaux, the moſt conſiderable then unprovided for. Here he acquired a vaſt reputation for his learning, eloquence, and virtue, and was even highly reſpected by thoſe of the Roman-catholic communion. He returned to his own country in the year 1653, where he remained till the revocation of the edict of Nantes in 1685. He retired to Francfort after this fatal blow ; and having preached in the French church at Hanau, the whole congregation were ſo edified by it, that they immediately called together the heads of the families, in order to propoſe that he might be invited to accept of being miniſter there. The propoſition was agreed to ; and he began the exerciſe of his miniſtry in that church about the end of the year 1685. His preaching made ſo great a noiſe at Hanau, that the profeſſors of divinity, and the German and Dutch miniſters, attended his ſermons frequently : the count of Hanau himſelf, who had never before been ſeen in the French church, came thither to hear Mr Ancillon : they came from the neighbouring parts, and even from Francfort ; people who underſtood nothing of French flocked together with great eagerneſs, and ſaid they loved to ſee him ſpeak. This occaſioned a great jealouſy in the two other miniſters ; which tended to make his ſituation uneaſy. He therefore went to Berlin ; where he met with a kind reception from his highneſs the elector, and was made miniſter of the city. Here he had the pleaſure of ſeeing his eldeſt ſon made judge and director of the French in the ſame city, and his other ſon rewarded with a penſion and entertained at the univerſity of Francfort upon the Oder. He had likewiſe the ſatisfaction of ſeeing his brother made judge of all the French in the ſtates of Brandenburg ; and Mr Cayart his ſon-in-law, engineer to his electoral highneſs. He enjoyed theſe agreeable circumſtances, and ſeveral others, till his death, which happened at Berlin the 3d of September, 1692, when he was 75 years of age.—Mr Ancillon having got a conſiderable fortune by marriage, was enabled thereby to gratify his paſſion for books ; his library was accordingly very curious and large, and he increaſed it every day with all that appeared new and important in the republic of letters, ſo that at laſt it was one of the nobleſt collections in the hands of any private perſon in the kingdom. He publiſhed a book, in quarto, in which the whole diſpute concerning Traditions is fully examined : he alſo wrote an apology for Luther, Zuinglius, Calvin, and Beza, and ſeveral other pieces.

ANCLAM, a ſtrong town of Germany, in the circle of Upper Saxony, and duchy of Pomerania, remarkable for its excellent paſtures. It is ſeated on the river Pene. E. Long. 14. 5. N. Lat. 54. 10.

ANCONA (marquiſate of), a province in the pope's territories in Italy. It lies between the gulph of Venice and mount Appenine, which bound it on the north; Abruzzo on the eaſt; the duchy of Spoletto, and that of Urbino, on the weſt. The air is indifferent; but the ſoil is fruitful, particularly in hemp and flax; and there is great plenty of wax and honey. It contains ſeveral large towns, as Fermo, Loretto, Recanati, Macerata, Jeſi, Tolentino, Aſcoli, Oſimo, St Severino, Monte Alto, Camerino, and Ripatranſone, which are all archiepiſcopal or epiſcopal ſees.

Ancona, a ſea-port town of Italy, the capital of the marquiſate of that name, and the ſee of a biſhop. It was formerly the fineſt port in all Italy, being built by the emperor Trajan, about the year 115; but was almoſt ruined, and its trade loſt: however, it has again begun to revive. Its harbour is the beſt in all the pope's dominions. The town lies round it on two hills; one of which is at the point of Cape St Cyriaco, from whence there is a delightful proſpect. On the other ſtands the citadel, which commands the town and harbour. The ſtreets of this city are narrow and uneven; and the public and private buildings inferior to thoſe of the other great towns in Italy. The cathedral is a low dark ſtructure; and though the front is covered with fine marble, the architecture has neither beauty nor regularity. The church of St Dominic, and that of the Franciſcans, have each an excellent picture of Titian. The exchange, where the merchants meet, is a handſome ſquare portico, in which is an equeſtrian ſtatue of Trajan, who firſt built the port. At the four corners are four other ſtatues. The triumphal arch of Trajan remains almoſt entire, with its inſcription. The common people in this town are a little particular and fantaſtical in their dreſs, but the better ſort follow the French mode. It is a great thorough-fare from the north of Italy to Loretto; which renders proviſions very dear. The tide does not riſe here above a foot, and near the Mediterranean it is ſcarce viſible. E. Long. 15. 5. N. Lat. 43. 36.

ANCONES, in architecture, the corners or coins of walls, croſs-beams, or rafters.—Vitruvius calls the *conſoles* by the ſame name.

ANCONY, in the iron-works, a piece of half-wrought iron, of about three quarters of 100 weight, and of the ſhape of a bar in the middle, but rude and unwrought at the ends. The proceſs for bringing the iron to this ſtate is this: They firſt melt off a piece from a ſow of caſt-iron, of the proper ſize; this they hammer at the forge into a maſs of two feet long, and of a ſquare ſhape, which they call a *bloom;* when this is done, they ſend it to the finery, where, after two or three heats and workings, they bring it to this figure, and call it an *ancony*. The middle part beat out at the finery, is about three feet long, and of the ſhape and thickneſs the whole is to be; this is then ſent to the chafery, and there the ends are wrought to the ſhape of the middle, and the whole made into a bar. See Bar.

ANCORARUM URBS, Αγκυρων Πολις, a city in the Nomos Aphroditopolites, towards the Red Sea; ſo called becauſe there was in the neighbourhood a ſtone quarry, in which they hewed ſtone anchors (Ptolemy), before iron anchors came to be uſed. The gentilitious name is *Ancyropolites*, (Stephanus).

ANCOURT (Florent-Carton d'), an eminent French actor and dramatic writer, born at Fontainbleau, October 1661. He ſtudied in the Jeſuits college at Paris, under father De la Rue; who, diſcovering in him a remarkable vivacity and capacity for learning, was extremely deſirous of engaging him in their order; but Ancourt's averſion to a religious life rendered all his efforts ineffectual. After he had gone through a courſe of philoſophy, he applied himſelf to the civil law, and was admitted advocate at 17 years of age. But falling in love with an actreſs, he was induced to go upon the ſtage, and he married her. As he had all the qualifications neceſſary for the theatre, he ſoon greatly diſtinguiſhed himſelf: and not being ſatisfied with the applauſe only of an actor, he began to write pieces for the ſtage; many of which had ſuch prodigious ſucceſs, that moſt of the players grew rich from the profits of them. His merit in this way procured him a very favourable reception at court; and Lewis XIV. ſhewed him many marks of his favour. His ſprightly converſation and polite behaviour made his company agreeable to all the men of figure both at court and in the city, and the moſt conſiderable perſons were extremely pleaſed to have him at their houſes. Having taken a journey to Dunkirk, to ſee his eldeſt daughter who lived there, he took the opportunity of paying his compliments to the elector of Bavaria, who was then at Bruſſels: this prince received him with the utmoſt civility; and having detained him a conſiderable time, diſmiſſed him with a preſent of a diamond valued at 1000 piſtoles: he likewiſe rewarded him in a very generous manner, when, upon his coming to Paris, Ancourt compoſed an entertainment for his diverſion. Ancourt began at length to grow weary of the theatre, which he quitted in Lent 1718, and retired to his eſtate of Courcelles le Roy, in Berry, where he applied himſelf wholly to devotion, and compoſed a tranſlation of David's Pſalms in verſe, and a ſacred tragedy, which were never printed. He died the 6th of December, 1726, being 65 years of age.—The plays which he wrote are 52 in all; moſt of which were printed ſeparately at the time when they were firſt repreſented: they were afterwards collected into five volumes, then into ſeven, and at laſt into nine. This laſt edition is the moſt complete.

ANCRE, a ſmall town of France, in Picardy, with the title of a marquiſate, ſeated on a little river of the ſame name. E. Long. 2. 45. N. Lat. 49. 59.

ANCUS MARTIUS, the fourth king of the Romans, ſucceeded Tullius Hoſtilius, 639 years before Chriſt. He defeated the Latins, ſubdued the Fidenates, conquered the Sabines, Volſcii, and Veientines, enlarged Rome by joining to it mount Janicula, and made the harbour of Oſtia. He died about 615 years before the Chriſtian æra.

ANCYLE, in antiquity, a kind of ſhield that fell, as was pretended, from heaven, in the reign of Numa Pompilius; at which time, likewiſe, a voice was heard declaring that Rome ſhould be miſtreſs of the world as long as ſhe ſhould preſerve this holy buckler. It was kept with great care in the temple of Mars, under the direction of twelve prieſts; and leſt any ſhould attempt to ſteal it, eleven others were made ſo like, as not to be diſtinguiſhed from the ſacred one. Theſe ancylia were carried in proceſſion every year round the city of Rome.

Ancyle, in ſurgery. See Ancyloſis.

ANCYLOBLEPHARON, (from αγκυλος bent, and βλεφαρον an eye-lid); a diſeaſe of the eye, which cloſes the eye-lids. Sometimes the eye-lids grow together, and alſo to the tunica albuginea of the eye, from careleſſneſs when there is an ulcer in theſe parts. Both theſe caſes are called *ancyloblepharon* by the Greeks. This diſorder muſt be diſtinguiſhed from that coalition of the eye-lids which happens from viſcid matter gluing them together. If the coheſion is on the cornea, the ſight is inevitably loſt. This hath ſometimes happened in the ſmall-pox. If there is only a growing together of the eye-lids, they may be ſeparated with the ſpecillum, and pledgets kept between them to prevent their re-union. If the eye-lids adhere to the eye, they are to be ſeparated by a fine-edged knife; and their re-union is to be prevented by a proper uſe of injections, and lint placed between them, after dipping it in ſome proper liniment.

ANCYLOGLOSSUM, (from αγκυλος crooked, and γλωσσα the tongue); a contraction of the ligaments of the tongue. Some have this imperfection from their birth, others from ſome diſeaſe. In the firſt caſe, the membrane which ſupports the tongue is too ſhort or too hard: in the latter, an ulcer under the tongue, healing and forming a cicatrix, is ſometimes the cauſe; theſe ſpeak with ſome difficulty. The ancylogloſſi by nature are late before they ſpeak; but when they begin, they ſoon ſpeak properly. Theſe we call *tongue-tied*. Mauriceau ſays, that in this caſe it is a ſmall membranous production, which extends from the frænulum to the tip of the tongue, that hinders the child from ſucking, &c. He juſtly condemns the cruel practice among nurſes, of tearing this membrane with their nails; for thus ulcers are ſometimes formed, which are of difficult cure: he adviſes to ſnip it with ſciſſars in two or three places, taking care not to extend the points of the ſciſſars ſo far as the frænulum. The inſtances rarely occur which require any kind of aſſiſtance; for if the child can thruſt the tip of its tongue to the outer edge of its lip, this diſeaſe does not exiſt; and if the tongue is not greatly reſtrained, the frænulum will ſtretch by the child's ſucking and crying. Beſides, without an abſolute neceſſity for it, an operation ſhould not be admitted of; for, without great circumſpection, by cutting the frænulum, the nerves paſſing there may be alſo cut, and then a loſs of ſpeech is the conſequence. Sometimes the tongue is bound down with a fleſhy ſubſtance: when that is the caſe, it ſhould never be cut through, becauſe a dangerous hæmorrhage would follow, without any attending advantage; all that is adviſeable in this circumſtance, is to deſire the nurſe, now and then, to ſtretch it gently by a light preſſure on it with her finger-end. When, in conſequence of delivering a child by the feet, a ſwelling is obſerved under the tongue, the nurſe ſhould be forbid to uſe any means, for the complaint will be increaſed thereby: this tumour will ſoon ſubſide.

ANCYLOSIS, in ſurgery, implies a diſtortion or ſtiffneſs of the joints, cauſed by a ſettlement of the humours, or a diſtenſion of the nerves, and therefore remedies of a mollifying and relaxing nature are required.

ANCYRA, the capital of Galatia, (Livy, Pliny, Ptolemy); at no great diſtance from the river Halys, (Livy): ſaid to be built by Midas, king of Phrygia, and to take its name from an anchor found there, (Pauſanias). It was greatly improved by Auguſtus, deemed the ſecond founder of it, as appears from the *Marmor Ancyranum*. It is now called *Angura*, or *Angoura*. E. Long. 33°. Lat. 41. 20.

ANDABATÆ, in antiquity, a ſort of gladiators, who, mounted on horſeback or in chariots, fought hoodwinked, having a helmet that covered their eyes.

ANDALUSIA, is the moſt weſtern province of Spain, having Eſtremadura and La Mancha on the north; the kingdom of Granada, the ſtraits of Gibraltar, and the Ocean, on the eaſt and ſouth; and, on the weſt, the kingdom of Algarva in Portugal, from which it is ſeparated by the river Guadiana. It is about 182 miles long, and 150 broad. The chief cities and towns are Seville the capital, Baeza, Gibraltar, Corduba, Cadiz, Medina Sidonia, Jaen, Port St Mary, *&c.* It is the beſt, moſt fruitful, and the richeſt part of all Spain. There is a good air, a ſerene ſky, a fertile ſoil, and a great extent on the ſea-coaſt fit for commerce.

New Andalusia, a diviſion of the province of Terra Firma in South America, whoſe boundaries cannot be well aſcertained, as the Spaniards pretend a right to countries in which they have never eſtabliſhed any ſettlements. According to the moſt reaſonable limits, it extends in length 500 miles from north to ſouth, and about 270 in breadth from eaſt to weſt. The interior country is woody and mountainous, variegated with fine valleys that yield corn and paſturage. The produce of the country conſiſts chiefly in dying-drugs, gums, medicinal roots, brazil-wood, ſugar, tobacco, and ſome valuable timber. To this province alſo belonged five valuable pearl-fiſheries. The capital of New Andaluſia is Comana, Cumana, or New Corduba, ſituated in N. Lat. 9. 55. about nine miles from the north ſea. Here the Spaniards laid the foundation of a town in the year 1520. The place is ſtrong by nature, and fortified by a caſtle capable of making a vigorous defence; as appeared in the year 1670, when it was aſſaulted by the bucaneers, who were repulſed with very great ſlaughter.

ANDAMAN, or Andeman Iſlands, in the Eaſt Indies, ſituated about 80 leagues diſtance from Tanaſſerim on the coaſt of Siam. They are but little known; only the Eaſt India ſhips ſometimes touch at them, and are ſupplied by the natives with rice, herbs, and fruits: the inhabitants are by ſome repreſented as an harmleſs inoffenſive race of men, and by others as cannibals. E. Long. 92. 0. N. Lat. from 10° to 15°.

ANDANTI, in muſic, ſignifies, eſpecially in thorough-baſſes, that the notes are to be played diſtinctly.

ANDECAVI, (Tacitus); Andegavi, (Pliny); Andes, (Cæſar); Andi, (Lucan); a people of Gallia Celtica, having the Turones to the eaſt, the Namnetes to the weſt, the Pictones to the ſouth, and the Aulerci Cœnomani to the north; now *Anjou*.

ANDEGAVI, or Andegavus, a town of Gallia Celtica, (Pliny, Ptolemy); now *Angiers*. Called *Andecavi*, (Tacitus.) W. Long. 30'. Lat. 47. 30.

ANDELY, a town of Normandy in France, parted in two by a paved cauſeway. Here is a fountain to which pilgrims flock from all parts, to be cured of their diſorders, on the feaſt-day of the ſaint to which it is dedicated. It is 20 miles S. E. of Rouen, and five N. W. of Paris. E. Long. 1. 30. N. Lat. 49. 20.

ANDENA, in old writers, denotes the ſwath made in mowing of hay, or as much ground as a man could ſtride over at once.

ANDEOL (St), a town of France, in the Vivarez, five miles S. of St Viviers, whoſe biſhop formerly reſided there. E. Long. 2. 50. N. Lat. 44. 24.

ANDERAB, the moſt ſouthern city of the province of Balkh, poſſeſſed by the Uſbeck Tartars. It is very rich and populous, but a place of no great ſtrength. The neighbouring mountains yield excellent quarries of lapis lazuli, in which the Bukhârs drive a great trade with Perſia and India.—This city is ſituated at the foot of the mountains dividing the dominions of the Great Mogul and Perſia from Great Bukharia. As there is no other way of croſſing theſe mountains but by the road through this city, all travellers with goods muſt pay 4 *per cent.* On this account the Khan of Balkh maintains a good number of ſoldiers in the place.

ANDERNACHT, a city of Cologne, in the circle of the Lower Rhine. It is ſituated in a plain on the river Rhine; and is fortified with a wall, caſtle, and bulwarks. It has a trade in ſtone jugs and pitchers, which are ſent to the mineral waters at Dunchſtein. There are three monaſteries here, and ſeveral churches. E. Long. 7. 4. N. Lat. 50. 27.

ANDERO (St), a ſea-port town in the bay of Biſcay, in Old Caſtile, ſeated on a ſmall peninſula. It is a trading town, and contains about ſeven hundred houſes, two pariſh-churches, and four monaſteries. Here the Spaniards build and lay up ſome of their men of war. W. Long. 4. 30. N. Lat. 43. 20.

ANDERSON (Sir Edmund), a younger ſon of an ancient Scotch family ſettled in Lincolnſhire. He was ſome time a ſtudent of Lincoln college, Oxford; and removed from thence to the Inner Temple, where he applied himſelf diligently to the ſtudy of the law, and became a barriſter. In the ninth of Queen Elizabeth, he was both lent and ſummer reader, and in the ſixteenth double reader. He was appointed her majeſty's ſerjeant at law in the nineteenth year of her reign; and ſome time after, one of the juſtices of aſſize. In 1582 he was made lord chief juſtice of the common pleas, and in the year following was knighted. He held his office to the end of his life, died in the year 1605, and was buried at Eyworth in Bedfordſhire. He was an able, but punctilious lawyer; a ſcourge to the Puritans; and a ſtrenuous ſupporter of the eſtabliſhed church. His works are, 1. Reports of many principal caſes argued and adjudged in the time of Queen Elizabeth, in the common bench. Lond. 1644, fol. 2. Reſolutions and judgments on the caſes and matters agitated in all the courts of Weſtminſter, in the latter end of the reign of Queen Elizabeth. Publiſhed by John Goldſborough, Eſq; Lond. 1653, *4to.* Beſides theſe, there is a manuſcript copy of his Readings ſtill in being.

ANDES, a great chain of mountains in South America, which running from the moſt northern part of Peru to the ſtraits of Magellan, between 3 and 4000 miles, are the longeſt and moſt remarkable in the world. The Spaniards call them the *Cordillera de los Andes;* they form two ridges, the lowermoſt of which is overſpread with woods and groves, and the uppermoſt covered with everlaſting ſnow. Thoſe who have been at the top, affirm, that the ſky is always ſerene and bright; the air cold and piercing; and yet ſo thin, that they were ſcarce able to breathe, and the reſpiration was much quicker than ordinary; and this is attended with reaching and vomiting; which, however, has been conſidered by ſome as merely accidental. When they looked downwards, the country was hid by the clouds that hovered on the mountain's ſides. The mountains juſt mentioned, which have been frequently aſcended, are much inferior in height to many others in this enormous chain. The following is the account given of the mountain called *Pichincha*, by the mathematicians ſent by the kings of France and Spain to make obſervations in relation to the figure of the earth.

Soon after our artiſts arrived at Quito, they determined to continue the ſeries of the triangles for meaſuring an arch of the meridian to the S. of that city: the company accordingly divided themſelves into two bodies, conſiſting of French and Spaniards, and each retired to the part aſſigned them. Don George Juan and M. Godin, who were at the head of one party, went to the mountain of Pambamarca; while M. Bouguer, de la Condamine, and Don Ulloa, together with their aſſiſtants, climbed up to the higheſt ſummit of Pichincha. Both parties ſuffered extremely, as well from the ſeverity of the cold, as from the impetuoſity of the winds, which on theſe heights blow with inceſſant violence; difficulties the more painful, as they had been little uſed to ſuch ſenſations. Thus in the torrid zone, nearly under the equinoctial, where it is natural to ſuppoſe they had moſt to fear from the heat, their greateſt pain was cauſed by the exceſſiveneſs of the cold.

Their firſt ſcheme for ſhelter and lodging in theſe uncomfortable regions, was to pitch a field-tent for each company; but on Pichincha this could not be done from the narrowneſs of the ſummit: they were therefore obliged to be contented with a hut ſo ſmall that they could hardly all creep into it. Nor will this appear ſtrange, if the reader conſiders the bad diſpoſition and ſmallneſs of the place, it being one of the loftieſt crags of a rocky mountain, 100 fathoms above the higheſt part of the deſart of Pichincha. Such was the ſituation of their manſion, which, like all the other adjacent parts, ſoon became covered with ice and ſnow. The aſcent up this ſtupendous rock, from the baſe, or the place where the mules could come, to their habitation, was ſo craggy as only to be climbed on foot; and to perform it coſt them four hours continual labour and pain, from the violent efforts of the body, and the ſubtility of the air; the latter being ſuch as to render reſpiration difficult.

The ſtrange manner of living to which our artiſts were reduced during the time they were employed in a geometrical menſuration of ſome degrees of the meridian, may not perhaps prove unentertaining to the reader; and therefore the following account is given as a ſpecimen of it. The deſart of Pichincha, both with regard to the operations performed there, and its inconveniencies, differing very little from others, an idea may be very eaſily formed of the fatigues, hardſhips, and dangers, to which they were continually expoſed during the time they were proſecuting the enterprize, with the conduct of which they had been honoured. The principal difference between the ſeveral deſarts conſiſted in their greater or leſſer diſtance from places where they could procure proviſions; and in the inclemency of the weather, which was proportionate to the height of the mountains, and the ſeaſon of the year.

They generally kept within their hut. Indeed they were obliged to do this, both on account of the intenſeneſs of the cold, the violence of the wind, and their being continually involved in ſo thick a fog, that an object at ſix or eight paces was hardly diſcernible. When the fog cleared up, the clouds by their gravity moved nearer to the ſurface of the earth, and on all ſides ſurrounded the mountains to a vaſt diſtance, repreſenting the ſea, with their rock like an iſland in the centre of it. When this happened, they heard the horrid noiſes of the tempeſts, which then diſcharged themſelves on Quito and the neighbouring country. They ſaw the lightnings iſſue from the clouds, and heard the thunders roll far beneath them: and whilſt the lower parts were involved in tempeſts of thunder and rain, they enjoyed a delightful ſerenity; the wind was abated, the ſky clear, and the enlivening rays of the ſun moderated the ſeverity of the cold. But their circumſtances were very different when the clouds roſe: their thickneſs rendered reſpiration difficult; the ſnow and hail fell continually; and the wind returned with all its violence; ſo that it was impoſſible entirely to overcome the fears of being, together with their hut, blown down the precipice, on whoſe edge it was built, or of being buried under it by the daily accumulations of ice and ſnow.

The wind was often ſo violent in theſe regions, that its velocity dazzled the ſight, whilſt their fears were increaſed from the dreadful concuſſions of the precipice, cauſed by the fall of enormous fragments of rocks. Theſe cruſhes were the more alarming, as no other noiſes are heard in theſe deſerts: and during the night, their reſt, which they ſo greatly wanted, was frequently diſturbed by ſuch ſudden ſounds. When the weather was any thing fair with them, and the clouds gathered about ſome of the other mountains which had a connection with their obſervations, ſo that they could not make all the uſe they deſired of this interval of good weather, they left their hut to exerciſe themſelves. Sometimes they deſcended to ſome ſmall diſtance; and at others, amuſed themſelves with rolling large fragments of rocks down the precipice; and theſe frequently required the joint ſtrength of them all, though they often ſaw the ſame effected by the mere force of the wind. But they always took care in their excurſions not to go ſo far out, but that on the leaſt appearance of the clouds gathering about their cottage, which often happened very ſuddenly, they could regain their ſhelter. The door of their hut was faſtened with thongs of leather, and on the inſide not the ſmalleſt crevice was left unſtopped; beſide which, it was very compactly covered with ſtraw: but, notwithſtanding all their care, the wind penetrated through. The days were often little better than the nights; and all the light they enjoyed was that of a lamp or two, which they kept continually burning.

Though their hut was ſmall, and crowded with inhabitants, beſide the heat of the lamps; yet the intenſeneſs of the cold was ſuch, that every one of them was obliged to have a chafing-diſh of coals. Theſe precautions would have rendered the rigour of the climate ſupportable, had not the imminent danger of periſhing by being blown down the precipice rouſed them, every time it ſnowed, to encounter the ſeverity of the outward air, and ſally out with ſhovels to free the roof of their hut from the maſſes of ſnow which were gathering on it. Nor would it, without this precaution, have been able to ſupport the weight. They were not indeed without ſervants and Indians; but theſe were ſo benumbed with the cold, that it was with great difficulty they could get them out of a ſmall tent, where they kept a continual fire. So that all our artiſts could obtain from them was to take their turns in this labour; and even then they went very unwillingly about it, and conſequently performed it ſlowly.

It may eaſily be conceived what this company ſuffered from the aſperities of ſuch a climate. Their feet were ſwelled; and ſo tender, that they could not even bear the heat; and walking was attended with extreme pain. Their hands were covered with chilblains; their lips ſwelled and chopped; ſo that every motion in ſpeaking, or the like, drew blood; conſequently they were obliged to ſtrict taciturnity, and little diſpoſed to laugh, as, by cauſing an extenſion of the lips, it produced ſuch fiſſures as were very painful for two or three days after.

Their common food in this inhoſpitable region was a little rice boiled with ſome fleſh or fowl, procured from Quito; and, inſtead of fluid water, their pot was filled with ice; they had the ſame reſource with regard to what they drank; and while they were eating, every one was obliged to keep his plate over a chafing-diſh of coals, to prevent his proviſions from freezing. The ſame was done with regard to the water. At firſt they imagined the drinking ſtrong liquors would diffuſe a heat through the body, and conſequently render it leſs ſenſible of the painful ſharpneſs of the cold; but, to their ſurpriſe, they felt no manner of ſtrength in ſuch liquors, nor were they any greater preſervative againſt the cold than the common water.

At the ſame time they found it impoſſible to keep the Indians together. On their firſt feeling of the climate, their thoughts were immediately turned on deſerting their maſters. The firſt inſtance they had of this kind was ſo unexpected, that, had not one, of a better diſpoſition than the reſt, ſtaid and acquainted them of their deſign, it might have proved of very bad conſequence. The affair was this: There being on the top of the rock no room for pitching a tent for the Indians, they uſed every evening to retire to a cave at the foot of the mountain; where, beſide a natural diminution of the cold, they could keep a continual fire; and, conſequently, enjoyed more comfortable quarters than their maſters. Before they withdrew at night, they faſtened, on the outſide, the door of the hut, which was ſo low that it was impoſſible to go in or out without ſtooping; and as every night the hail and ſnow which had fallen formed a wall againſt the door, it was the buſineſs of one or two of the Indians to come early and remove this obſtruction. For though the negro ſervants were lodged in a little tent, their hands and feet were ſo covered with chilblains, that they would rather have ſuffered themſelves to have been killed than move. The Indians therefore came conſtantly up to diſpatch this work betwixt nine or ten in the morning: but they had not been there above four or five days, when they were not a little alarmed to ſee ten, eleven, and twelve o'clock come, without any news of their labourers; when they were relieved by the honeſt ſervant mentioned above, who had withſtood the ſeduction of his countrymen, and informed his maſters of the deſertion of the four others. As ſoon as the ſnow was cleared away from the door, they diſpatched the Indian to the corregidor of Quito, who with equal diſpatch ſent other Indians, threatening to chaſtiſe them ſeverely if they were wanting in their duty.

But the fear of puniſhment was not ſufficient to induce them to ſupport the rigour of this ſituation; for within two days they deſerted. The corregidor therefore, to prevent any other inconvenience, ſent four Indians under the care of an alcalde, and gave orders for their being relieved every fourth day.

Twenty-three tedious days our artiſts ſpent on this rock, *viz.* to the 6th of September, and even without any poſſibility of finiſhing their obſervations of the angles: for, when it was fair and clear weather with them, the others, on whoſe ſummits the ſignals which formed the triangles for meaſuring the degrees of the meridian, were hid in the clouds; and when thoſe were clear, Pichincha was involved in clouds. It was therefore neceſſary to erect their ſignals in a lower ſituation, and in a more favourable region. This however did not produce any change in their habitation till the beginning of December; when, having finiſhed the obſervations which particularly concerned Pichincha, they proceeded to others; but with no abatement either of inconveniencies, cold, or fatigue; for the places where they made their obſervations being neceſſarily on the higheſt parts of the deſarts, the only reſpite in which they enjoyed ſome little eaſe, was during the ſhort interval of paſſing from one to the other.

In all their ſtations ſubſequent to that on Pichincha, during their fatiguing menſuration of the degrees of the meridian, each company lodged in a field-tent, which, though ſmall, they found leſs inconvenient than the hut on Pichincha; though at the ſame time they had more trouble, being oftener obliged to clear it from the ſnow, as the weight of it would otherwiſe have demoliſhed the tent. At firſt, indeed, they pitched it in the moſt ſheltered places; but on taking a reſolution that the tents themſelves ſhould ſerve for ſignals, to prevent the inconvenience of having others of wood, they removed them to a more expoſed ſituation, where the impetuoſity of the winds ſometimes tore up the piquets, and blew them down.

Tho' this mountain is famous for its great height, it is conſiderably lower than the mountain of Cotopaxi: but it is impoſſible to conceive the coldneſs of the ſummit of the laſt mentioned mountain, from that felt on this; ſince it muſt exceed every idea that can be formed by the human mind, tho' they are both ſeated in the midſt of the torrid zone. In all this range of mountains, there is ſaid to be a conſtant inferior boundary, beyond which the ſnow never melts: this boundary, in the midſt of the torrid zone, is ſaid by ſome to be 2434 fathoms above the level of the ſea; by others, only 2400 feet. The ſnow indeed falls much lower, but then it is ſubject to be melted the very ſame day. It is affirmed, that there are in the Andes 16 volcanoes or burning mountains, which throw out fire and ſmoke with a terrible noiſe. The height of Chimborazo, ſaid to be the higheſt peak of the Andes, has been determined by geometrical calculations to be 20,282 feet. But the great differences between the calculators of the height of mountains in other parts of the world, muſt very much diminiſh the credit of ſuch calculations. Inſtances of this we have already given under the article ÆTNA. No leſs remarkable are the differences concerning the height of the peak of Teneriffe; which, according to the calculations of Varenius, is three miles and three quarters, or 19,800 feet; according to thoſe of Dr Heberden, it is only 15,396 feet; and according to thoſe of M. Feuille, is no more than 13,128 feet. From theſe ſpecimens, we can ſcarce avoid concluding, that all the methods hitherto invented for calculating the exact height of mountains are inſufficient.

As all or moſt rivers have their ſource in mountains, it is no wonder a great number run down the ſides of the Andes. Some hurry along with a prodigious rapidity; while others form beautiful caſcades, or run thro' holes in rocks, which look like bridges of a ſtupendous height. There is a public road thro' the mountains, 1000 miles in length, part of which runs from Quito to Cuſco.

ANDES, a hamlet of Mantua in Italy, the birthplace of Virgil. Hence the epithet *Andinus*, (Silius Italicus). Now called *Pietola*, two miles to the weſt of Mantua.

ANDETRIUM; ANDRETIUM, (Strabo); ANDECRIUM, or ANDRECIUM, (Ptolemy); an inland town of Dalmatia. The genuine name is *Andetrium*, (Inſcription). It is deſcribed as ſituated near Salonæ, on a naturally ſtrong and inacceſſible rock, ſurrounded with deep valleys, with rapid torrents; from which it appears to be the citadel now called *Cliſſa*. E. Long. 17. 46. Lat. 43. 20.

ANDEUSE, a city of Languedoc in France, ſituated in E. Long. 3. 40. and N. Lat. 43. 45.

ANDOMADUNUM; ANDOMATUNUM, (Ptolemy); and ANTEMATUNUM, (Antonine); CIVITAS LINGONUM, (Tacitus); a city of Gallia Belgica; now *Langres* in Champagne, ſituated on an eminence (which ſeems to juſtify the termination *dunum*), on the borders of Burgundy, at the ſprings of the Marne. Tacitus calls an inhabitant *Lingon*. E. Long. 5. 22. N. Lat. 48. 0.

ANDOVER, a large market-town in Hampſhire, on the London road. It is ſeated on a branch of the river Teſt, and ſends two members to parliament. It has ſeveral inns, which afford good accommodation for travellers; and has a market on Saturday, well ſtocked with proviſions. It is governed by a bailiff, a ſteward, a recorder, ten approved men, and twenty-two capital burgeſſes, who yearly chuſe the bailiff, and he elects two ſerjeants at mace to attend him. The living is a vicarage, valued at 171 l. 4s. 4d. in the king's books. W. Long. 0. 56. N. Lat. 51. 20.

ANDRACHNE, BASTARD ORPINE; a genus of the gynandria order, belonging to the monœcia claſs of plants; of which there are three

Species. 1. The telephoides, or herbaceous trailing andrachne, is a low plant, whoſe branches trail upon the ground. The leaves are ſmall, of an oval ſhape, ſmooth, and of a ſea-green colour. It is found wild in ſome parts of Italy and the Archipelago; but is a plant of no great beauty, and therefore ſeldom cultivated. 2. The fruticoſa, or ſhrubby baſtard orpine, is a native of China and ſome places of America, where it riſes 12 or 14 feet high. The leaves are ſpear-ſhaped, pointed, and ſmooth; and under them are produced the footſtalks of the flowers, which are ſmall, and of an herbaceous white colour. 3. The arborea, with a tree-like ſtalk. This ſpecies was diſcovered by the late Dr William Houſton, growing naturally at Campeachy; it has a ſtrong woody ſtem, which riſes more than 20 feet high, and ſends out many branches on every ſide. This has not yet flowered in Britain.—A fourth ſort is alſo mentioned by Mr Millar as raiſed by him from ſeeds ſent from Jamaica. It agrees in general with the third ſort; but the leaves are ſomewhat like the laurel, only much larger.

Culture. The firſt ſpecies may be raiſed, by ſowing the ſeeds in March, on a moderate hot-bed. The plants may be removed into ſmall pots, and plunged into another very moderate hot-bed, to bring them forward; but in mild weather they ſhould have plenty of air admitted to them, and be frequently refreſhed with water. In June they will produce flowers, and the ſeeds will ripen in Auguſt and September.—The other ſpecies are very tender, and therefore muſt be kept conſtantly in the bark-ſtove. It is very difficult to procure good ſeeds of theſe ſorts; the covers often containing nothing, though they appear very fair outwardly. Of all the ſeeds ſent over by Dr Houſton, only one was found to contain a kernel, ſo that only one plant was produced.

ANDRAPODISMUS, in ancient writers, the ſelling of perſons for ſlaves. Hence alſo *andrapodiſtes*, a dealer in ſlaves, more particularly a kidnapper, who ſteals men or children to ſell them; a crime for which the Theſſalians were noted.

ANDRAPODOCAPELI, in antiquity, a kind of dealers in ſlaves. The *andropodocapeli* had a particular proceſs for taking off moles and the like diſfigurements on the faces of the ſlaves they kept for ſale, by rubbing them with bran. At Athens, ſeveral places in the forum were appointed for the ſale of ſlaves. Upon the firſt day of every month, the merchants called Ανδραποδοκαπηλοι brought them into the market, and expoſed them to ſale; the crier ſtanding upon a ſtone erected for that purpoſe, called the people together.

ANDREA (St), a ſmall village on the Malabar coaſt in the Eaſt-Indies, founded originally by the Portugueſe. It takes its name from a church dedicated to St Andrew, and ſerved by the prieſts of St Thomas.—On the ſhore of St Andrea, about half a league out in the ſea, lies Mud-bay, a place which few in the world can parallel. It is open to the wide ocean, and has neither iſland nor bank to break the force of the billows, which come rolling with great violence from all parts, in the ſouth-weſt monſoons: but on this bank of mud they loſe themſelves in a moment; and ſhips lie on it as ſecure as in the beſt harbour, without motion or diſturbance. It reaches about a mile along ſhore, and has been obſerved to ſhift its place from the northward about three miles in 30 years.—From St Andrea to Kranganôr, about twelve leagues to the ſouth, the water has the bad property of cauſing ſwellings in the legs of thoſe who drink it conſtantly. Some it affects in one leg, and ſome in both. It cauſes no pain, but itching; nor does the ſwelled leg ſeem heavier to the owner than the ſmall one, though ſome have been ſeen a yard in circumference at the ancle.—The Romiſh legends impute the cauſe of this diſtemper (for which no preventative or cure hath been hitherto found) to a curſe laid by St Thomas upon his murderers and their poſterity; though, according to the Romans themſelves, St Thomas was killed by the Tillinga prieſts at Meliaphûr, on the coaſt of Coromandel, about 400 miles diſtant, and where the natives have not this diſtemper.

ANDREAS (John), a celebrated canoniſt in the 14th century, was born at Mugello, near Florence; and was profeſſor of canon-law at Padua, Piſa, and afterwards at Bologna. It is ſaid that he macerated his body with faſting; and lay upon the bare ground every night for 20 years together, covered only with the ſkin of a bear. Andreas had a beautiful daughter, named *Novella*, whom he loved extremely: and he is ſaid to have inſtructed her ſo well in all parts of learning, that when he was engaged in any affair which hindered him from reading lectures to his ſcholars, he ſent his daughter in his room; and leſt her beauty ſhould prevent the attention of the hearers, ſhe had a little curtain drawn before her. To perpetuate the memory of this daughter, he intitled his commentary upon the Decretals of Gregory IX. the *Novellæ*. He married her to John Calderinus, a learned canoniſt. The firſt work of Andreas was his Gloſs upon the ſixth Book of the Decretals, which he wrote when he was very young. He wrote alſo Gloſſes upon the Clementines; and a Commentary *in regulas Sexti*, which he intitled *Mercuriales*, becauſe he either engaged in it on Wedneſdays *(diebus Mercurii,)* or becauſe he inſerted his Wedneſdays diſputes in it. He enlarged the Speculum of Durant, in the year 1347. This is all which Mr Bayle mentions of his writings, tho' he wrote many more. Andreas died of the plague at Bologna, in 1348, after he had been a profeſſor 45 years; and was buried in the church of the Dominicans. Many eulogiums have been beſtowed upon him. He has been called *archidoctor decretorum:* In his epitaph, *Rabbi doctorum; lux, cenſor, normaque morum;* "Rabbi of the doctors, the light, cenſor, and rule of manners:" And it is ſaid, that pope Boniface called him *lumen mundi*, "the light of the world."

ANDREAS (John) was born a Mahometan, at Xativa in the kingdom of Valencia, and ſucceeded his father in the dignity of alfaqui of that city. He was enlightened with the knowledge of the Chriſtian religion by being preſent at a ſermon in the great church of Valencia on the day of Aſſumption of the bleſſed Virgin, in the year 1487. Upon this he deſired to be baptized; and, in memory of the calling of St John and St Andrew, he received the name John Andreas. "Having received holy orders (ſays he), and, from an alfaqui and a ſlave of Lucifer, become a prieſt and miniſter of Chriſt; I began, like St Paul, to preach and publiſh the contrary of what I had erroneouſly believed and aſſerted; and, with the aſſiſtance of Almighty God, I converted at firſt a great many ſouls of the Moors, who were in danger of hell, and under the dominion of Lucifer, and conducted them into the way of ſalvation. After this, I was ſent for by the moſt catholic prince, king Ferdinand, and queen Iſabella, in order to preach in Granada to the Moors of that kingdom, which their majeſties had conquered: by God's bleſſing on my preaching, an infinite number of Moors were brought to abjure Mahomet, and to turn to Chriſt. A little after this, I was made a canon by their grace; and ſent for again by the moſt Chriſtian queen Iſabella to Arragon, that I might be employed in the converſion of the Moors of thoſe kingdoms, who ſtill perſiſted in their errors, to the great contempt and diſhonour of our crucified Saviour, and the prodigious loſs and danger of all Chriſtian princes. But this excellent and pious deſign of her majeſty was rendered ineffectual by her death." At the deſire of Martin Garcia, biſhop of Barcelona, he undertook to tranſlate from the Arabic, into the language of Arragon, the whole law of the Moors; and after having finiſhed this undertaking, he compoſed his famous work of *The Confuſion of the Sect of Mahumed:* it contains twelve chapters, wherein he has collected the fabulous ſtories, impoſtures, forgeries, brutalities, follies, obſcenities, abſurdities, impoſſibilities, lies, and contradictions, which Mahomet, in order to deceive the ſimple people, has diſperſed in the writings of that ſect, and eſpecially in the alcoran, which, as he ſays, was revealed to him in one night by an angel, in the city of Meke; though in another place he contradicts himſelf, and affirms that he was 20 years in compoſing it. Andreas tells us, he wrote this work, that not only the learned amongſt Chriſtians, but even the common people might know the different belief and doctrine of the Moors; and on the one hand might laugh and ridicule ſuch inſolent and brutal notions, and on the other might lament their blindneſs and dangerous condition. This book, which was publiſhed at firſt in Spaniſh, has been tranſlated into ſeveral languages; all thoſe who write againſt the Mahometans, quote it very much.

ANDREINI (Iſabella), a native of Padua, was an excellent poeteſs, and one of the beſt comedians in Italy, towards the beginning of the 17th century. The Intenti of Pavia thought they did their ſociety an honour by admitting her a member of it; and ſhe, in acknowledgment of this honour, never forgot to mention amongſt her titles that of *Academica Infanta:* her titles were theſe, "Iſabella Andreini, comica geloſa, academica infanta, detta l'acceſſa." She was alſo a woman of extraordinary beauty; which, added to a fine voice, made her charm both the eyes and ears of the audience. She died of a miſcarriage, at Lyons, the 10th of June, 1604, in the 42d year of her age. Her death being a matter of general concern and lamentation, there were many Latin and Italian elegies printed to her memory: ſeveral of theſe pieces were placed before her poems in the edition of Milan, in 1605. Beſides her ſonnets, madrigals, ſongs, and eclogues, there is a paſtoral of hers intitled Myrtilla, and letters, printed at Venice in 1610. She ſung extremely well, played admirably on ſeveral inſtruments, underſtood the French and Spaniſh languages, and was not unacquainted with philoſophy.

ANDRELINUS (Publius Fauſtus), born at Forli in Italy. He was a long time profeſſor of poetry and philoſophy in the univerſity of Paris. Lewis XII. of France made him his poet laureat; and Eraſmus tells us he was likewiſe poet to the queen. His pen was not wholly employed in making verſes; for he wrote alſo moral and proverbial letters in proſe, which were printed ſeveral times. His poems, which are chiefly in Latin, are inſerted in Vol. I. of the *Deliciæ Poetarum Italorum.* Mr De la Monnoie tells us, "that Andrelinus, when he was but 22 years old, received the crown of laurel: That his love-verſes, divided into four books, intitled *Livia,* from the name of his miſtreſs, were eſteemed ſo fine by the Roman Academy, that they adjudged the prize of the Latin elegy to the author." He died in 1518. This author's manner of life was not very exemplary; yet he was ſo fortunate, ſays Eraſmus, that though he took the liberty of rallying the divines, he was never brought into trouble about it.

ANDREW (St), the apoſtle, born at Bethſaida in Galilee, brother to Simon Peter: he was a zealous preacher of the goſpel in ſeveral countries; and ſealed it with his blood at Patræ, a city of Achaia, ſuffering martyrdom with great heroiſm, A. D. 69.

ANDREW, or *Knights of St* ANDREW, an order of knights, more uſually called the order of the thiſtle *.

* See *Thiſtle.*

Knights of St ANDREW, is alſo an order inſtituted by Peter the Great of Muſcovy in 1698; the badge of which is a golden medal, on one ſide whereof is repreſented St Andrew's croſs, with theſe words, *Cazar Pierre monarque de tout la Ruſſie.* This medal, being faſtened to a blue ribbon, is ſuſpended from the right ſhoulder.

St ANDREW'S *Croſs*, one in form of the letter X *.

* See *Croſs.*

St ANDREW'S *Day*, a feſtival of the Chriſtian church, celebrated on the 30th of November, in honour of the apoſtle St Andrew.

ANDREWS (St), a town of Fifeſhire in Scotland, once the metropolis of the Pictiſh kingdom, lying in W. Long. 2. 25. N. Lat. 56. 18. If we may credit legend, St Andrews owes its origin to a ſingular accident. St Regulus, (or St *Rule*, as he is likewiſe called,) a Greek of Achaia, was warned by a viſion to leave his native country, and viſit Albion, an iſle placed in the remoteſt part of the world; and to take with him the arm-bone, three fingers, and three toes, of St Andrew. He obeyed, and ſet ſail with his companions, but had a very tempeſtuous paſſage. After being toſſed for ſome time on a ſtormy ſea, he was at laſt ſhipwrecked on the coaſts of Otholania, in the territories of Herguſtus king of the Picts, in the year 370. On hearing of the arrival of the ſtrangers, with their precious relicts, the king immediately gave orders for their reception, afterwards preſenting the ſaint with his own palace, and building near it the church, which ſtill bears the name of *St Regulus.*

At this time the place was ſtyled *Mucroſs*, or the *land of boars;* all round was foreſt, and the lands beſtowed on the Saint were called *Byrehid.* The boars equalled in ſize the ancient Erymanthian; as a proof of which, two tuſks, each ſixteen inches long and four thick, were chained to the altar of St Andrews. St Regulus changed the name to *Kilrymont;* and eſtabliſhed here the firſt Chriſtian prieſts of the country, called *Culdees.* This church was ſupreme in the kingdom of the Picts; Ungus having granted to God and St Andrew,

drew, that it ſhould be the head and mother of all the churches in his dominions. He alſo directed that the croſs of St Andrew ſhould become the badge of the country. In 518, after the conqueſt of the Picts, he removed the epiſcopal ſee to St Andrews, and the biſhop was ſtiled *maximus Scotorum epiſcopus*. In 1441, it was erected into an archbiſhopric by Sextus IV. at the interceſſion of James III. In 1606, the priory was ſuppreſſed; and, in 1617, the power of election was transferred to eight biſhops, the principal of St Leonard's college, the arch-deacon, the vicars of St Andrews, Leuchars, and Coupar.

The town of St Andrews was erected into a royal borough by David I. in the year 1140, and their privileges afterwards confirmed. The charter of Malcolm II. is preſerved in the tolbooth; and appears written on a bit of parchment, but the contents equally valid with what would at this time require whole ſkins. Here alſo are kept the ſilver keys of the city; which, for form's ſake, are delivered to the king, if he ſhould viſit the place, or to a victorious enemy, in token of ſubmiſſion. In this place, likewiſe, is to be ſeen the monſtrous ax which, in 1646, took off the heads of Sir Robert Spotſwood and other diſtinguiſhed loyaliſts. The town underwent a ſiege in 1337; at which time it was poſſeſſed by the Engliſh, and other partizans of Baliol; but the loyaliſts, under the earls of March and Fife, made themſelves maſters of it in three weeks, by the help of their battering machines.

St Andrews is now greatly reduced in the number of its inhabitants; at preſent ſcarcely exceeding 2000. It is impoſſible to aſcertain the ſum when it was the ſeat of the primate: all that can be known is, that during the period of its ſplendor, there were between 60 and 70 bakers; but now 9 or 10 are ſufficient for the place. It is a mile in circuit, and contains three principal ſtreets. On entering the weſt port, a well-built ſtreet, ſtraight, and of a vaſt length and breadth, appears; but ſo graſs-grown, and preſenting ſuch a dreary ſolitude, that it forms the perfect idea of having been laid waſte by the peſtilence.

The cathedral of St Andrews was founded by biſhop Arnold in 1161, but did not attain its full magnificence till 1318. Its length from eaſt to weſt was 370 feet; that of the tranſept, 322. But tho' this vaſt pile was 157 years in building, John Knox, in June 1559, effected its demolition in a ſingle day; and ſo effectually has it been deſtroyed, that nothing now remains but part of the eaſt and weſt ends, and of the ſouth ſide.

Near the eaſt end is the chapel of St Regulus; the tower of which is a lofty equilateral triangle, of 20 feet each ſide, and 103 feet high; the body of the chapel remains, but the two ſide-chapels are ruined. The arches of the windows and doors are round, and ſome even more than ſemicircles; an undoubted proof of their antiquity.

The priory was founded by Alexander I. in 1122; and the monks (canons regular of St Auguſtine) were brought from Scone, in 1140, by Robert, biſhop of this ſee. By an act of parliament, in the time of James I. the prior had precedence of all abbots and priors, and on the days of feſtival wore a mitre and all epiſcopal ornaments. Dependent on this priory were thoſe of Lochleven, Portmoak, Monimuſk, the iſle of May, and Pittenweem, each originally a ſeat of the Culdees.

The revenues of the houſe were vaſt, *viz.* In money 2237 *l.* 2 *s.* 10½ *d.*; 38 chaldrons, 1 boll, 3 firlots of wheat; 132 ch. 7 bolls of bear; 114 ch. 3 bolls, 1 peck of meal; 151 ch. 10 bolls, 1 firlot, 1 peck and a half of oats; 3 ch. 7 bolls of peas and beans: 480 acres of land alſo belonged to it.

Nothing remains of the priory except the walls of the precinct, which ſhew its vaſt extent. In one part is a moſt artleſs gateway, formed only of ſeven ſtones. This incloſure begins near the cathedral, and extends to the ſhore.

The other religious houſes were, one of Dominicans, founded, in 1274, by biſhop Wiſhart; another of Obſervantines, founded by biſhop Kennedy, and finiſhed by his ſucceſſor Patrick Graham in 1478; and, according to ſome, the Carmelites had a fourth.

Immediately above the harbour ſtood the collegiate church of Kirk-heugh, originally founded by Conſtantine III. who, retiring from the world, became here a Culdee. From its having been firſt built on a rock, it was ſtyled, *Præpoſitura Sanctæ* Mariæ *de rupe*.

On the eaſt ſide of the city are the poor remains of the caſtle, on a rock overlooking the ſea. This fortreſs was founded, in 1401, by biſhop Trail, who was buried near the high altar of the cathedral, with this ſingular epitaph:

> Hic fuit eccleſiæ directa columna, feneſtra
> Lucida, thuribulum redolens, campana ſonora.

This caſtle was the reſidence of cardinal Beaton; who, after the death of George Wiſhart, apprehending ſome danger, cauſed it to be fortified ſo ſtrongly as to be at that time deemed impregnable. In this fortreſs, however, he was ſuprized and aſſaſſinated by Norman Leſly with 15 others. They ſeized on the gate of the caſtle early in the morning of May 29, 1546; it having been left open for the workmen who were finiſhing the fortifications: and having placed centinels at the door of the cardinal's apartment, they awakened his numerous domeſtics one by one; and, turning them out of the caſtle, they without violence, tumult, or offering an injury to any other perſon, inflicted on Beaton the death he juſtly merited. The conſpirators were immediately beſieged in this caſtle by the regent, earl of Arran; and notwithſtanding they had acquired no greater ſtrength than 150 men, they reſiſted all his efforts for five months. This, however, was owing to the unſkilfulneſs of the beſiegers more than to the ſtrength of the place or the valour of the beſieged; for in 1547 the caſtle was reduced and demoliſhed. The entrance of it is ſtill to be ſeen; and the window is ſhewn, out of which it is ſaid the cardinal leaned to glut his eyes with the cruel martyrdom of George Wiſhart, who was burnt on a ſpot beneath.

In the church of St Salvator is a moſt beautiful tomb of biſhop Kennedy, who died, an honour to his family, in 1466. The Gothic work is uncommonly elegant. Within the tomb were diſcovered ſix magnificent maces, which had been concealed here in troubleſome times. One was given to each of the other three Scotch univerſities, and three are preſerved here. In the top is repreſented our Saviour; around are angels, with the inſtruments of the paſſion.

With theſe are ſhewn ſome ſilver arrows, with large ſilver plates affixed to them, on which are inſcribed the arms and names of the noble youth, victors in the annual competitions in the generous art of archery, which were dropt but a few years ago; and golf is now the reigning game. That ſport, and foot-ball, were formerly prohibited, as uſeleſs and unprofitable to the public; and at all *weapon ſchawings*, or reviews of the people, it was ordered, that *fute-bal and golſe be utterly cryed down, and that bow-markes be maid at ilk pariſh kirk, a pair of butts and ſchutting be uſed; and that ilk man ſchutte ſex ſhottes at leaſt, under the paine to be raiped upon them that cummis not, at leaſt twa pennyes to be given to them that cummis to the bow-markes ta drinke.*

The trade of St Andrews was once very conſiderable. In the time of Cromwell's uſurpation, 60 or 70 veſſels belonged to the port, but now ſcarce a ſingle one. The harbour is artificial, guarded by piers, with a narrow entrance, to give ſhelter to veſſels from the violence of a very heavy ſea, by the encroachments of which it has ſuffered much. The manufactures this city might in former times poſſeſs, are now reduced to one, that of golf-balls; which, trifling as it may ſeem, maintains ſeveral people. The trade is commonly fatal to the artiſts; for the balls are made by ſtuffing a great quantity of feathers into a leathern caſe, by help of an iron rod, with a wooden handle, preſſed againſt the breaſt, which ſeldom fails to bring on a conſumption.

The celebrated univerſity of this city was founded in 1411, by biſhop Wardlaw; and the next year he obtained from Benedict III. the bull of confirmation. It conſiſted once of three colleges. 1. St Salvator's, founded in 1458, by Biſhop Kennedy. This is a handſome building, with a court or quadrangle within: on one ſide is the church, on another the library; the third contains apartments for ſtudents: the fourth is unfiniſhed. 2. St Leonard's college was founded by prior Hepburn, in 1522. This is now united with the laſt, and the buildings ſold, and converted into private houſes. 3. The new, or St Mary's, college, was eſtabliſhed by archbiſhop Hamilton, in 1553; but the houſe was built by James and David Bethune, or Beaton, who did not live to complete it. This is ſaid to have been the ſite of a *ſchola illuſtris* long before the eſtabliſhment even of the univerſity; where ſeveral eminent clergymen taught, *gratis*, the ſciences and languages. But it was called the *new college*, becauſe of its late erection into a divinity college by the archbiſhop.

The univerſity is governed by a chancellor, an office originally deſigned to be perpetually veſted in the archbiſhops of St Andrews; but ſince the reformation, he is elected by the two principals, and the profeſſors of both the colleges.

The rector is the next great officer; to whoſe care is committed the privileges, diſcipline, and ſtatutes of the univerſity. The colleges have their rectors, and profeſſors of different ſciences, who are indefatigable in their attention to the inſtruction of the ſtudents, and to that eſſential article their morals. This place poſſeſſes ſeveral very great advantages reſpecting the education of youth. The air is pure and ſalubrious; the place for exerciſe, dry and extenſive; the exerciſes themſelves are healthy and innocent. The univerſity is fixed in a peninſulated county; remote from all commerce with the world, the haunt of diſſipation. From the ſmallneſs of the ſociety every ſtudent's character is perfectly known. No little irregularity can be committed, but it is inſtantly diſcovered and checked: vice cannot attain a head in this place, for the incorrigible are never permitted to remain the corrupters of the reſt.

Andrews (Lancelot), biſhop of Wincheſter, was born at London, in 1555, and educated at Cambridge. After ſeveral preferments, he was made biſhop, firſt of Chicheſter, then of Ely, and, in 1618, was raiſed to the ſee of Wincheſter. This very learned prelate, who was diſtinguiſhed by his piety, charity, and integrity, may be juſtly ranked with the beſt preachers and completeſt ſcholars of his age; he appeared to much greater advantage in the pulpit than he does now in his works, which abound with Latin quotations and trivial witticiſms. His ſermons, though full of puns, were ſuited to the taſte of the times in which he lived, and were conſequently greatly admired. He was a man of polite manners and lively converſation; and could quote Greek and Latin authors, or even pun, with king James. There is a pleaſant ſtory related of him in the life of Waller the poet. When that gentleman was young, he had the curioſity to go to court, and ſtood in the circle to ſee king James dine; where, among other company, there ſat at table two biſhops, Neale and Andrews. The king propoſed aloud this queſtion, Whether he might not take his ſubjects money when he needed it, without all this formality of parliament? Neile replied, "God forbid you ſhould not; for you are the breath of our noſtrils." Whereupon the king turned, and ſaid to the biſhop of Wincheſter, "Well my lord, what ſay you?" "Sir (replied the biſhop), I have no ſkill to judge of parliamentary caſes." The king anſwered, "No put-offs, my lord; anſwer me preſently." "Then, ſir (ſaid he), I think it lawful for you to take my brother Neale's money, for he offers it." Mr Waller ſays, the company was pleaſed with this anſwer, but the wit of it ſeemed to affect the king; for a certain lord coming ſoon after, his majeſty cried out, "O, my lord, they ſay you lig with my lady." "No, ſir (ſays his lordſhip, in confuſion), but I like her company becauſe ſhe has ſo much wit." "Why then (ſays the king) do not you lig with my lord of Wincheſter there?"—This great prelate was in no leſs reputation and eſteem with king Charles I. than he had been with his predeceſſors. He died at Wincheſter-houſe in Southwark, September 27, 1626, in the 71st year of his age; and was buried in the pariſh-church of St Saviour's, where his executors erected to him a very fair monument of marble and alabaſter, on which is an elegant inſcription, in Latin, written by one of his chaplains. Mr Milton alſo, at 17 years of age, wrote a beautiful elegy on his death, in the ſame language. Biſhop Andrews had, 1. A ſhare in the tranſlation of the Pentateuch, and the hiſtorical books from Joſhua to the firſt book of Chronicles excluſively. He alſo wrote, 2. *Tortura Torti*, in anſwer to a work of cardinal Bellarmine, in which that cardinal aſſumes the name of Matthew Tortus. 3. A Manual of Private Devotions: and, 4. A Manual of Directions for the Viſitation of the Sick; beſides the Sermons and Tracts, in Engliſh and Latin, publiſhed after his death.

ANDRIA, in Grecian antiquity, public entertainments firſt inſtituted by Minos of Crete, and, after his example, appointed by Lycurgus at Sparta, at which a whole city or a tribe aſſiſted. They were managed with the utmoſt frugality, and perſons of all ages were admitted, the younger ſort being obliged by the lawgiver to repair thither as to ſchools of temperance and ſobriety.

Andria, is a city and a biſhop's ſee in the territory of Bari, in the kingdom of Naples. It is pretty large, well peopled, and ſeated in a ſpacious plain, four miles from the Adriatic coaſt. E. Long. 17. 4. N. Lat. 41. 15.

ANDRISCUS, a man of mean extraction, who, pretending to be the ſon of Perſeus laſt king of Macedonia, took upon him the name of Philip, for which reaſon he was called *Pſeudo-Philippus*, the *Falſe Philip.* After a complete victory over Juventius the Roman Prætor ſent againſt him, he aſſumed kingly power, but exerciſed it with vaſt cruelty. At laſt, the Romans obliged him to fly into Thrace, where he was betrayed and delivered into the hands of Metellus. This victory gained Macedonia once more into the power of the Romans, and to Metellus the name of Macedonicus, but coſt the Romans 25,000 men. Andriſcus adorned the triumph of Metellus, walking in chains before the general's chariot.

ANDROAS, or **Androdamas**, among ancient naturaliſts, a kind of pyritæ, to which they attributed certain magical virtues.

ANDROGEUS, in fabulous hiſtory, the ſon of Minos king of Crete, was murdered by the Athenian youth and thoſe of Megara, who envied his being always victor at the Attic games. But Minos, having taken Athens and Megara, obliged the inhabitants to ſend him an annual tribute of ſeven young men and as many virgins, to be devoured by the Minotaur; but Theſeus delivered them from that tribute.

ANDROGYNES, in natural hiſtory, a name given to thoſe living creatures which, by a monſtrous formation of their generative parts, ſeem (for it is only ſeeming) to unite in themſelves the two ſexes, that of the male and of the female. This *luſus naturæ*, this defect, or perhaps redundancy, in the animal-ſtructure, is deſcribed by medical authors in the following manner. 'There is a depravation in the ſtructure of the 'parts intended by nature for propagation, when, be'ſides thoſe concealed parts that are found neceſſary 'for the diſcharge of prolific functions, the *pudenda* 'of the other ſex likewiſe appear. This monſtrous 'production of nature is diverſified in four different 'ways; of which three appear in males, and one in fe'males. In men, the female pudendum, cloathed with 'hair, ſometimes appears contiguous to the perinæum; 'at other times, in the middle of the ſcrotum; at other 'times, which conſtitutes the third diverſity, through 'that part itſelf which in the midſt of the ſcrotum ex'hibits the form of a pudendum, urine is emitted. 'Near that part which is the teſt of puberty, and a'bove the pudendum, even in females, the maſculine 'genitals appear in ſome, conſpicuous in all their three 'forms, one reſembling the *viretram* or yard, the other 'like the two teſticles: but for the moſt part it hap'pens, that, of the two inſtruments of generation, one 'is feeble and inert; and it is extremely rare that both 'are found ſufficiently valid and proper for feats of 'love; nay, even in a great many, both theſe mem'bers are deficient and impotent, ſo that they can per'form the office neither of a male nor of a female.'

With reſpect to them, it appears, from a collation of all the circumſtances which have been obſerved by naturaliſts worthy of credit, that there is no ſuch thing as a perfect *androgyne*, or real hermaphrodite; that is to ſay, a living creature which, by its unnatural, or rather preternatural ſtructure, poſſeſſes the genuine powers of both ſexes, in ſuch a manner as to be qualified for performing the functions of either with ſucceſs: the irregularity of their fabrication almoſt always conſiſts in ſomething ſuperfluous added to one of the two ſexes, which gives it the appearance of the other, without beſtowing the real and characteriſtical diſtinction; and every *hermaphrodite* is almoſt always a very woman. Since this monſtrous exhibition of nature is not ſuch as to abrogate the rights or deſtroy the character of humanity amongſt human beings, this involuntary misfortune implies no right to deprive thoſe upon whom it is inflicted by nature, of the privileges natural to every citizen; and as this deficiency is no more infectious than any other corporeal mutilation, it is not eaſy to ſee why marriage ſhould be prohibited to one of theſe unhappy beings, merely on account of its equivocal appearance, which acts in the character of its prevailing ſex. If ſuch a creature, by the defect of its construction, ſhould be barren; this does not infer any right of diſſolving the marriage which it may have contracted, more than the ſame ſterility proceeding from any cauſe whether known or unknown, if his or her conſort ſhould not on that account require a divorce. It is only the licentious abuſe either of one or the other ſex which can be ſubjected to the animadverſion of the police. See **Hermaphrodite**.

Such are the ſentiments of the authors of the French Encyclopédie. After all, we cannot forbear to add, that from ſuch heterogeneous matches nature ſeems to recoil with innate and inextinguiſhable horror. Nor are any of theſe invincible averſions implanted in our frame, without a final cauſe worthy of its Author. We would gladly aſk theſe free-thinking gentlemen, In caſes where the ſexes are ſo unnaturally confounded, how the police can, by its moſt ſevere and rigorous animadverſions, either detect or prevent thoſe licentious abuſes againſt which they remonſtrate? Since, therefore, an evil ſo baneful to human ſociety could no otherwiſe be prevented than by the ſanction of nature againſt ſuch horrible conjunctions, the inſtinctive antipathy which they inſpire was highly worthy of her wiſdom and purity.

Androgynes, in ancient mythology, creatures, of whom, according to the fable, each individual poſſeſſed the powers and characters of both ſexes, having two heads, four arms, and two feet. The word itſelf is compounded of two Greek radical words; ανδηρ, in genitive ανδρος, a *male*; and γυνη, a *female*. Many of the rabbinical writers pretend, that Adam was created double, one body being male, the other female, which in their origin not being eſſentially joined, God afterwards did nothing but ſeparate them.

The gods, ſays Plato in his *Banquet*, had formed the ſtructure of man round, with two bodies and two ſexes. This fantaſtic being, poſſeſſing in itſelf the whole human ſyſtem, was endowed with a gigantic force, which rendered it inſolent, inſomuch that it reſolved to make war againſt the gods. Jupiter, exaſperated, was going to deſtroy it; but, ſorry at the ſame time to annihilate the human race, he ſatisfied himſelf

ſelf with debilitating this double being, by disjoining the male from the female, and leaving each half to ſubſiſt with its own powers alone. He aſſigned to Apollo the taſk of repoliſhing theſe two half bodies, and of extending their ſkins ſo that their whole ſurface might be covered. Apollo obeyed, and faſtened it at the *umbilicus:* If this half ſhould ſtill rebel, it was once more to be ſubdivided by another ſection, which would only leave it one of the parts of which it was then conſtituted; and even this fourth of a man was to be annihilated, if it ſhould perſiſt in its obſtinacy and miſchief. The idea of theſe *androgynes* might well be borrowed from a paſſage in Moſes, where that hiſtorian of the birth and infancy of nature deſcribes Adam as calling Eve *bone of his bone* and *fleſh of his fleſh*. However this may be, the fable of Plato has been uſed with great ingenuity by a French poet, who has been rendered almoſt as conſpicuous by his misfortunes as by his verſes. With the ancient philoſopher, he attributes the propenſity which attracts one of the ſexes towards the other, to the natural ardour which each half of the *androgynes* feels for reunion; and their inconſtancy, to the difficulty which each of the ſeparated parts encounters in its efforts to recover its proper and original half. If a woman appears to us amiable, we inſtantly imagine her to be that moiety with whom we ſhould only have conſtituted one whole, had it not been for the inſolence of our original double-ſexed progenitor:

> The heart, with fond credulity impreſs'd,
> Tells us the half is found, and hopes for reſt;
> But 'tis our curſe, that ſad experience ſhows,
> We neither find our half, nor gain repoſe.

ANDROGYNOUS, in zoology, an appellation given to animals which have both the male and female ſex in the ſame individual.—In botany, the term is applied to ſuch plants as bear both male and female flowers on the ſame root.

ANDROIDES, in mechanics, a human figure, which, by certain ſprings or other movements, is capable of performing ſome of the natural motions of a living man. The motions of the human body are more complicated, and conſequently more difficult to be imitated, than thoſe of any other creature; whence the conſtruction of an *androides*, in ſuch a manner as to imitate any of theſe actions with tolerable exactneſs, is juſtly ſuppoſed to indicate a greater ſkill in mechanics than any other piece of workmanſhip whatever.

A very remarkable figure of this kind appeared in Paris, in the year 1738. It repreſented a flute-player, and was capable of performing many different pieces of muſic on the German flute; which, conſidering the difficulty of blowing that inſtrument, the different contractions of the lips neceſſary to produce the diſtinctions between the high and low notes, and the complicated motions of the fingers, muſt appear truly wonderful.

This machine was the invention of M. Vaucanſon, member of the Royal Academy of Sciences; and a particular deſcription of it was publiſhed in the Memoirs of the Academy for that year: but as the deſcription there given behoved to be not only unentertaining, but abſolutely unintelligible, to a great number of readers, we muſt content ourſelves with giving an account only of its general principles, and the method by which the air was conducted to, and afterwards modified in, the body of the figure, ſo as to produce the ſurpriſing effects above mentioned.

The figure itſelf was about five feet and an half in height, ſituated at the end of an artificial rock, and placed upon a ſquare pedeſtal four feet and an half high, and three and an half broad. The air entered the body by three pipes ſeparated one from the other. It was conveyed to them by nine pair of bellows, three of which were placed above, and ſix below. Theſe were made to expand and contract regularly in ſucceſſion, by means of an axis of ſteel turned round by ſome clock-work. On this axis were different protuberances at proper diſtances, to which were fixed cords thrown over pullies, and terminating in the upper boards of the bellows, ſo that, as the axis turned, theſe boards were alternately raiſed and let down. A contrivance was alſo uſed to prevent the diſagreeable hiſſing fluttering noiſe uſually attending the motion of bellows. This was by making the cord, by which the bellows was moved, preſs, in its deſcent, upon one end of a ſmaller lever, the other end of which aſcending forced open the ſmall leathern valve that admitted the air, and kept it ſo, till, the cord being relaxed by the deſcent of the upper board, the lever fell, and the air was forced out. Thus the bellows performed their functions conſtantly without the leaſt hiſſing or other noiſe by which it could be judged in what manner the air was conveyed to the machine. The upper boards of three of the pairs of bellows were preſſed down by a weight of four pounds, that of three others by a weight of two pounds, and thoſe of the three remaining ones by nothing but their own weight.

The three tubes, by which the air entered, terminated in three ſmall reſervoirs in the trunk of the figure. There they united, and, aſcending towards the throat, formed the cavity of the mouth, which terminated in two ſmall lips adapted in ſome meaſure to perform their proper functions. Within this cavity alſo was a ſmall moveable tongue; which by its play, at proper periods, admitted the air, or intercepted its paſſage to the flute.

The fingers, lips, and tongue, received their proper directions by means of a ſteel cylinder turned by clock-work. It was divided into 15 equal parts, which by means of pegs, preſſing upon the ends of 15 different levers, cauſed the other extremities to aſcend. Seven of theſe levers directed the fingers, having wires and chains affixed to their aſcending extremities, which, being attached to the fingers, cauſed them aſcend in proportion as the other extremity was preſſed down by the motion of the cylinder, and *vice verſa*. Thus the aſcent or deſcent of one end of a lever produced a ſimilar aſcent or deſcent in the correſponding finger, by which one of the holes of the flute was occaſionally opened or ſtopped, as by a living performer. Three of the levers ſerved to regulate the ingreſs of the air, being contrived ſo as to open and ſhut, by means of valves, the three reſervoirs of air above mentioned, ſo that more or leſs ſtrength might be given, and a higher or lower note produced, as occaſion required. The lips were, by a ſimilar mechaniſm, directed by four levers, one of which opened them, to give the air a freer paſſage; the other contracted them; the third drew them backward; and the fourth puſhed them forward. The lips were projected upon that part of the flute which receives the air; and, by the different motions already mentioned, modified the tone in a proper manner.—

The remaining lever was employed in the direction of the tongue, which it eaſily moved ſo as to ſhut or open the mouth of the flute.

Thus we ſee how all the motions neceſſary for a German-flute-player could be performed by this machine; but a conſiderable difficulty ſtill remains, namely, how to regulate theſe motions properly, and make each of them follow in juſt ſucceſſion. This, however, was effected by the following ſimple method. The extremity of the axis of the cylinder was terminated on the right ſide by an endleſs ſcrew, conſiſting of twelve threads, each placed at the diſtance of a line and an half from the other. Above this ſcrew was fixed a piece of copper, and in it a ſteel pivot, which, falling in between the threads of the ſcrew, obliged the cylinder to follow the threads, and, inſtead of turning directly round, it was continually puſhed to one ſide. Hence, if a lever was moved, by a peg placed on the cylinder, in any one revolution, it could not be moved by the ſame peg in the ſucceeding revolution, becauſe the peg would be moved a line and an half beyond it by the lateral motion of the cylinder. Thus, by an artificial diſpoſition of theſe pegs in different parts of the cylinder, the ſtatue was made, by the ſucceſſive elevation of the proper levers, to exhibit all the different motions of a flute-player, to the admiration of every one who ſaw it.

The conſtruction of machines capable of imitating even the mechanical actions of the human body, ſhew exquiſite ſkill; but what ſhall we ſay of one capable, not only of imitating actions of this kind, but of acting as external circumſtances require, as though it were endowed with life and reaſon? This, nevertheleſs, has been done. One M. de Kempell, a gentleman of Preſburg in Hungary, excited by the performances of M. de Vaucanſon, at firſt endeavoured to imitate them, and at laſt far excelled them. This gentleman conſtructed an Androides capable of playing at cheſs!—Every one, who is in the leaſt acquainted with this game, muſt know, that it is ſo far from being mechanically performed, as to require a greater exertion of the judgment and rational faculties than is ſufficient to accompliſh many matters of greater importance. An attempt, therefore, to make a wooden cheſs-player, muſt appear as ridiculous as to make a wooden preacher, or counſeller of ſtate. That this machine really was made, however, we have the atteſtation of the Rev^{d} Mr Dutens, whoſe account appeared in 1770, and is as follows. "This machine repreſents a man of the natural ſize, dreſſed like a Turk, ſitting before a table which holds a cheſs-board. This table (which is about three feet and a half long, and about two feet and an half broad) is ſupported by four feet, that roll on caſtors, in order the more eaſily to change its ſituation, which the compoſer fails not to do from time to time, in order to take away all ſuſpicion of any communication. Both the table and the figure are full of wheels, ſprings, and levers. M. de Kempell makes no difficulty of ſhewing the inſide of the machine, eſpecially when he finds any one ſuſpects a boy to be concealed in it. I have examined with attention all the parts both of the table and figure, and I am well aſſured there is not the leaſt ground for ſuch an imputation. I have played a game at cheſs with the automaton myſelf. I have particularly remarked, with great aſtoniſhment, the preciſion with which it made the various and complicated movements of the arm with which it plays. It raiſes this arm; it advances it towards that part of the cheſs-board on which the piece ſtands which ought to be moved; and then, by a movement of the wriſt, it brings the hand down upon the piece, opens the hand, cloſes it upon the piece in order to graſp it, lifts it up and places it upon the ſquare it is to be removed to. This done, it lays its arm down upon a cuſhion, which ſtands beſide the cheſs-board. If it ought to take one of its adverſary's pieces, then, by one entire movement, it removes that piece quite off the cheſs-board, and, by a ſeries of ſuch movements as I have been deſcribing, it returns to take up its own piece, and place it in the ſquare which the other had left vacant. I attempted to practiſe a ſmall deception, by giving the queen the move of a knight: but my mechanic opponent was not to be ſo impoſed on; he took up my queen, and replaced her in the ſquare ſhe had been removed from. All this is done with the ſame readineſs that a common player ſhews at this game: and I have often engaged with perſons who played neither ſo expeditiouſly nor ſo ſkilfully as this automaton, who yet would have been extremely affronted if one had compared them to him."

Tho' this account is written in ſuch a manner that its authenticity can hardly be queſtioned, the fact appears ſo much beyond the verge of credibility, that, without ſome corroborating evidence, we could ſcarce have allowed ourſelves to believe it; but having been favoured with the following extract of a letter to Sir W^{m} Forbes of Edin^{r}, dated Paris, May 22^{d} 1777, concerning this machine, we muſt now look upon its exiſtence as indiſputable. "I ſhall give you what particulars I recollect with regard to my ſurpriſing friend.—I was then in company with ſeveral Engliſh gentlemen: we were introduced to the automaton's chamber: The machine was a well-dreſſed Turkiſh figure as large as life, ſeated at a ſquare table, or rather box (as it was cloſe on all ſides), ſurrounded at a little diſtance by a rail, within which no perſon entered but the proprietor (an independent gentleman of Preſburg.) The cheſs-board ſeemed fixed to the table, which was ſo placed, that any perſon from without the rail could play on it. Before the game began, the proprietor opened the ſides of the table, and the body of the Turk; but nothing was to be ſeen but wheels upon wheels. He then wound up the machine (this he repeated once during the game.) A gentleman of our company was his antagoniſt; and as he was but a wooden Turk, he gave him the firſt move. I do not underſtand the game; but thoſe preſent who did, ſaid he played very well. The game was left unfiniſhed, as all there were fully ſatisfied that this wooden Turk did play the game; but no one dared hazard a gueſs on what principle, or who directed. His right hand, with which he made all his moves, had the fingers as it were drawn together, which he opened and cloſed at pleaſure when he removed any of his men. His face had a ſerious caſt; which, added to a grave ſhake of the head when any difficulty aroſe in the game, had a moſt ridiculous effect: on the contrary, when his adverſary laid himſelf open, his motions were quicker; and when he made a falſe ſtroke (which he did on purpoſe), he immediately removed the man off the board with which the ſtroke was made. I forgot to mention, that within the rail, at the diſtance of ſome feet from the machine, there ſtood a ſmall ſquare box on a ſtool, which apparently had no connection with the machine, but which the proprietor ſaid he muſt have opened had it gone wrong. I imagined I heard a noiſe in the box like that occaſioned by the turning of wheels.—His arm moved horizontally, at a height ſo as not to diſcompoſe the men. When his hand came over the man he wanted to move, he opened his fingers, let it down, cloſed them on the man, lifted him up and carried him off the board, ſet him down, and laid his arm down upon the table."——

As the inventor of this admirable piece of mechaniſm hath not yet thought proper to communicate to the public the means by which it is actuated, it is in vain for any, except thoſe who are exquiſitely ſkilled in mechanics, to form conjectures concerning them.—Many other curious imitations of the human body, as well as that of other animals, have been exhibited, though none of them equal to the laſt mentioned one. See the article AUTOMATON.

ANDROLEPSY, in Grecian antiquity, an action allowed by the Athenians againſt ſuch as protected perſons guilty of murder. The relations of the deceaſed were empowered to ſeize three men in the city or houſe whither the malefactor had fled, till he were either ſurrendered, or ſatisfaction made ſome way or other for the murder.

ANDROMACHE, the wife of the valiant Hector, the mother of Aſtyanax, and daughter of Eton king of Thebes in Cilicia. After the death of Hector and the deſtruction of Troy, ſhe married Pyrrhus; and afterwards Helenus the ſon of Priam, with whom ſhe reigned over part of Epirus.

ANDROMACHUS's TREACLE. See PHARMACY, n° 893.

ANDROMEDA, in aſtronomy, a northern conſtellation, behind Pegaſus, Caſſiopeia, and Perſeus. It repreſents the figure of a woman chained; and is fabled to have been formed in memory of Andromeda, daughter of Cepheus and Caſſiopeia, and wife of Perſeus, by whom ſhe had been delivered from a ſea-monſter, to which ſhe had been expoſed to be devoured for her mother's pride. Minerva tranſlated her into the heavens.

The ſtars in the conſtellation Andromeda in Ptolemy's catalogue are 23, in Tycho's 22, in Bayer's 27, in Mr Flamſted's no leſs than 84.

ANDROMEDA, the name of a celebrated tragedy of Euripides, admired by the ancients above all the other compoſitions of that poet, but now loſt.

It was the repreſentation of this play, in a hot ſummer day, that occaſioned that epidemic fever, or phrenzy, for which the Abderites are often mentioned, wherein they walked about the ſtreets, rehearſing verſes, and acting parts of this piece. See ABDERA.

ANDROMEDA, a genus of the monogynia order, belonging to the decandria claſs of plants. For this genus there is no Engliſh name.

Species. 1. The polifolia is a low plant, growing naturally in bogs in the northern countries. It is difficultly preſerved in gardens; and, being a plant of no great beauty, is ſeldom cultivated. 2. The mariana, a native of North America. It is a low ſhrub, ſending out many woody ſtalks from the root, which are garniſhed with oval leaves placed alternately; the flowers are collected in ſmall bunches, are of an herbaceous colour, and ſhaped like thoſe of the ſtrawberry-tree. They appear in June and July. 3. The paniculata † is a native of Virginia and Carolina, growing in moiſt places. The plants uſually arrive at the height of ten feet, with thin leaves ſet alternately, and having their edges finely ſerrated. The flowers are tubulous, ſmall, and of a greeniſh white, cloſely ſet horizontally on one ſide of the ſlender ſtalks. Theſe flowers are ſucceeded by berries, which open when ripe; and divide into five ſections, incloſing many ſmall ſeeds. 5. The arborea is a native of the ſame countries, where it is called the *ſorrel-tree*. It grows to the height of 20 feet, with a trunk uſually five or ſix inches thick. The branches are ſlender, thick ſet with leaves like thoſe of the pear-tree. From the ends of the branches proceed many ſlender ſtalks, on one ſide of which hang many ſmall white flowers like thoſe of the ſtrawberry-tree. 5. The caniculata, is a native of Siberia, and likewiſe of North America. It grows on moſſy land, and is therefore very difficult to keep in gardens. The leaves are ſhaped like thoſe of the box-tree, and are of the ſame conſiſtence, having ſeveral ſmall punctures on them. The flowers grow in ſhort ſpikes from the extremity of the branches. They are produced ſingle between two leaves, are of a white colour, and a cylindrical or pitcher-like ſhape.

Culture. All the ſorts, except the fourth, are very hardy plants, which delight in moiſt ground. They increaſe by their creeping roots, which put up ſuckers at a diſtance. Theſe may be taken off with roots; and tranſplanted where they are to remain, for they cannot bear to be often removed. The fourth ſort requires to be ſheltered from froſt in winter, but in the ſummer ſhould be frequently watered. It is difficult to keep in gardens, as it grows naturally in boggy places, and requires a greater heat than that of this climate. It may be propagated by ſeeds, which ſhould be procured from America.

ANDRON, in Grecian antiquity, denotes the apartment in houſes deſigned for the uſe of men; in which ſenſe it ſtands oppoſed to *Gynæceum*.—The Greeks alſo gave their dining-rooms the title of *andron*, becauſe the women had no admittance to feaſts with the men.

ANDRONA, in ancient writers, denotes a ſtreet, or public place, where people met and converſed together. In ſome writers, *androna* is more expreſsly uſed for the ſpace between two houſes; in which ſenſe, the Greeks alſo uſe the term ανδρωνας, for the way or paſſage between two apartments.

ANDRONA is alſo uſed, in eccleſiaſtical writers, for that part in churches deſtined for the men. Anciently it was the cuſtom for the men and women to have ſeparate apartments in places of worſhip, where they performed their devotions aſunder; which method is ſtill religiouſly obſerved in the Greek church. The ανδρων, or *androna*, was in the ſouthern ſide of the church, and the womens apartment on the northern.

ANDRONICUS I. emperor of the Eaſt, cauſed Alexius II. who had been put under his care, to be ſtrangled; and then took poſſeſſion of the throne of Conſtantinople, in 1183: but the people, becoming exaſperated at his cruelties, proclaimed Iſaac Angelus emperor, and put Andronicus in irons: they then thruſt out his eyes; and, having led him through the city in an ignominious manner, hanged him.

ANDRONICUS *of Cyrrhus*, built, at Athens, an octagon tower, with figures carved on each ſide, repreſenting the eight principal winds. A braſs triton at the ſummit, with a rod in its hand, turned round by the wind, pointed to the quarter from whence it blew. From this model is derived the cuſtom of placing weather-cocks on ſteeples.

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† Pl. XXII. fig. 2.

ANDROPHAGI, in ancient geography, the name of a nation whoſe country, according to Herodotus, was adjacent to Scythia. Their name, compounded of two Greek words, ſignifies *man-eaters*. Herodotus does not inform us whether their manner of ſubſiſting correſponded with their name; whether they were ſo ſavage as to eat human fleſh *. They are repreſented, however, as the moſt barbarous and fierce of all nations. They were not governed by laws: the care of their cattle was their chief employment. Their dreſs was like that of the Scythians; and they had a language peculiar to themſelves.

ANDROS, one of the ancient Cyclades, lying between Tenedos and Eubœa; being one mile diſtant from the former, and ten from the latter. The ancients gave it various names, viz. Cauros, Laſia, Nonagria, Epagris, Antandros, and Hydruſia. The name of *Andros* it received from one Andreus, appointed, according to Diodorus Siculus, by Rhadamanthus, one of the generals, to govern the Cyclades, after they had of their own accord ſubmitted to him. As to the name of *Antandros*, the ſame author tells us, that Aſcanius the ſon of Æneas, being taken priſoner by the Pelaſgians, gave them this iſland for his ranſom, which on that account was called *Antandros*, or "delivered for one man." The name of *Hydruſia* it obtained in common with other places well ſupplied with water. It had formerly a city of great note, bearing the ſame name, and ſituated very advantageouſly on the brow of an hill, which commanded the whole coaſt. In this city, according to Strabo and Pliny, ſtood a famous temple dedicated to Bacchus. Near this temple, Mutianus, as quoted by Pliny, tells us, there was a ſpring called the *gift of Jupiter;* the water of which had the taſte of wine in the month of January, during the feaſts of Bacchus, which laſted ſeven days. The ſame author adds, that the waters, if carried to a place whence the temple could not be ſeen, loſt their miraculous taſte. Pauſanias makes no mention of this ſpring; but ſays, that, during the feaſt of Bacchus, wine flowed, or was at leaſt by the Andrians believed to flow, from the temple of that god. The prieſts, no doubt, found their account in keeping up this belief, by conveying, thro' ſecret conduits, a great quantity of wine into the temple.

The Andrians were the firſt of all the iſlanders who joined the Perſians at the time Xerxes invaded Greece; and therefore Themiſtocles, after the victory at Salamis, reſolved to attack the city of Andros, and oblige the inhabitants to pay large contributions for the maintenance of his fleet. Having landed his men on the iſland, he ſent heralds to the magiſtrates, acquainting them, that the Athenians were coming againſt them with two powerful divinities, *perſuaſion* and *force;* and therefore they muſt part with their money by fair means or foul. The Andrians replied, that they likewiſe had two mighty deities who were very fond of their iſland, viz. *poverty* and *impoſſibility;* and therefore could give no money. Themiſtocles, not ſatisfied with this anſwer, laid ſiege to the town; which he probably made himſelf maſter of and deſtroyed, as we are informed by Plutarch, that Pericles, a few years after, ſent thither a colony of 250 Athenians. It was, however, ſoon retaken by the Perſians; and, on the overthrow of that empire by Alexander the Great, ſubmitted to him, along with the other iſlands. On his death, it ſided with Antigonus, who was driven out by Ptolemy. The ſucceſſors of the laſt mentioned prince held it to the times of the Romans, when Attalus, king of Pergamus, beſieged the metropolis at the head of a Roman army; and, having taken it, was by them put in poſſeſſion of the whole iſland. Upon the death of Attalus, the republic claimed this iſland, as well as his other dominions, in virtue of his laſt will. It is now ſubject to the Turks; and contains a town of the ſame name, with a great many villages. It is the moſt fruitful iſland in all the Archipelago, and yields a great quantity of ſilk. There are ſaid to be about 6000 inhabitants, beſides thoſe of the villages Arni and Amoldeos, who are about two hundred, have a different language and cuſtoms, and are called *Albanois*. There are ſeven monaſteries, a great number of churches, and a cathedral for the biſhops of the Roman-catholic perſuaſion; but moſt of the inhabitants are of the Greek communion. The Jeſuits had a houſe and a church in this iſland; but they were forced to quit them long ago. Here are ſome delightful valleys; but the air is bad, and the water of the city worſe. The women would be agreeable enough, if it was not for their dreſs, which is very unbecoming; for they ſtuff out their clothes without the leaſt regard to their ſhape: but the Albaneſe women make a much better appearance. The peaſants make wicker-baſkets, wherewith they ſupply the greateſt part of the Archipelago. They have all ſorts of game in the woods and mountains, but know not how to take them for want of guns. Their principal food is goats fleſh; for there is no fiſh to be met with on their coaſts. When they are ſick, they are obliged to let the diſeaſe take its natural courſe, having neither phyſician nor ſurgeon on the iſland. A cadi, aſſiſted by a few of the principal perſons of the iſland, has the management of civil affairs, and his reſidence is in the caſtle: an aga, who preſides over the military force, lives in a tower without the city. About two miles from the preſent town are ſtill to be ſeen the ruins of a ſtrong wall with the fragments of many columns, chapiters, baſes, broken ſtatues, and ſeveral inſcriptions, ſome of which mention the ſenate and people of Andros, and the prieſts of Bacchus; from which it is probable, that this was the ſite of the ancient city. E. Long. 25. 30. N. Lat. 37. 50.

ANDROSACE, a genus of the monogynia order, belonging to the pentandria claſs of plants, for which there is no Engliſh name. Of this genus Dr Linnæus reckons ſix

Species. 1. The maxima grows naturally in Auſtria and Bohemia, among the corn. It hath broad leaves, which ſpread near the ground; from the centre of theſe the footſtalks ariſe, which are terminated by an umbel of white flowers like thoſe of the auricula. Theſe appear in April and May, and the ſeeds ripen in June; ſoon after which the plants periſh. 2. The ſeptentrionalis, villoſa, carnea, and lactea, grow naturally on the Alps and Helvetian mountains, as alſo in Siberia. They

* See the article Anthropophagi.

are much ſmaller than the former, ſeldom growing more than three inches high. Of the other ſpecies, called the elongata, we have no particular deſcription.

Culture. Theſe plants are propagated by ſeeds, which ſhould be ſown ſoon after they are ripe, otherwiſe they ſeldom come up the ſame year. If permitted to ſcatter, they will grow better than when they are ſown.

ANDRUM, a kind of hydrocele, to which the people of Malabar are very ſubject.—Its origin is derived from the vitious quality of the country waters, impregnate with corroſive muriatic ſalts, the ſource of moſt other diſeaſes that infect the Malabarians. Its ſigns, or ſymptoms, are an eryſipelas of the ſcrotum, returning every new moon, by which the lymphatics, being eroded, pour a ſerous ſaline humour into the cavity of the ſcrotum. The andrum is incurable; thoſe once ſeized with it, have it for life: but it is not dangerous, nor very troubleſome, to thoſe uſed to it; tho' ſometimes it degenerates into an hydroſarcocele. The means of prevention is by a heap of ſand fetched from a river of the province Mangatti, and ſtrowed in the wells. This is practiſed by the rich. As to the cure, they have only a palliative one; which is by inciſion, or tapping, and drawing off the water from the ſcrotum, once in a month or two.

ANDRYALA, DOWNY SOW-THISTLE; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants.

Species. 1. The integrifolia is an annual plant, growing naturally in the ſouth of France, Spain, and Italy. It riſes to the height of a foot and an half, with woolly branching ſtalks. The flowers are produced in ſmall cluſters at the top of the ſtalks. They are yellow, and like thoſe of the ſow-thiſtle; ſo do not make any great appearance. 2. The raguſina is a native of the Cape of Good Hope. The leaves are extremely white, and much indented on their edges. The flower-ſtalks grow about a foot high, having ſmall cluſters of yellow flowers, which appear in July. The ſeeds ſometimes ripen in Britain, but not always. 3. The lanata is a native of Sicily and of the country round Montpelier. The lower leaves are indented and woolly, but thoſe on the ſtalks are entire. It ſeldom riſes more than a foot high, ſupporting a few yellow flowers at top. 4. The ſinuata grows in Spain and Portugal: the leaves are broader, longer, and more downy, than either of the other ſorts; the flower-ſtalks riſing more than a foot high. They branch into ſeveral footſtalks, each ſuſtaining one large yellow flower, ſhaped like thoſe of hawk-weed, which are ſucceeded by oblong black ſeeds covered with down.

Culture. All theſe plants are eaſily propagated by ſeeds, which ſhould be ſown in autumn, where they are to remain, and will require no other culture than to thin them where they are too cloſe, and to keep them free from weeds. The third ſort muſt have a light dry ſoil, or it will not live in this country.

ANDUXAR, a city in the province of Andaluſia, in Spain, ſeated on the Guadalquivir. It is pretty large, indifferently rich, and defended by a good caſtle. It is adorned with handſome churches and ſeveral religious houſes, and inhabited by many families of high rank. The land about it abounds in corn, wine, oil, honey, and fruit of all ſorts; and the inhabitants carry on a conſiderable trade in ſilk. W. Long. 4. 2. N. Lat. 37. 45.

ANDUZE, a town of France in Lower Languedoc, ſeated on the river Gardon. It carries on a conſiderable trade in ſerges and woollen cloth. E. Long. 3. 42. N. Lat. 43. 39.

ANEAU (Bartholomew), a native of Bourges in France, a man of eminent learning in the 16th century, educated under Melchior Volmar. He was profeſſor at Lyons, where he propagated the doctrines of the Reformation ſecretly for a long time: but on the feſtival of the Holy Sacrament 1565, as the proceſſion was paſſing on towards the college, there was a large ſtone thrown from one of the windows upon the Hoſt and prieſt who carried it. The people, enraged at this, broke into the college, and aſſaſſinated Mr Aneau, whom they imagined to have been the occaſion, and the college itſelf was ſhut up next day by order of the city.

ANECDOTE, among hiſtorians, implies ſome fact not formerly publiſhed to the world, or very little known. The word is Greek, ανεκδοτος; and compounded of α, priv. and εκδοτος, publiſhed.

ANEE, in commerce, a meaſure for grain, uſed in ſome provinces of France. At Lyons, it ſignifies alſo a certain quantity of wine, which is the load an aſs can carry at once: which is fixed at 80 Engliſh quarts, wine-meaſure.

ANEGADA, one of the Caribbee Iſlands in America. W. Long. 63. 5. N. Lat. 18. 6. It is only remarkable for its humming birds, and beautifully coloured crabs of a delicate taſte.

ANELLO (Thomas). See MASSANIELLO.

ANEMOMETER, in mechanics, implies a machine for meaſuring the force and velocity of the wind.

Various machines of this kind have been invented at different times, and by different perſons. The following has been often experienced, and found to anſwer the intention.

An open frame of wood, ABCDEFGHI, * is ſupported by the ſhaft or arbor I. In the two croſs-pieces H K, LM, is moved a horizontal axis QM, by means of the four ſails, *ab*, *cm*, *Of*, *gh*, expoſed to the wind in a proper manner. Upon this axis is fixed a cone of wood, MNO; upon which, as the ſails move round, a weight R, or S, is raiſed by a ſtring round its ſuperficies, proceeding from the ſmaller to the larger end N O. Upon this larger end or baſe of the cone, is fixed a rocket wheel, *k*, in whoſe teeth the click X falls, to prevent any retrograde motion from the depending weight.

* Pl. XXII. fig. 3.

The ſtructure of this machine ſufficiently ſhews that it may be accommodated to eſtimate the variable force of the wind; becauſe the force of the weight will continually increaſe, as the ſtring advances on the conical ſurface, by acting at a greater diſtance from the axis of motion; conſequently, if ſuch a weight be added on the ſmaller part, M, as will juſt keep the machine in equilibrio in the weakeſt wind, the weight to be raiſed, as the wind becomes ſtronger, will be increaſed in proportion, and the diameter of the cone N O may be ſo large in compariſon to that of the ſmaller end at M, that the ſtrongeſt wind ſhall but juſt raiſe the weight at the greater end.

If, for example, the diameter of the axis be to that of the baſe of the cone N O, as 1 to 28; then, if S be a weight of one pound at M on the axis, it will be equivalent to 28 pounds when raiſed to the greater end: if therefore, when the wind is weakeſt, it ſupports one pound on the axis, it muſt be 28 times as ſtrong to raiſe the weight to the baſe of the cone. If therefore a line or ſcale of 28 equal parts be drawn on the ſide of the cone, the ſtrength of the wind will be indicated by that number on which the ſtring reſts.

ANEMONE, **WIND-FLOWER**; a genus of the polygynia order, belonging to the polyandria claſs of plants. It has its name from the Greek word ανεμος, ſignifying the *wind;* becauſe the flower is ſuppoſed not to open unleſs the wind blows.

Of this genus Dr Linnæus enumerates 21 ſpecies; but thoſe valuable on account of the beauty of their flowers are only the following. 1. The nemoroſa, which grows wild in the woods in many parts of Britain, where it flowers in April and May. The flowers are white, purple, or reddiſh purple, ſometimes ſingle, and ſometimes double, ſo that they make a pretty appearance. 2. The apennina is likewiſe a native of Britain, growing in woods. The flowers of this ſpecies, like the laſt, are ſometimes ſingle, and ſometimes double; their colours are white, blue, or violet. They appear in April. 3. The coronaria. 4. The hortenſis. Theſe two are natives of the Levant, particularly of the Archipelago iſlands, where the borders of the fields are covered with them of the moſt beautiful colours. When they grow wild, the flowers are commonly ſingle; but by culture they are greatly improved: they become large and double, making ſome of the greateſt ornaments of gardens. Their principal colours are red, white, purple, and blue; ſome of them are finely variegated with red, white, purple, and many intermediate ſhades of theſe colours.

Culture. The firſt and ſecond ſorts may be propagated by taking up their roots when the leaves decay, and tranſplanting them in wilderneſſes, where they will thrive and increaſe greatly, if they are not diſturbed. The two laſt ſorts require a good deal of care, and ample directions for their culture.—The ſoil in which theſe flowers will thrive extremely, may be compoſed in the following manner: Take a quantity of freſh untried earth (from a common or ſome other paſture land) that is of a light ſandy loam or hazel mould, obſerving not to take it above ten inches deep below the ſurface; and if the turf be taken with it, the better, provided it hath time to rot thoroughly before it is uſed: mix this with a third part of rotten cow-dung, and lay it in a heap, keeping it turned over at leaſt once a month for eight or ten months, the better to mix it, and rot the dung and turf, and to let it have the advantages of the free air. In doing this work, be careful to rake out all great ſtones, and break the clods; but by no means ſift or ſcreen the earth, which has been found very hurtful to many ſorts of roots. This earth ſhould be mixed twelve months before it is uſed, if poſſible: but if conſtrained to uſe it ſooner, it muſt be the oftener turned over, to mellow and break the clods; obſerving to rake out all the parts of the green ſwaird that are not quite rotten, before it is uſed, as they would be prejudicial to the roots if ſuffered to remain. The beginning of September is a proper ſeaſon to prepare the beds for planting, which (if in a wet ſoil) ſhould be raiſed with this ſort of earth ſix or eight inches above the ſurface of the ground, laying at the bottom ſome of the rakings of the heap to drain off the moiſture; but, in a dry ſoil, three inches above the ſurface will be ſufficient: this compoſt ſhould be laid at leaſt two feet and a half thick, and in the bottom there ſhould be about four or five inches of rotten neats dung, or the rotten dung of an old melon or cucumber bed. The beds muſt be laid (if in a wet ſoil) a little round, to ſhoot off the water; but in a dry one, nearer to a level. In wet land, where the beds are raiſed above the ſurface, it will be proper to fill up the paths between them, in winter, either with rotten tan or dung, to prevent the froſt from penetrating into the ſides of the beds, which otherwiſe may deſtroy their roots. The earth ſhould be laid in the beds at leaſt a fortnight or three weeks before the roots are planted, and a longer time would be yet better, that it may ſettle; and when they are planted, ſtir the upper part of the ſoil about ſix inches deep, with a ſpade; then rake it even and ſmooth, and with a ſtick draw lines each way of the bed at ſix inches diſtance, ſo that the whole may be in ſquares, that the roots may be planted regularly: then with three fingers make a hole in the centre of each ſquare, about three inches deep, laying therein a root with the eye uppermoſt; and when the bed is finiſhed, with the head of a rake draw the earth ſmooth, ſo as to cover the crown of the roots about two inches thick.

The beſt ſeaſon for planting theſe roots, if for forward flowers, is about the latter end of September, and for thoſe of a middle ſeaſon any time in October; but obſerve to perform this work, if poſſible, at or near the time of ſome gentle ſhowers; for if planted when the ground is perfectly dry, and there ſhould no rain fall for three weeks or a month after, the roots will be very apt to grow mouldy upon the crown; and if once they get this diſtemper, they ſeldom come to good after.

As all the fine varieties of theſe flowers were firſt obtained from ſeeds, ſo no good floriſt that hath garden-room ſhould neglect to ſow them; in order to which, he ſhould provide himſelf with a quantity of good roots of the ſingle (or what the gardeners call *poppy*) anemonies, of the beſt colours, and ſuch as have ſtrong ſtems and large flowers, but eſpecially ſuch as have more leaves than common, and alſo other good properties: theſe ſhould be planted early, that they may have ſtrength to produce good ſeeds, which will be ripe in three weeks or a month's time after the flowers are paſt; when the ſeeds muſt be carefully gathered, otherwiſe they will be blown away in a ſhort time, as being incloſed in a downy ſubſtance. You muſt preſerve this ſeed till the beginning of Auguſt, when you may either ſow it in pots, tubs, or a well-prepared bed of light earth: in the doing of it, you muſt be careful not to let your ſeeds be in heaps; to avoid which, the beſt method is to mix them with a little fine ſand, and, when ſown, gently ſtreak the bed with a ſtrong hair-bruſh.

In about two months after ſowing, the plants will begin to appear, if the ſeaſon has proved favourable. The firſt winter after their appearing above ground, they are ſubject to injuries from hard froſts, or too much wet, againſt both of which you muſt equally defend them: for the froſt is very apt to looſen the earth, ſo that the young plants are often turned out of the ground, after which a ſmall froſt will deſtroy them; and too much wet often rots their tender roots, ſo that all your former trouble may be loſt in a ſhort time for want of care in this particular: nor is any thing more deſtructive to thoſe tender plants than the cold black froſts and winds of February and March, from which you muſt be careful to defend them, by placing a low reed-fence on the north and eaſt ſides of the bed, which may be moveable, and only faſtened to a few ſtakes to ſupport it for the preſent, and may be taken quite away as the ſeaſon advances, or removed to the ſouth and weſt ſides of the bed, to ſcreen it from the violence of the ſun, which often impairs theſe plants when young. As the ſpring advances, if the weather ſhould prove dry, you muſt gently refreſh them with water, which will greatly ſtrengthen your roots; and when the green leaves are decayed, if your roots are not too thick to remain in the ſame bed another year, you muſt clear off all the weeds and decayed leaves from the bed, and ſift a little more of the ſame prepared good earth, about a quarter of an inch thick over the ſurface, and obſerve to keep them clear from weeds during the ſummer ſeaſon, and at Michaelmas repeat the ſame earthing; but as theſe roots ſo left in the ground will come up early in the autumn, the beds ſhould be carefully covered in froſty weather, otherwiſe their leaves will be injured, whereby the roots will be weakened, if not deſtroyed. If your roots ſucceed well, many of them will flower the ſecond year, when you may ſelect all ſuch as you like, by marking them with a ſtick: but you ſhould not deſtroy any of them till after the third year, when you have ſeen them blow ſtrong, at which time you will be capable to judge of their goodneſs; for until the roots have acquired ſtrength, the flowers will not ſhew themſelves to advantage.

The ſingle (or poppy) anemonies will flower moſt part of the winter and ſpring, when the ſeaſons are favourable, if they are planted in a warm ſituation, at which time they make a fine appearance; therefore deſerve a place in every flower-garden, eſpecially as they require little culture. There are ſome fine blue colours amongſt theſe ſingle anemonies, which, with the ſcarlets and reds, make a beautiful mixture; and as theſe begin flowering in January or February, when the weather is cold, they will continue a long time in beauty, provided the froſt is not too ſevere, or if they are covered with mats. The ſeeds of theſe are ripe by the middle or end of May; and muſt be gathered daily as they ripen, otherwiſe they will be ſoon blown away by the winds.

ANEMOSCOPE, a machine that ſhews either the courſe or velocity of the wind *.

The machine which ſhews the courſe of the wind, or from what point of the compaſs it blows, conſiſts of an index moving about an upright circular plate, like the dial of a clock, on which the 32 points of the compaſs are drawn inſtead of the hours. The index, which points to the diviſions on the dial, is turned by a horizontal axis, having a trundle-head at its external extremity. This trundle-head is moved by a cog-wheel on a perpendicular axis; on the top of which a vane is fixed, that moves with the courſe of the wind, and puts the whole machine in motion. The whole contrivance is extremely ſimple; and nothing required in the conſtruction, but that the number of cogs in the wheel, and rounds in the trundle head, be equal; becauſe it is neceſſary, that, when the vane moves entirely round, the index of the dial alſo make a complete revolution.—An anemoſcope of this kind is placed in one of the turrets of the queen's palace. The anemoſcope, calculated for indicating the force or velocity of the wind, is the ſame with what moſt writers call an *anemometer;* and we have accordingly deſcribed one of thoſe machines under that article. We ſhall here add another, contrived by the late Mr Pickering, and publiſhed in the *Philoſophical Tranſactions*, N° 473. This anemoſcope is a machine four feet and a quarter high, conſiſting of a broad and weighty pedeſtal, a pillar faſtened into it, and an iron axis of about half an inch diameter faſtened into the pillar. Upon this axis turns a wooden tube; at the top of which is placed a vane, of the ſame materials, 21 inches long, conſiſting of a quadrant, graduated, and ſhod with an iron rim, notched to each degree; and a counterpoiſe of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are faſtened two ſmall round pieces of wood, which ſerve as moveable radii to deſcribe the degrees upon the quadrant, and as handles to a velum or ſail, whoſe pane is one foot ſquare, made of canvas, ſtretched upon four battens, and painted. On the upper batten, next to the ſhod rim of the quadrant, is a ſmall ſpring which catches at every notch correſponding to each degree, as the wind ſhall, by preſſing againſt the ſail, raiſe it up; and prevents the falling back of the ſail, upon leſſening of the force of the wind. At the bottom of the wooden tube, is an iron index, which moves round a circular piece of wood faſtened to the top of the pillar on the pedeſtal, on which are deſcribed the 32 points of the compaſs. The figure of this machine is given on Plate XXII. fig. 4. where *a* is the pedeſtal; *b*, the pillar on which the iron axis is fitted; *c*, the circle of wood, on which are deſcribed the 32 points of the compaſs; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoiſe of the vane. The adjoining figure repreſents the velum, which takes off: *a* is the plane of the velum; *b*, the ſpring; *c c*, the wooden radii; *d*, *d*, the holes through which the pin in the centre of the quadrant goes. Its uſes are the following.

1. Having a circular motion round the iron axis, and being furniſhed with a vane at top, and index at the bottom, when once you have fixed the artificial cardinal points, deſcribed on the round piece of wood on the pillar, to the ſame quarters of the heavens, it gives a faithful account of that quarter from which the wind blows. 2. By having a velum or ſail elevated by the wind along the arch of the quadrant to an height proportionable to the power of the column of wind preſſing againſt it, the relative force of the wind, and its comparative power, at any two times of examination, may be accurately taken. 3. By having a ſpring fitted to the notches of the iron with which the quadrant is ſhod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the higheſt blaſt, ſince the laſt time of examination, without the trouble of watching it.

The ingenious contriver of this machine tells us, that he carefully examined what dependence may be had upon it, during the ſtorms of February 1743-4, and found that it anſwered exceeding well; for that, in ſuch winds as the ſailors call violent ſtorms, the machine

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* See alſo the article *Wind*-GAUGE.

Plate XXII.

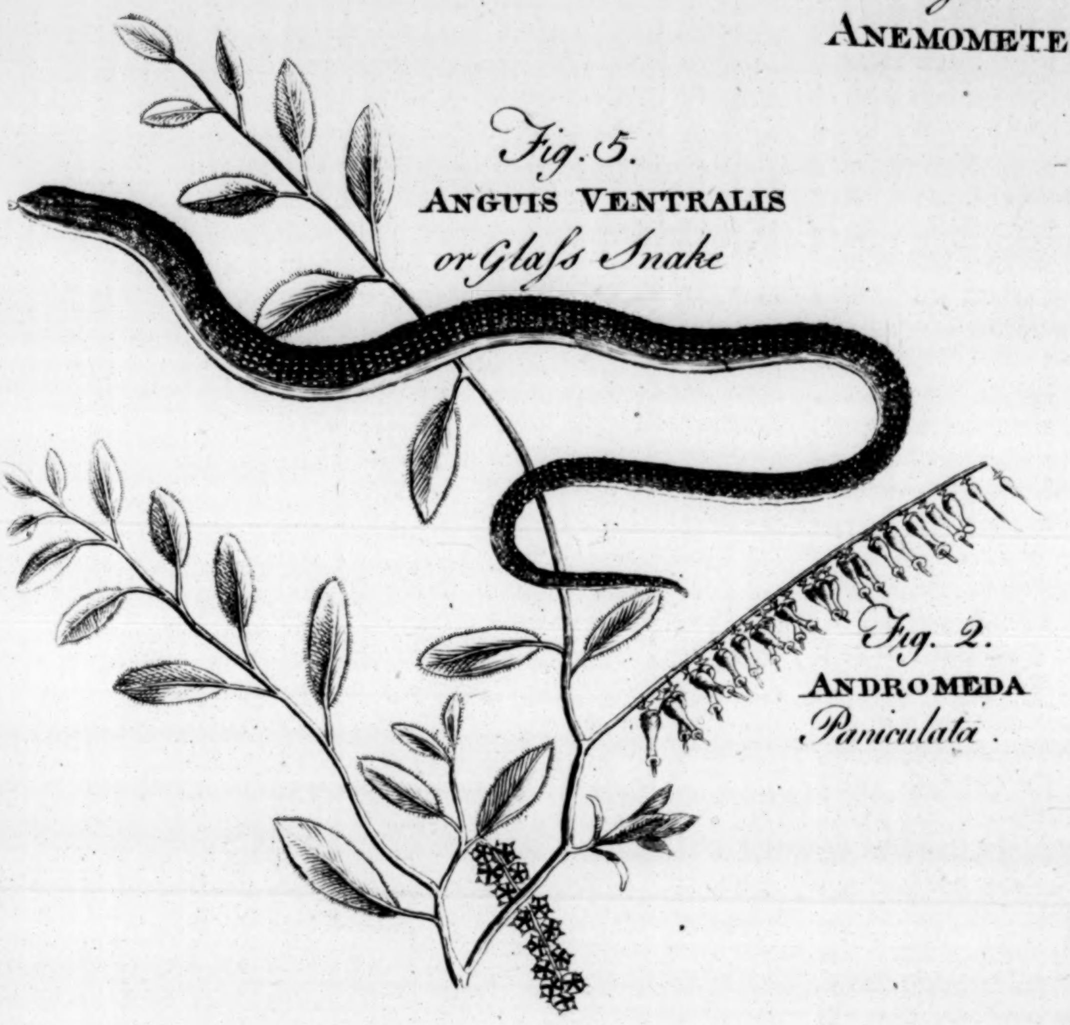

Fig. 5.
Anguis Ventralis
or Glaſs Snake

Fig. 2.
Andromeda
Paniculata.

Fig. 3.
Anemometer

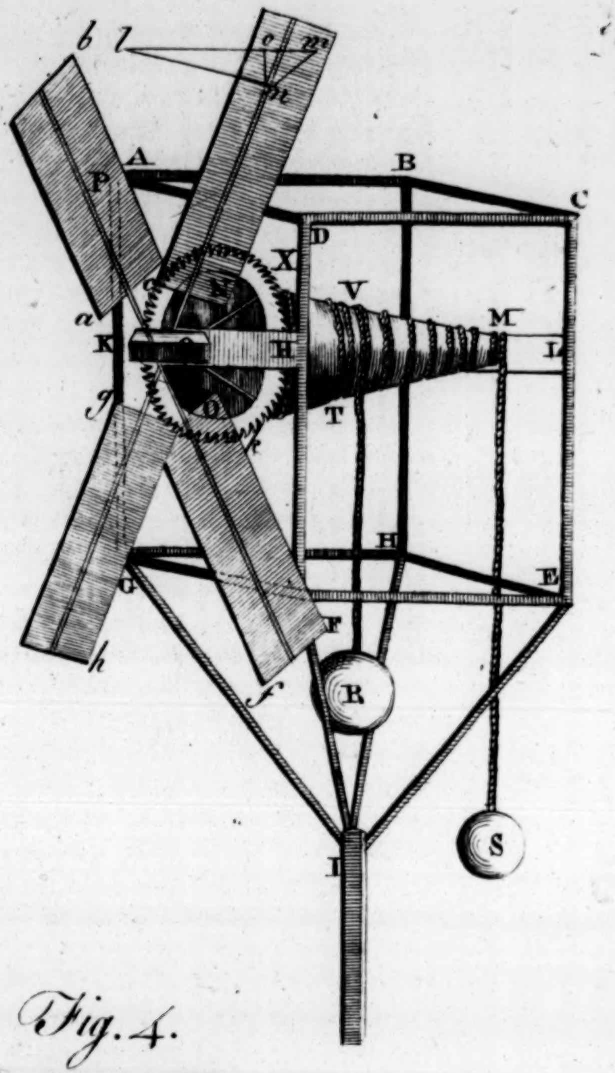
b
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Fig. 4.
Anemoscope

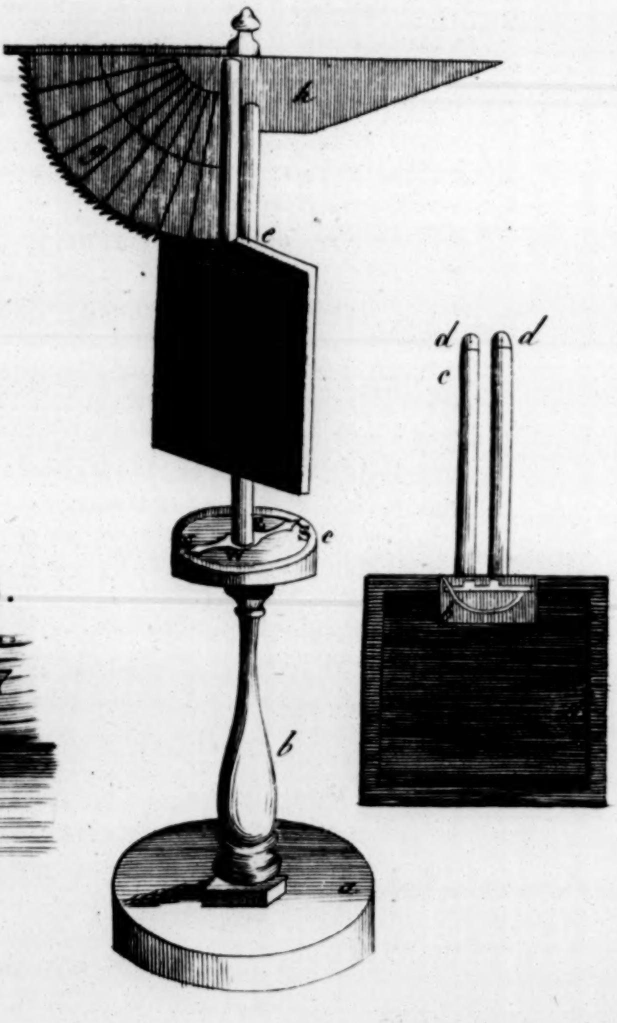
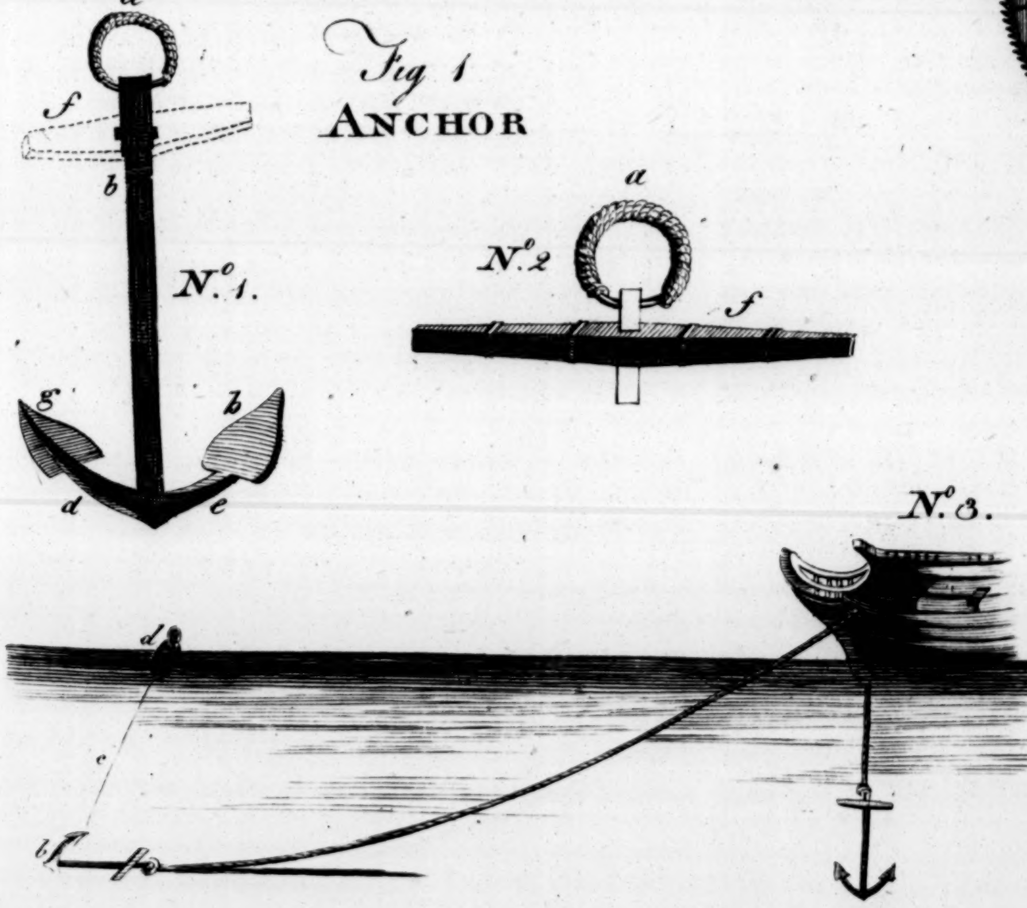


Fig 1
Anchor


a
f
b
N°. 1.
g
h
d
e
a
N°. 2
f
N°. 3.
d
c
b

A. Bell Sculp.t

3 MA 53

chine had ſix degrees to ſpare for a more violent guſt, before it comes to a horizontal poſition. It is certainly to be depended upon in ordinary weather, the velum being hung ſo tenderly as to feel the moſt gentle breeze. There is however reaſon to fear, that the expoſing the anemoſcope to all winds for a continuance, muſt diſorder it, eſpecially irregular blaſts and ſqualls. It may not therefore be amiſs, in violent weather, for the obſerver to take the tube with its vane and velum in his hand, in order to know the force of the wind; and, when he has finiſhed his obſervations, to carry the machine into the houſe, till the violence of the ſtorm is abated, when it may be replaced in its former ſituation.

ANETHUM, (from ανα and θεειν, to *run up*, becauſe it is of quick growth,) DILL; a genus of the digynia order, belonging to the pentandria claſs of plants.

Species. Of this genus Dr Linnæus mentions two ſpecies, the graveolens, and the fœniculum; but as the latter is commonly reckoned a diſtinct genus, and ſeveral ſpecies of it are mentioned by other botanical writers, we chuſe to keep them ſeparate, and ſhall here take notice only of the graveolens. This is an annual plant: the root is long, ſlender, and white: the leaves are divided into a multitude of fine, long, narrow ſegments like thoſe of fennel, but of a bluiſh green colour, and leſs ſtrong ſmell. The ſtalk is round and firm, growing to the height of four feet, with yellow flowers in moderately large umbels.

Culture. This plant thrives beſt in a light ſoil, and cannot bear to be tranſplanted. If the ſeeds are ſuffered to ſcatter, the trouble of ſowing will be prevented; but the plants muſt be thinned, ſo as to leave eight or ten inches between them, or they will be very weak.

Medicinal Uſes. For the purpoſes of medicine only the ſeeds of theſe plants are uſed. They are of a pale yellowiſh colour, in ſhape nearly oval, convex on one ſide, and flat on the other. Their taſte is moderately warm and pungent; their ſmell aromatic, but not of the moſt agreeable kind. They are recommended as a carminative, in flatulent colics proceeding from a cold cauſe or a viſcidity of the juices. See MATERIA MEDICA, n° 103.

ANEURISM, in ſurgery, a throbbing tumor, diſtended with blood, and formed by a dilatation or rupture of an artery. See SURGERY, n° 38.

ANGARIA, in Roman antiquity, a kind of public ſervice impoſed on the provincials, which conſiſted in providing horſes and carriages for the conveyance of military ſtores, and other public burdens. It is ſometimes alſo uſed for a guard of ſoldiers, poſted for the defence of a place. In a more general ſenſe, it is uſed for any kind of oppreſſion or ſervices performed through compulſion.

ANGAZYA, one of the Comorra iſlands, lying between the north end of Madagaſcar, and the coaſt of Zanguebar in Africa, from Lat. 10° to 15° S. It is inhabited by Moors, who trade with divers parts of the continent, in cattle, fruits, and other commodities of the iſland; which they exchange for callicoes and other cotton cloths. The houſes here are built of ſtone, and lime made of calcined oyſter-ſhells; with which the walls and roof are plaiſtered in a very elegant manner. The government of Angazia is a pure ariſtocracy; the iſland being ſubject to ten lords, who have all the title of *Sultan*. The people are very careful of their women; never permitting ſtrangers to ſee them, without permiſſion from a Sultan, or an order which the ſtranger brings with him. Many of them read and write Arabic with great facility; and ſome even underſtand Portugueſe, which they learn from their intercourſe with Moſambique, whither they trade in veſſels of 40 tons burthen.

ANGEIOTOMY, in ſurgery, implies the opening a vein or artery, as in bleeding; and conſequently includes both arteriotomy and phlebotomy.

ANGEL, a ſpiritual intelligent ſubſtance, the firſt in rank and dignity among created beings.

Angels, in the proper ſignification of the word (A), do not import the nature of any being, but only the office, to which they are appointed, eſpecially by way of meſſage, or intercourſe between God and his creatures; in which ſenſe they are called the *miniſters of God*, who do his pleaſure, and *miniſtring ſpirits* ſent forth to miniſter for them who ſhall be heirs of ſalvation. That there are ſuch beings as we call *angels*, that is, certain permanent ſubſtances, inviſible, and imperceptible to our ſenſes, endued with underſtanding and power ſuperior to that of human nature, created by God, and ſubject to him as the ſupreme Being; miniſtring to his divine providence in the government of the world by his appointment, and more eſpecially attending the affairs of mankind; is a truth ſo fully atteſted by ſcripture, that it cannot be doubted. Nay, the exiſtence of ſuch inviſible beings was generally acknowledged by the antient heathens, though under different appellations: the Greeks called them *dæmons*; and the Romans *genii*, or *lares*. Epicurus ſeems to have been the only one among the old philoſophers who abſolutely rejected them. Indeed, the belief of middle intelligences influencing the affairs of the world, and ſerving as miniſters or interpreters between God and man, is as extenſive as the belief of a God; having never, ſo far as we know, been called in queſtion by thoſe who had any religion at all.

When created.

That the angels were in being long before the Moſaic creation, is generally allowed; and indeed cannot be doubted, ſince they were actually preſent, if not employed, in that creation, *when the morning-ſtars ſang together, and all the ſons of God ſhouted for joy*; and ſince it is more than probable, that the fall of the apoſtate angels was ſome time at leaſt before it.

Their nature, power, employment, &c.

As to the nature of theſe beings, we are told, that they are ſpirits; but whether pure ſpirits diveſted of all matter, or united to ſome thin bodies, or corporeal vehicles, has been a controverſy of long ſtanding. Not only the ancient philoſophers, but ſome of the Chriſtian fathers, were of opinion, that angels were cloathed with ethereal, or fiery, bodies, of the ſame nature with thoſe which we ſhall one day have when we come to be equal to them. But the more general opinion, eſpecially of later times, has been, that they are ſub-

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(A) The word *Angel* is Greek, and ſignifies a *Meſſenger*: the Hebrew מלאך ſignifies the ſame thing. The angels are in Daniel (chap. iv. ver. 13, *&c.*) called עירים, or *Watchers*, from their vigilance: for the ſame reaſon they are, in the remains we have of the prophecy attributed to Enoch, named *Egregori*; which word imports the ſame in Greek.

ſtances entirely ſpiritual, though they can at any time aſſume bodies, and appear in human or other ſhapes.

That the angelical powers and abilities vaſtly excel thoſe of man, cannot be denied, if we conſider, that their faculties are not clogged or impeded, as ours are, by any of thoſe imperfections which are inſeparable from corporeal beings: ſo that their underſtandings are always in perfect vigour; their inclinations regular; their motions ſtrong and quick; their actions irreſiſtible by material bodies, whoſe natural qualities they can controul, or manage to their purpoſes, and occaſion either bleſſings or calamities, public or private, here below, inſtances of which are too numerous to mention.

Beſides their attendance on God, and their waiting and executing of his commands, they are alſo preſumed to be employed in taking care of mankind and their concerns: and that every man had ſuch a tutelar, or guardian angel, even from his birth, was a firm belief and tradition among the Jews; and our Saviour himſelf ſeems to have been of the ſame ſentiment. The heathens were alſo of the ſame perſuaſion, and thought it a crime to neglect the admonitions of ſo divine a guide. Socrates publicly confeſſed himſelf to be under the direction of ſuch an angel, or dæmon, as ſeveral others have ſince done. And on this tutelar genius of each perſon they believed his happineſs and fortune depended. Every genius did his beſt for the intereſt of his client; and if a man came by the worſt, it was a ſign the ſtrength of his genius was inferior to that of his opponent, that is, of an inferior order; and this was governed by chance. There were ſome genii, whoſe aſcendent was ſo great over others, that their very preſence entirely diſconcerted them; which was the caſe of that of Auguſtus in reſpect of that of Marc Anthony; and for the ſame reaſon, perhaps, ſome perſons have wit, and ſpeak well, when others are abſent, in whoſe preſence they are confounded, and out of countenance. The Romans thought the tutelar genii of thoſe who attained the empire, to be of an eminent order; on which account they had great honours ſhewn them. Nations and cities alſo had their ſeveral genii. The ancient Perſians ſo firmly believed the miniſtry of angels, and their ſuperintendence over human affairs, that they gave their names to their months, and the days of their month; and aſſigned them diſtinct offices and provinces: and it is from them the Jews confeſs to have received the names of the months and angels which they brought with them when they returned from the Babyloniſh captivity. After which, we find, they alſo aſſigned charges to the angels, and in particular the patronage of empires and nations; Michael being the prince of the Jews, as Raphael is ſuppoſed to have been of the Perſians.

The Mahometans have ſo great a reſpect for the angels, that they account a man an infidel who either denies their exiſtence, or loves them not. They believe them to be free from ſin, enjoying the preſence of God, to whom they are never diſobedient: that they have ſubtil pure bodies, being created of light; and have no diſtinction of ſexes, nor do they need the refreſhment of food or ſleep. They ſuppoſe them to have different forms and offices: that ſome adore God in ſeveral poſtures; others ſing his praiſes, and intercede for men; ſome carry and encompaſs his throne; others write the actions of men, and are aſſigned guardians to them.

As the numbers of theſe celeſtial ſpirits are very great, it is likewiſe reaſonable to believe that there are ſeveral orders and degrees among them; which is alſo confirmed by ſcripture: whence ſome ſpeculative men have diſtributed them into nine orders, according to the different names by which they are there called; and reduced thoſe orders into three *hierarchies*, as they call them; to the firſt of which belong ſeraphim, cherubim, and thrones; to the ſecond, dominions, virtues, and powers; and to the third, principalities, arch-angels, and angels. They imagine farther, that there are ſome who conſtantly reſide in heaven; others who are miniſters, and ſent forth, as there is occaſion, to execute the orders they receive from God by the former. The Jews reckon but four orders or companies of angels, each headed by an arch-angel; the firſt order being that of Michael, the ſecond of Gabriel, the third of Uriel, and the fourth of Raphael: but tho' the Jews believe them to be four, yet it ſeems there were rather ſeven. The Perſians alſo held, there were ſubordinate degrees among the angels.

Of the fallen angels.

Although the angels were originally created perfect, good, and obedient to their Maſter's will, yet ſome of them ſinned, and kept not their firſt eſtate, but left their habitation, and ſo, of the moſt bleſſed and glorious, became the moſt vile and miſerable of all God's creatures. They were expelled the regions of light, and caſt down to hell, to be reſerved in everlaſting chains under darkneſs, until the day of judgment. With heaven they loſt their heavenly diſpoſition, which delighted once in doing good and praiſing God; and fell into a ſettled rancour againſt him, and malice againſt men: their inward peace was gone; all deſire of doing good departed from them; and, inſtead thereof, revengeful thoughts and deſpair took poſſeſſion of them, and created an eternal hell within them.

When, and for what offence, theſe apoſtate ſpirits fell from heaven, and plunged themſelves into ſuch an abyſs of wickedneſs and wo, are queſtions very hard, if not impoſſible, to be determined by any clear evidence of ſcripture. As to the time, it is moſt reaſonable to believe, that their fall preceded the creation of the world: though ſome have imagined it to have been after; and that carnality, or luſting to converſe with women upon earth, was the ſin which ruined them: an opinion (B) built on a miſtaken interpretation of ſcripture, as if angels were meant by *the ſons of God* who are

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(B) This opinion ſeems to have been originally occaſioned by ſome copies of the Septuagint, which, in the days of St Auſtin, had in this place *the angels of God*. Lactantius ſuppoſes the angels, who were guilty of this enormity, had been ſent down by God to guard and take care of mankind; and being endued with free-will, were charged by him not to forfeit the dignity of their celeſtial nature, by defiling themſelves with the corruptions of the earth; but that the devil at length enticed them to debauch themſelves with women. He adds, that, being not admitted into heaven by reaſon of the wickedneſs into which they had plunged themſelves, they fell down to the earth, and became the devil's miniſters; but that thoſe who were begotten by them, being neither angels nor men, but of a middle nature, were not received into hell, no more than their parents were into heaven. Hence aroſe two kinds of dæmons, celeſtial are ſaid to have begotten the mighty men of old on the daughters of men. Others have ſuppoſed, that the angels, being informed of God's intention to create man after his own image, and to dignify his nature by Chriſt's aſſuming of it, and thinking their glory to be eclipſed thereby, envied man's happineſs, and ſo revolted: and with this opinion that of the Mahometans has ſome affinity, who are taught, that the devil, who was once one of thoſe angels who are neareſt to God's preſence, and named *Azazil*, forfeited paradiſe for refuſing to pay homage to Adam, at the command of God. But on what occaſion ſoever it firſt ſhewed itſelf, pride ſeems to have been the leading ſin of the angels; who, admiring and valuing themſelves too much on the excellence of their nature and the height of their ſtation, came at length to entertain ſo little reſpect for their Creator, as to be guilty of downright rebellion and apoſtaſy.

It is certain from ſcripture, that theſe fallen angels were in great numbers, and that there was alſo ſome order and ſubordination preſerved among them; one eſpecially being conſidered as their prince, and called by ſeveral names, *Beelzebub*, *Satan*, or *Sammaël* by the Jews; *Ahâriman*, by the Perſians; and *Eblis*, by the Mahometans. Their conſtant employment is not only doing evil themſelves, but endeavouring by all arts and means to ſeduce and pervert mankind, by tempting them to all kind of ſin, and thereby bringing them into the ſame deſperate ſtate with themſelves.

ANGEL is likewiſe a title given to biſhops of ſeveral churches. In this ſenſe is St Paul underſtood by ſome authors, where he ſays, *Women ought to be covered in the church, becauſe of the angels.* The learned Dr Prideaux obſerves, that the miniſter of the ſynagogue, who officiated in offering up the public prayers, being the mouth of the congregation, delegated by them as their repreſentative, meſſenger, or angel, to ſpeak to God in prayer for them, was therefore, in the He-

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celeſtial and terreſtrial. Theſe are unclean ſpirits, the authors of whatever evils are committed, and whoſe prince is the devil. From hence very probably proceeded the notions of *Incubi*, or dæmons who are ſuppoſed to have carnal knowledge of women.

But the fancy of angels defiling themſelves with women has been greatly propagated by that forgery entitled *the prophecy of Enoch*. As the fragments of it are extant which give a particular hiſtory of theſe imaginary tranſactions, we ſhall here inſert an extract of them for the amuſement of our readers.

" When men were greatly increaſed, they had daughters of ſuch excellent beauty, that the Egregori, or watching-angels, † fell in love with them, and propoſed to one another that they ſhould go down and chuſe themſelves wives of the daughters of men: to which Semiazas, their prince, replying, that he was apprehenſive they would not go through with the affair, but leave him to bear the guilt alone, they all ſwore and bound themſelves under imprecations, that they would not recede from their reſolution. The number of theſe Egregori was two hundred; who, in the days of Jared, deſcended on the top of mount Hermon, which was ſo called from the oath they had taken. Their princes were twenty, whoſe names follow: *Semiazas* their chief, *Atarcuph*, *Araciel*, *Chobabiel*, *Orammame*, *Ramiel*, *Sampſich*, *Zaciel*, *Balciel*, *Azalzel*, *Pharmarus*, *Amariel*, *Anagemas*, *Thauſael*, *Samiel*, *Sarinas*, *Eumiel*, *Tyriel*, *Jumiel*, *Sariel*.

† See the preceding note.

" Theſe, and the reſt of them, in the year of the world one thouſand one hundred and ſeventy, took themſelves wives, and began to commit lewdneſs with them, which they continued to do until the flood; and the women bore to them three generations. The firſt generation were the giants, the giants begat the Nephilim, and the Nephilim thoſe named *Eliud*; and they were multiplied according to their ſtature, and taught themſelves and their wives magic and enchantments. The tenth of their princes, named *Azalzel*, taught them to make ſwords, breaſtplates, and inſtruments of war; as alſo the working of metals, particularly gold and ſilver, and faſhioning various ornaments for the women: he alſo inſtructed them in the preparing of coſmetics, the poliſhing of precious ſtones, and the art of dyeing. Theſe things the ſons of men provided for themſelves and their daughters, and they tranſgreſſed; and alſo ſeduced thoſe that were virtuous among them, and wickedneſs prevailed greatly in the earth. Semiazas, the chief of theſe angels, taught the force of poiſonous roots and herbs; Pharmarus, the eleventh, charms and incantations; the ninth, aſtroſcopy; the fourth, aſtrology; the eighth, aëroſcopy; the third, the ſigns of the earth; the ſeventh, thoſe of the ſun; the twentieth, thoſe of the moon; and in like manner each of them revealed certain ſecrets to their wives and children.

" Afterwards the giants began to devour human fleſh; by which means the number of men daily decreaſing, thoſe that remained cried to heaven againſt their cruelty, and beſought God to remember them. This the four arch-angels hearing, looked down upon the earth, and beholding a great deal of bloodſhed thereon, and that all manner of impiety and diſorder was committed, made their report thereof to God, and at his command bound the princes of thoſe trangreſſors, and threw them into the abyſs, there to be kept to the day of judgment. Uriel in particular was ſent to Noah, the ſon of Lamech, to acquaint him that the whole earth was to be deſtroyed by a deluge, and inſtruct him by what means to eſcape it. Raphael was ordered to bind Azael [*Azalzel*] hand and foot, and to throw him into darkneſs, in the deſert of Dudael, and to lay him upon ſharp ſtones, and cover him with darkneſs, that he might dwell therein for ever, being deſtined to the puniſhment of fire on the day of judgment. The words which follow, directing him to heal the earth of the wounds cauſed therein, by the ſecrets revealed by the Egregori, are ſomething dark, and deſerve not the trouble of an explication. Gabriel's charge was to deſtroy the giants, the ſons of the Egregori, by exciting them to mutual and inteſtine wars, that they might fall by each others hands; and Michael was commanded to bind Semiazas, and the reſt of his companions, and to lead them, after they had ſeen the ſlaughter of their beloved ſons, to the utmoſt parts of the earth, where they were to be confined for ſeventy generations, till the conſummation of all things, and the day of judgment, when they were to be thrown into the gulph of fire. The giants, being begotten by a mixture of ſpirit and fleſh, were condemned to become evil ſpirits, doing miſchief upon the earth, appearing as ſpectres, and taking no food; but were to riſe with mankind at the general reſurrection. Therefore, from the day of the ſlaughter of the giants, the Nephilim, the mighty men of the earth, and the great men of renown, the ſpirits which went forth from their ſouls, as from fleſh, were to continue their miſchievous employments till the laſt day. It was alſo decreed, that mount Hermon, where thoſe angels mutually bound themſelves by an oath, ſhould never be without ſnow and cold till the day of judgment, when it ſhould melt like wax. Mankind are alſo threatened with a general deſtruction, and that their life ſhould be but one hundred and twenty years." *Ex primo libro Enoch. apud Syncellum.*

brew language, called the *angel* of the church; and from thence the biſhops of the ſeven churches of Aſia are, by a name borrowed from the ſynagogue, called the *angels* of thoſe churches.

Angel, in commerce, the name of a gold coin formerly current in England. It had its name from the figure of an angel repreſented upon it, weighed four pennyweights, and was twenty-three and a half carats fine. It had different values in different reigns; but is at preſent only an imaginary ſum, or money of account, implying ten ſhillings.

ANGEL-FISH, in ichthyology, a ſpecies of ſqualus. See Squalus.

ANGELICA, a genus of the digynia order, belonging to the pentandria claſs of plants, of which there are five

Species. 1. The ſativa, or common angelica, which is cultivated in gardens for medicinal uſe, and likewiſe for a ſweetmeat, grows naturally in the northern countries. The root of this ſpecies is brown, oblong, and an inch or two thick, fragrant, and acrid. The leaves are very large, compoſed of pinnated foliola, of an oblong oval figure, dentated at the edge, and the odd leaf at the end of the pinna lobated; the ſtalk is round, ſtriated, and as thick as a child's arm. The umbels are very large, and of a globoſe figure; the flowers very ſmall, and greeniſh. 2. The arch-angelica is a native of Hungary and Germany. The leaves are much larger than thoſe of the former, and the flowers are yellow. 3. The ſylveſtris grows naturally in moiſt meadows, and by the ſides of rivers, in many parts of Britain; ſo is ſeldom admitted into gardens. 4. The atro-purpurea canadenſis. 5. The lucida canadenſis. Theſe are natives of North America, but have neither beauty nor uſe.

Culture. The common angelica delights to grow in a moiſt ſoil: the ſeeds ſhould be ſown ſoon after they are ripe. When the plants come up about ſix inches high, they ſhould be tranſplanted very wide, as their leaves ſpread greatly. If they are planted on the ſides of ditches or pools of water, about three feet diſtance, they will thrive exceedingly.

Medicinal Uſes. For the purpoſes of medicine, Bohemia and Spain produce the beſt kinds of angelica. The London college direct the roots brought from Spain to be alone made uſe of. Angelica roots are apt to grow mouldy, and be preyed upon by inſects, unleſs thoroughly dried, kept in a dry place, and frequently aired. We apprehend that the roots which are ſubject to this inconvenience might be preſerved, by dipping them in boiling ſpirit, or expoſing them to its ſteam, after they are dried.

All the parts of angelica, eſpecially the root, have a fragrant aromatic ſmell, and a pleaſant bitteriſh warm taſte, glowing upon the lips and palate for a long time after they have been chewed. The flavour of the ſeeds and leaves is very periſhable, particularly that of the latter, which, on being barely dried, loſe the greateſt part of their taſte and ſmell: the roots are more tenacious of their flavour, though even theſe loſe part of it upon keeping. The freſh root, wounded early in the ſpring, yields an odorous, yellow juice, which, ſlowly exſiccated, proves an elegant gummy reſin, very rich in the virtues of the angelica. On drying the root, this juice concretes into diſtinct moleculæ, which, on cutting it longitudinally, appear diſtributed in little veins: in this ſtate, they are extracted by pure ſpirit, but not by watery liquors.

Angelica is one of the moſt elegant aromatics of European growth, though little regarded in the preſent practice. The root, which is the moſt efficacious part, is rarely met with in preſcription, and does not enter any officinal compoſition. See Materia Medica, n° 104.

ANGELICS, in church-hiſtory, an ancient ſect of heretics, ſuppoſed by ſome to have got this appellation from their exceſſive veneration of angels; and by others, from their maintaining that the world was created by angels.

Angelics is alſo the name of an order of knights, inſtituted in 1191, by Angelus Flavius Commenus emperor of Conſtantinople.

Angelics is alſo a congregation of nuns, founded at Milan in 1534, by Louiſa Torelli, counteſs of Guaſtalla. They obſerve the rule of St Auguſtine.

ANGELITES, in eccleſiaſtical hiſtory, a ſect of Chriſtian heretics, in the reign of the emperor Anaſtaſius, and the pontificate of Symmachus, about the year 494; ſo called from Angelium, a place in the city of Alexandria, where they held their firſt meetings. They were called likewiſe *Severites*, from one Severus, who was the head of their ſect; as alſo Theodoſians, from one among them named *Theodoſius*, whom they made pope at Alexandria. They held, that the perſons of the Trinity are not the ſame; that none of them exiſts of himſelf, and of his own nature; but that there is a common god, or deity, exiſting in them all; and that each is God, by a participation of this deity.

ANGELO (Michael.) There were five celebrated Italian painters of this name, who flouriſhed in the 16th and 17th centuries; but the two moſt diſtinguiſhed of of them are theſe. Firſt, Michael Angelo Buonarroti, who was a moſt incomparable painter, ſculptor, and architect, born in 1474, in the territory of Arezzi in Tuſcany. He was the diſciple of Dominico Ghirlandaio; and erected an academy of painting and ſculpture in Florence, under the protection of Lorenzo di Medicis; which, upon the troubles of that houſe, was obliged to remove to Bologna. About this time he made an image of Cupid, which he carried to Rome, broke off one of its arms, and buried the image in a place he knew would ſoon be dug up, keeping the arm by him. It was accordingly found, and ſold to Cardinal St Gregory for an antique; until Michael, to their confuſion and his own credit, diſcovered his artifice, and confirmed it by the deficient arm which he produced: it is rather unuſual for the manufacturers of antiques to be ſo ingenuous. His reputation was ſo great at Rome, that he was employed by pope Sixtus to paint his chapel; and by the command of pope Paul III. executed his moſt celebrated piece, *The laſt judgment.* He has the character of being the greateſt deſigner that ever lived; and it is univerſally allowed that no painter ever underſtood anatomy ſo well. He died immenſely rich at Rome, in 1564. Secondly, Michael Angelo de Caravaggio, born at that village in Milan, in 1569. He was at firſt no more than a bricklayer's labourer: but he was ſo charmed with ſeeing ſome painters at work, that he immediately applied himſelf to the art; and made ſuch a progreſs in a few years, that he was admired as the author of a new ſtyle in painting. It was obſerved of Michael Angelo Buonarotti, that he was incomparable in deſigning, but knew little of colouring; and of Caravaggio, that he had as good a goût in colouring, as he had a bad one in deſigning. There is one picture of his in the Dominican church at Antwerp, which Rubens uſed to call his maſter. It is ſaid of this painter, that he was ſo ſtrangely contentious, that the pencil was no ſooner out of his hand, but his ſword was in it. He died in 1609.

ANGELO (St.) a ſmall but ſtrong town of Italy, in the Capitanata. There are ſeveral other towns and caſtles of the ſame name in Italy, and particularly the caſtle of St Angelo at Rome. E. long. 15. 56. N. lat. 41. 43.

ANGELOS (LOS), a province of Mexico, the ancient republic of Tlaſcala, of which a city called *Tlaſcala* was once the capital. That city is now reduced to an inconſiderable village, and has given place to another called *Puebla des los Angelos*, or the city of Angels. It is ſituated in W. Long. 103. 12. and N. Lat. 19. 13. It was formerly an Indian town; but in 1530 was entirely abandoned by the natives, on account of the cruelties of the Spaniards. A ſucceeding viceroy of Mexico, by a milder treatment, recalled them; and the town is now exceedingly rich and populous, ſo as even to vie with Mexico itſelf in magnificence. It is ſituated on the river Zacatula, in a fine valley, about 25 leagues to the eaſtward of Mexico. In the middle is a beautiful and ſpacious ſquare, from whence run the principal ſtreets in direct lines, which are croſſed by others at right Angles. One ſide is almoſt entirely occupied by the magnificent front of the cathedral; while the other three conſiſts of piazzas, under which are the ſhops of tradeſmen. The city is the ſee of a biſhop, ſuffragan to the archbiſhop of Mexico, and we may form a judgment of the wealth of the place by the revenue of the cathedral and chapter, which amounts to 300,000 pieces of eight annually. It muſt be remembered, however, that in all popiſh countries the wealth of the laity by no means bears the ſame proportion to that of the clergy, as in Britain. What contributes greatly to increaſe the riches of this province is, that here is ſituated the city of Vera Cruz, the natural centre of all the American treaſures belonging to Spain. See VERA CRUZ.

ANGELOT, a gold coin ſtruck at Paris, while ſubject to the Engliſh; ſo called from the repreſentation of an angel ſupporting the arms of England and France.

ANGER, a violent paſſion of the mind, conſiſting in a propenſity to take vengeance on the author of ſome real or ſuppoſed injury done the offended party. See MORAL PHILOSOPHY, nº 31, 212.; and the article EMOTIONS *and Paſſions*, nº vi. and xi. 9, 10.

Phyſicians and naturaliſts afford inſtances of very extraordinary effects of this paſſion. Borrichius cured a woman of an inveterate tertian ague, which had baffled the art of phyſic, by putting the patient in a furious fit of anger. Valeriola made uſe of the ſame means, with the like ſucceſs, in a quartan ague. The ſame paſſion has been equally ſalutary to paralytic, gouty, and even dumb perſons; to which laſt it has ſometimes given the uſe of ſpeech. Etmuller gives divers inſtances of very ſingular cures wrought by anger; among others, he mentions a perſon laid up in the gout, who, being provoked by his phyſician, flew upon him, and was cured. It is true, the remedy is ſomewhat dangerous in the application, when a patient does not know how to uſe it with moderation. We meet with ſeveral inſtances of princes to whom it has proved mortal; *e. gr.* Valentinian the firſt, Wenceſlas, Matthius Corvinus king of Hungary, and others. There are alſo inſtances wherein it has produced the epilepſy, jaundice, cholera-morbus, diarrhœa, *&c. Mem. de Trev.* 1707. p. 923.

ANGERMANIA, a province of the kingdom of Sweden, bounded on the N. by Lapland and Bothnia, on the E. by the gulph of Bothnia and Medelpadia, and on the W. by Jemti and Herndel. It is full of rocks, mountains, and foreſts; and there is one very high mountain called *Scull*. It has excellent iron-works, and lakes abounding with fiſh.

ANGERMOND, a town of the duchy of Berg, in Germany, on the E. ſide of the Rhine, ſubject to the Elector Palatine. E. Long. 6. 20. N. Lat. 51. 10.

ANGERONA, in mythology, the name of a pagan deity whom the Romans prayed to for the cure of a diſtemper called the *quinzy*; in Latin, *angina*. Pliny calls her the *goddeſs of ſilence* and *calmneſs of mind*, who baniſhes all uneaſineſs and melancholy. She is repreſented with her mouth covered, to denote patience and refraining from complaints. Her ſtatue was ſet up, and ſacrificed to, in the temple of the goddeſs Volupia, to ſhew that a patient enduring of affliction leads to pleaſure.

ANGERONALIA, feaſts inſtituted at Rome in honour of the goddeſs Angerona. They were celebrated on the 21ſt of December.

ANGERS, a great city of France, and capital of the duchy of Anjou, with a biſhop's ſee. It is ſeated a little above the place where the Sarte and the Loire loſe themſelves in the Maine. This laſt river divides the city into two equal parts. There are twelve pariſhes in the city, and four in the ſuburbs, which contain upwards of thirty-ſix thouſand inhabitants. Beſides theſe, there are eight chapters, and a great number of convents for both ſexes. Its greateſt extent is along the declivity of a hill, which reaches quite down to the river ſide. The caſtle is flanked with eighteen large round towers and a ſtrong half-moon. From the platform there is a very delightful proſpect. The cathedral church is remarkable for the length and height of its great nave, which is without pillars, and is thought to be the fineſt in France. It contains a treaſure which is never ſhown but on great feſtival-days. Over the great gate are three very high ſteeples, the middlemoſt of which is ſupported by the other two, and ſeems to be ſuſpended in the air: it is very much admired by ſtrangers. At the foot of the caſtle there is a chain, which reaches to the other ſide of the river, and is faſtened to a tower, which prevents the entrance by the river into the city. Near the church of St Michael is the handſomeſt ſquare in the city, from whence runs a ſtreet which has the name of the church. On one ſide of this ſtreet is the town-houſe; which has a fine tower, with a clock, raiſed upon an arch, which ſerves for a paſſage into the great ſquare. There are two large bridges, which keep up a communication between the two parts of the city; and in the leſſer of theſe there is another ſquare, which ſerves for a market. The univerſity of Angers was founded in 1398, and the academy of belles lettres in 1685. This laſt conſiſts of thirty academicians. At the end of the ſuburbs of Breſigny are the quarries of Angiers, ſo famous for the fine ſlate which is got from thence. The pieces are of the thickneſs of a crown-piece, and a foot ſquare. All the houſes in Angers are covered with this ſlate, which has gained it the appellation of the *Black city*. W. Long. 0. 30. N. Lat. 47. 28.

ANGHIERA, a town of Italy, in the duchy of Milan, and capital of a county of the ſame name. It is ſeated on the eaſtern ſide of the lake Maggiore, in E. Long. 9. 5. N. Lat. 45. 42.

ANGINA, in medicine, a violent inflamation of the throat, otherwiſe called *quinzy*. See Quinzy.

ANGIOSPERMIA, in the Linnæn ſyſtem of botany, the ſecond order in the claſs Didynamia. It conſiſts of thoſe plants, of that claſs, whoſe ſeeds are incloſed in a pericarpium. In this order the ſtigma is generally obtuſe. Theſe are the *perſonati* of Tournefort.

ANGLE, in geometry, the inclination of two lines meeting one another in a point, and called the *legs of the angle*. See Geometry.

Angle *of Incidence*, in optics, the angle which a ray of light makes with a perpendicular to that point of the ſurface of any medium on which it falls; tho' it is ſometimes underſtood of the angle which it makes with the ſurface itſelf.

Angle *of Refraction* now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the ſurface on which it was incident; but has ſometimes been underſtood of the angle which it makes with the ſurface of the refracting medium itſelf.

ANGLER, a perſon who practices the art of angling, whether as a diverſion, or otherwiſe. See the article Angling.

Angler, in ichthyology, the Engliſh name of a ſpecies of lophus. See Lophus.

ANGLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, ſettled in that part of Denmark, and duchy of Sleſwick, which to this day is called *Angel*, and of which the city of Flenſburgh is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variouſly accounted for. According to Saxo-Grammaticus, they were called *Angli* from one Angulus, ſon to Humblus king of Denmark. Widiſchind, a Saxon writer, will have them to be called *Angli*, from an iſland in the corner or angle of the ſea, which they conquered. Goropius derives their name from the Saxon word *Angel*, or *Engel*, ſignifying a fiſh-hook; the Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being ſo named by the neighbouring nations; as if, like hooks, they caught all that was in the ſea. To this nation the Britiſh ambaſſadors are ſaid to have applied when ſoliciting ſuccours againſt the Scots and Picts. The Angles therefore came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England. See England.

ANGLESEY (Iſle of,) is the moſt weſtern county of North Wales. It is 24 miles in length, 14 in breadth, and ſends one member to parliament. It is ſeparated from Caernarvonſhire by a ſtrait called *Meni*, and on every other ſide is ſurrounded by the ſea. It is a fertile ſpot, and abounds in corn, cattle, fleſh, fiſh, and fowls; with very good mill-ſtones and grind-ſtones. The chief town is Beaumaris. Near Kemlyn-harbour is a quarry of ſtone called *aſbeſtos*, which is a beautiful marble, out of which may be got the linum aſbeſtinum, called here *ſalamander's wool*; and will bear common fire: not far from this is a yellow ſulphureous copper-ore, which has never been worked. At Llahbadrig, about three miles eaſtward from hence, is a great body or vein of ſtony-oker, of various colours, as red, yellow, blue; and an extremely fine white-clay, of the cimolia kind, of great ſervice to painters, potters, and ſtone-cutters. In ancient times this iſland was called *Mon*, *Mona*, or *Moneg*; and got the name of *Angleſey* only when conquered by the Engliſh. It was the great nurſery of the religion of the Druids; being the reſidence of the grand Druid, or chief pontiff, and conſequently of all the learned doctors in that religion. In the reign of the emperor Claudius (A. D. 45.) the Druids beginning to be perſecuted by the Romans on account of their ſacrificing human victims, moſt of them retired to this iſland: but they did not long enjoy their retreat in ſafety; for, in the year 61, Suetonius Paulinus governor of Britain, having obſerved that the iſland of Angleſey was a great ſeat of diſaffection to the Roman government, and afforded an aſylum to all who were forming plots againſt it, he determined to root them out. He accordingly entered the iſland, and defeated the Britons who attempted to defend it, though they were animated by the preſence, prayers, and exhortations of a great number of Druids and Druideſſes. After this victory, he cut down the groves, and overturned the altars, which had been polluted by the blood of many human victims; and even requited the cruelties of the Druids upon themſelves, by burning many of them in the fires they had prepared for the Roman priſoners if the Britons had got the victory. Many ancient monuments of this religion ſtill remain in the iſland.

ANGLING, among ſportſmen, the art of fiſhing with a rod, to which are fitted a line, hook, and bait. See Fishing-*Rod*, Fishing-*Hook*, Fishing-*Fly*.

The angler's firſt buſineſs is to attract the fiſh to the place intended for angling. The method of doing this, in ſtanding waters, by throwing in grains, chopped worms, and the like, is well known: but the chief difficulty is in running rivers and brooks. The method, in this caſe, is to prepare a tin box capable of holding ſome hundred of worms, bored on all ſides, and full of holes of ſuch a ſize as they may be juſt able to crawl out at; there muſt be a plummet faſtened to this box to ſink it, and a line to draw it back at pleaſure; in this caſe it is to be thrown into the water in a proper place, above which the angler may ſtand under cover. The worms will ſlowly and gradually crawl out of this box, and the fiſh will be gathered about to feed on them; the baited hook is to be thrown in higher up and carried down by the ſtream. If this method do not bring the fiſh about the place in a little time, there is reaſon to ſuſpect that ſome pike lies lurking thereabout, and deters them: in this caſe, it is proper to throw out a baited hook, and he will generally be taken; after this the attempt will ſucceed.

When the angler takes his ſtand, he is to ſhelter himſelf under ſome tree or buſh, or ſtand ſo far from the brink of the water that he can only diſcern his float; as the fiſh are timorous and eaſily frighted away. The angling rod muſt be kept in a moderate ſtate, neither too dry nor too moiſt: in the firſt caſe, it will be brittle; in the other, rotten. When paſtes are uſed, it is proper to mix a little tow with them, and rub them over with honey; finally, a ſmall anointing with butter is of great uſe to keep them from waſhing off the hook. The eyes of any fiſh that is taken are an excellent bait for almoſt any other kind of fiſh. The beſt way of angling with the fly is down the river, and not up; neither need the angler ever make above half a dozen of trials in one place, either with fly or ground bait, when he angles for trout: by that time the fiſh will either offer to take, or refuſe the bait and not ſtir at all.

In a pond, the beſt place for the angler to take his ſtand is uſually that where the cattle go up into water: in rivers, if breams are fiſhed for, it ſhould be in the deepeſt and moſt quiet places; if eels, under the banks of rivers that hang over; perch are to be expected in clean places, where the ſtream is ſwift; and chub in deep ſhaded holes: roach are moſtly found where the perch are, and trout only in ſwift and clear ſtreams. Places where there are many weeds, or old ſtumps of trees, harbour fiſh in great numbers, and they uſually bite freely there; but there is danger of entangling the line, or faſtening the hook to the weeds. In caſe of this accident, recourſe is to be had to a ring of lead, of about ſix inches round, faſtened to a ſmall packthread: this ring is to be thruſt over the rod, and let fall into the water. It will deſcend to the place where the hook is entangled; and then, by pulling the packthread gently, the hook will be ſoon diſengaged, or at the worſt it can only be broke off near the end of the line; whereas, when this is not employed, the rod itſelf is ſometimes broken, or the line nearer its upper end.

Deep waters are beſt for angling in, for the fiſh do not love to be diſturbed by wind and weather.

The openings of ſluices and mill-dams always bring fiſh up the current to ſeek for the food, which is brought with the ſtream; and angling in theſe places is uſually ſucceſsful.

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ket. The univerſity of Angers was founded in 1398, and the academy of belles lettres in 1685. This laſt conſiſts of thirty academicians. At the end of the ſuburbs of Breſigny are the quarries of Angiers, ſo famous for the fine ſlate which is got from thence. The pieces are of the thickneſs of a crown-piece, and a foot ſquare. All the houſes in Angers are covered with this ſlate, which has gained it the appellation of the *Black city*. W. Long. 0. 30. N. Lat. 47. 28.

ANGHIERA, a town of Italy, in the duchy of Milan, and capital of a county of the ſame name. It is ſeated on the eaſtern ſide of the lake Maggiore, in E. Long. 9. 5. N. Lat. 45. 42.

ANGINA, in medicine, a violent inflamation of the throat, otherwiſe called *quinzy*. See Quinzy.

ANGIOSPERMIA, in the Linnæn ſyſtem of botany, the ſecond order in the claſs Didynamia. It conſiſts of thoſe plants, of that claſs, whoſe ſeeds are incloſed in a pericarpium. In this order the ſtigma is generally obtuſe. Theſe are the *perſonati* of Tournefort.

ANGLE, in geometry, the inclination of two lines meeting one another in a point, and called the *legs of the angle*. See Geometry.

Angle *of Incidence*, in optics, the angle which a ray of light makes with a perpendicular to that point of the ſurface of any medium on which it falls; tho' it is ſometimes underſtood of the angle which it makes with the ſurface itſelf.

Angle *of Refraction* now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the ſurface on which it was incident; but has ſometimes been underſtood of the angle which it makes with the ſurface of the refracting medium itſelf.

ANGLER, a perſon who practices the art of angling, whether as a diverſion, or otherwiſe. See the article Angling.

Angler, in ichthyology, the Engliſh name of a ſpecies of lophus. See Lophus.

ANGLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, ſettled in that part of Denmark, and duchy of Sleſwick, which to this day is called *Angel*, and of which the city of Flenſburgh is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variouſly accounted for. According to Saxo-Grammaticus, they were called *Angli* from one Angulus, ſon to Humblus king of Denmark. Widiſchind, a Saxon writer, will have them to be called *Angli*, from an iſland in the corner or angle of the ſea, which they conquered. Goropius derives their name from the Saxon word *Angel*, or *Engel*, ſignifying a fiſh-hook; the Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being ſo named by the neighbouring nations; as if, like hooks, they caught all that was in the ſea. To this nation the Britiſh ambaſſadors are ſaid to have applied when ſoliciting ſuccours againſt the Scots and Picts. The Angles therefore came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England. See England.

ANGLESEY (Iſle of,) is the moſt weſtern county of North Wales. It is 24 miles in length, 14 in breadth, and ſends one member to parliament. It is ſeparated from Caernarvonſhire by a ſtrait called *Meni*, and on every other ſide is ſurrounded by the ſea. It is a fertile ſpot, and abounds in corn, cattle, fleſh, fiſh, and fowls; with very good mill-ſtones and grind-ſtones. The chief town is Beaumaris. Near Kemlyn-harbour is a quarry of ſtone called *aſbeſtos*, which is a beautiful marble, out of which may be got the linum aſbeſtinum, called here *ſalamander's wool*; and will bear common fire: not far from this is a yellow ſulphureous copper-ore, which has never been worked. At Llahbadrig, about three miles eaſtward from hence, is a great body or vein of ſtony-oker, of various colours, as red, yellow, blue; and an extremely fine white-clay, of the cimolia kind, of great ſervice to painters, potters, and ſtone-cutters. In ancient times this iſland was called *Mon*, *Mona*, or *Moneg*; and got the name of *Angleſey* only when conquered by the Engliſh. It was the great nurſery of the religion of the Druids; being the reſidence of the grand Druid, or chief pontiff, and conſequently of all the learned doctors in that religion. In the reign of the emperor Claudius (A. D. 45.) the Druids beginning to be perſecuted by the Romans on account of their ſacrificing human victims, moſt of them retired to this iſland: but they did not long enjoy their retreat in ſafety; for, in the year 61, Suetonius Paulinus governor of Britain, having obſerved that the iſland of Angleſey was a great ſeat of diſaffection to the Roman government, and afforded an aſylum to all who were forming plots againſt it, he determined to root them out. He accordingly entered the iſland, and defeated the Britons who attempted to defend it, though they were animated by the preſence, prayers, and exhortations of a great number of Druids and Druideſſes. After this victory, he cut down the groves, and overturned the altars, which had been polluted by the blood of many human victims; and even requited the cruelties of the Druids upon themſelves, by burning many of them in the fires they had prepared for the Roman priſoners if the Britons had got the victory. Many ancient monuments of this religion ſtill remain in the iſland.

ANGLING, among ſportſmen, the art of fiſhing with a rod, to which are fitted a line, hook, and bait. See Fishing-*Rod*, Fishing-*Hook*, Fishing-*Fly*.

The angler's firſt buſineſs is to attract the fiſh to the place intended for angling. The method of doing this, in ſtanding waters, by throwing in grains, chopped worms, and the like, is well known: but the chief difficulty is in running rivers and brooks. The method, in this caſe, is to prepare a tin box capable of holding ſome hundred of worms, bored on all ſides, and full of holes of ſuch a ſize as they may be juſt able to crawl out at; there muſt be a plummet faſtened to this box to ſink it, and a line to draw it back at pleaſure; in this caſe it is to be thrown into the water in a proper place, above which the angler may ſtand under cover. The worms will ſlowly and gradually crawl out of this box, and the fiſh will be gathered about to feed on them; the baited hook is to be thrown in higher up and carried down by the ſtream. If this method do not bring the fiſh about the place in a little time, there is reaſon to ſuſpect that ſome pike lies lurking thereabout, and deters them: in this caſe, it is proper to throw out a baited hook, and he will generally be taken; after this the attempt will ſucceed.

When the angler takes his ſtand, he is to ſhelter himſelf under ſome tree or buſh, or ſtand ſo far from the brink of the water that he can only diſcern his float; as the fiſh are timorous and eaſily frighted away. The angling rod muſt be kept in a moderate ſtate, neither too dry nor too moiſt: in the firſt caſe, it will be brittle; in the other, rotten. When paſtes are uſed, it is proper to mix a little tow with them, and rub them over with honey; finally, a ſmall anointing with butter is of great uſe to keep them from waſhing off the hook. The eyes of any fiſh that is taken are an excellent bait for almoſt any other kind of fiſh. The beſt way of angling with the fly is down the river, and not up; neither need the angler ever make above half a dozen of trials in one place, either with fly or ground bait, when he angles for trout: by that time the fiſh will either offer to take, or refuſe the bait and not ſtir at all.

In a pond, the beſt place for the angler to take his ſtand is uſually that where the cattle go up into water: in rivers, if breams are fiſhed for, it ſhould be in the deepeſt and moſt quiet places; if eels, under the banks of rivers that hang over; perch are to be expected in clean places, where the ſtream is ſwift; and chub in deep ſhaded holes: roach are moſtly found where the perch are, and trout only in ſwift and clear ſtreams. Places where there are many weeds, or old ſtumps of trees, harbour fiſh in great numbers, and they uſually bite freely there; but there is danger of entangling the line, or faſtening the hook to the weeds. In caſe of this accident, recourſe is to be had to a ring of lead, of about ſix inches round, faſtened to a ſmall packthread: this ring is to be thruſt over the rod, and let fall into the water. It will deſcend to the place where the hook is entangled; and then, by pulling the packthread gently, the hook will be ſoon diſengaged, or at the worſt it can only be broke off near the end of the line; whereas, when this is not employed, the rod itſelf is ſometimes broken, or the line nearer its upper end.

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tainous; there being but few plains to be met with in it, except on the ſea-coaſt, and between the huge ridges of mountains.

1 Originally a province of Congo.

That part of the kingdom which we have diſtinguiſhed by the name of *Angola Proper*, was ſubject to the kings of Congo in the year 1484, when the Portugueſe firſt diſcovered the country: but how long it had been ſo before that time, is impoſſible to be diſcovered; as the inhabitants are utterly deſtitute of Chronology, and have no other way of diſtinguiſhing paſt events but by ſaying they happened in ſuch a king's reign. Neither, though Angola became a diſtinct kingdom ſince its diſcovery by the Portugueſe, is it known with more certainty at what time that revolution happened; or whether the Portugueſe were not concerned in aſſiſting the viceroy of the king of Congo, who governed the province of Angola, to ſet up for himſelf.

2 Tradition concerning its becoming a diſtinct kingdom.

All accounts agree, that this kingdom was founded by one *Ngola*, or *Angola*, from whom it took its name. According to the tradition of the country, this Ngola was a ſmith, and the inventor of that trade, in which he had been inſtructed by the demons of the country. In conſequence of this, he became exceeding rich, not in gold, ſilver, or ſhell-money, which were not at that time in uſe; but in corn, cattle, and fruits, which were then exchanged in traffic. The country being not long after viſited by a grievous famine, Ngola generouſly relieved his diſtreſſed countrymen, and ſaved the lives of ſome thouſands. In gratitude for this generoſity, he was unanimouſly choſen king; and hence the ſmith's trade is reckoned among the royal arts of Angola.

3 More authentic account.

According to other accounts which can be more depended upon, Ngola was the king of Congo's viceroy; who, having become powerful by the reduction of ſeveveral of the neighbouring ſtates, was induced to ſet up for himſelf. Dreading, nevertheleſs, the power of his old maſter, he choſe to ſend him the uſual tribute and preſents annually, till he reckoned himſelf firmly ſeated on the throne, and had ſecured it to his deſcendents. His meaſures were greatly facilitated by the wars which the king of Congo was then engaged in with the *Giagas*, a barbarous and cannibal nation in the neighbourhood. Theſe made ſuch a powerful inroad into his dominions, that he was glad to aſk aſſiſtance from Ngola; not as a ſubject, but as a friend and ally. This was readily granted; and the two monarchs continued ever after ſending preſents and aſſiſtance to each other, and encouraging a mutual commerce between their ſubjects.

4 Ngola the firſt king.

Ngola lived to a great age, highly reſpected by his ſubjects, and in alliance with the king of Congo and the Portugueſe, whoſe numerous ſettlements on the coaſt had made them become very powerful. According to the cuſtom of the country, he had many wives and concubines. By his chief favourite he had three daughters, *Zunda Riangola*, *Tumba Riangola*, and another whoſe name is unknown. Towards the latter part of his life, the king's chief care was to ſecure the crown to the eldeſt of theſe; for which purpoſe he conſulted his beloved queen, who encouraged him in the deſign with all the eloquence in her power. By her advice, he ſent for his lieutenant-general, a favourite ſlave, whom he had created viceroy over the whole kingdom, to acquaint him with his reſolution. The artful miniſter did not fail to applaud his deſign, though his intention was to defraud the princeſs, and ſeize the throne for himſelf. He accordingly took the opportunity, one day, when that princeſs and the whole court were employed in ſowing their lands, to ſpread a report that the Angolic enemies had entered the kingdom, and were deſtroying every thing with fire and ſword. In this confuſion, the treacherous viceroy conducted the three princeſſes to the royal palace; and acquainting Ngola with the pretended danger, urged him to betake himſelf to a ſpeedy flight.

5 Murdered by his prime miniſter, who ſeizes the throne.

The frighted monarch, unable to ſtir with age, deſired his miniſter to take the moſt proper means for his ſafety: whereupon, being a ſtout young fellow, he takes his majeſty on his back, and carries him into a neighbouring wood; where he no ſooner had him in a convenient place, than he ſtabbed him with a dagger. This ſtratagem was too ſhallow to remain long concealed; the murderer was quickly diſcovered, and many of the nobles roſe in arms againſt him; but finding his party too ſtrong to be oppoſed, they were at laſt obliged to ſubmit, and ſuffer him quietly to aſcend the throne, upon his publicly declaring that he had not ſeized it but with a view of ſecuring it to the young princeſs Zunda Riangola.

To this princeſs, the uſurper palliated his conduct in the beſt manner he could; and ſhe had art enough to diſguiſe her reſentment ſo effectually, that he never diſcovered, nor did ſhe give him the ſmalleſt occaſion for jealouſy.

6 Death of the uſurper, who is ſucceeded by Zunda Riangola.

At laſt, his ſudden death gave Zunda an opportunity of aſcending the throne peaceably; when ſhe behaved with ſuch moderation and juſtice, as to gain the love and affection of all her ſubjects. Her jealous temper prevented her from marrying; and, by giving too much way to it, ſhe came at laſt to dread as rivals the two ſons of her younger ſiſter Tumba, and to form deſigns againſt their life. To accompliſh her purpoſes, ſhe ordered them to be brought to court, pretending to have them educated under her own eye. This was declined for ſome time; but at length the queen prevailed ſo far as to have the eldeſt ſent to her;

7 Murders her nephew.

whom ſhe no ſooner got into her power, than ſhe cauſed him to be maſſacred, with all his attendants; only one eſcaping, all covered with wounds, to carry the dreadful news to the princeſs and her huſband.

On hearing of this bloody act, the afflicted parents immediately ſallied forth at the head of all their vaſſals. They were waited for by Queen Zunda at the head of a numerous army; but, no ſooner did her ſoldiers perceive the parents of the deceaſed prince, than they immediately abandoned the queen to their reſentment.

8 Is herſelf murdered by her ſiſter.

Tumba immediately ruſhed upon her ſiſter, and ſtabbed her to the heart; after which, ſhe commanded her entrails to be taken out, and thrown into the hole in which her ſon's body had been caſt. Upon this Tumba was crowned queen of Angola, and invited her huſband to participate with her in the management of public affairs. This offer he was too wiſe to accept; and Tumba, upon his refuſal, reſigned the crown into the hands of her ſurviving ſon, named *Angola Chilvagni*. He proved a great and wiſe prince, extending his dominions by conqueſt, and gaining the love of his ſubjects by the moderation and equity of his government.

9 Dambi Angola a cruel tyrant.

He was ſucceeded by one of his younger ſons, named *Dambi Angola;* who no ſooner aſcended the throne, than he put all his brethren to death, leſt they ſhould unite in favour of the eldeſt. The reſt of his reign proved conformable to ſuch a beginning. He was a

monſter

10 Ngola Chilivagni; his conqueſts.

monſter of cruelty, avarice, lewdneſs, and faithleſsneſs: death, however, in a ſhort time, happily delivered his ſubjects from this tyrant; who, notwithſtanding his infamous life, was buried with the greateſt magnificence; and a mount was erected over his grave, conſiſting, according to the cuſtom of the country, of a prodigious number of human victims which had been ſacrificed to his ghoſt. Dambi Angola was ſucceeded by Ngola Chilivagni, a warlike and cruel prince. He conquered many nations, and made the moſt dreadful inroads into the kingdom of Congo, along the rivers of Danda, Lucalla, Zanda, and Coanza; whoſe waters were often tinged with the blood of thouſands whom he maſſacred in his excurſions. Notwithſtanding theſe horrid butcheries, Ngola Chilivagni ſhewed ſuch generoſity to thoſe who readily ſubmitted to him, that he was ſure to conquer, not only wherever he came, but wherever he ſeemed to direct his forces. At laſt, as if weary of conqueſt, he planted a tree on the banks of the Coanza, about eight leagues from Loanda San Paulo, as a boundary to his ravages. This tree the Portugueſe called *Iſanda*, or *Iſandaura;* and afterwards erected a fortreſs near it.

11 Fancies himſelf a god.

The ſame folly and inſolence which took place in the breaſt of Alexander the Great, on account of his rapid conqueſts, ſoon puffed up the mind of this petty African tyrant. Becauſe he had conquered and ravaged ſome of the neighbouring countries, and brought under his ſubjection a few cowardly barbarians; he firſt fancied himſelf invincible, and then that he was a god. He demanded the ſame reſpect and adoration that was paid to their other deities; and with this infamous demand his ſubjects were mean enough to comply. This pretended deity, however, was forced to ſubmit to the fate of other mortals, and died without leaving a ſucceſſor behind him.

12 Revolt a- ainſt Bandi Angola.

13 Quelled by e aſſiſt- nce of the ing of Con- and the ortugueſe.

On the deceaſe of Ngola Chilivagni, the ſtates elected Ngingha-Angola-Chilombo-Kickaſanda, great-nephew to queen Tumba's huſband, as his ſucceſſor. He proved ſuch a rapacious and cruel tyrant, that his ſubjects univerſally wiſhed for his death; which, luckily for them, ſoon happened. He was interred with the uſual pomp and ſolemnities, particularly that of having a whole hecatomb of human victims ſacrificed upon his grave. His ſon Bandi Angola, who ſucceeded him, proved yet a greater tyrant than his father; ſo that he ſoon became intolerable to his ſubjects. A general revolt enſued, in which his ſubjects called in the cannibal Giagas to their aſſiſtance. Theſe immediately poured in like a band of hungry dogs haſtening to feed upon a carcaſe; and, having defeated and devoured the forces of the tyrant, beſieged him in an inacceſſible mountain; where, not being able to come at him, they reſolved to reduce him by famine. Bandi Angola, being now reduced to the utmoſt diſtreſs, applied to the king of Congo for aſſiſtance. As it was the intereſt of that prince to hinder the ravenous Giagas from entering into the Angolic dominions, whence they could ſo eaſily paſs into his own, he did not heſitate at granting his requeſt; and ordered a ſtrong reinforcement of the Portugueſe, of whoſe valour he had a high opinion, and of whom he entertained a great number at his court, to march to the aſſiſtance of the king of Angola. The command of the army was given to one of the moſt experienced Portugueſe officers; who, depending more on the handful of Europeans under his command, than on the Congoeſe, attacked the rebels, tho' greatly ſuperior in number; and, having utterly defeated them, reſtored the king of Angola to his throne.

14 The king's daughter falls in love with the Portugueſe general.

15 Who retires to Congo.

This eſſential piece of ſervice ſo endeared the Portugueſe to Bandi Angola, that he took them into his ſervice, and even into his council. Their general became a great favourite of the king, but much more ſo of his daughter, who conceived a violent paſſion for him. Unfortunately for them both, the amour was carried on with ſo little precaution on her part, that the king quickly diſcovered it; and immediately formed a reſolution of exterminating the Portugueſe all at once. Such violent meaſures, however, could not be concerted ſo privately but the princeſs got ſome intelligence of it; and having apprized her lover of his danger, he immediately withdrew into Congo, taking with him as many of his countrymen as he conveniently could. The king of Congo expreſſed ſuch ſtrong reſentment againſt Bandi Angola for his ingratitude, that the Portugueſe general would have probably prevailed upon him to declare war againſt Angola, had he not been obliged to defend his own dominions againſt a neighbouring prince who then made an invaſion. This afforded that general a fair pretence of aſking leave to return home; promiſing to return with ſuch reinforcements as would enable the king of Congo to revenge himſelf for the affront put upon him by the Angolic monarch. His real intention, however, was, to give the king of Portugal a fair pretence for ſeizing upon the kingdom of Angola.

16 Lays a plan for the conqueſt of Angola before the king of Portugal.

On his return to Liſbon, the Portugueſe general having laid his plan before the king, it was ſo well reliſhed by him, that an armament was ordered to be fitted out, well furniſhed with every neceſſary for building fortreſſes, &c. and a ſufficient number of men. The wind proving favourable all the way back, the Portugueſe ſoon arrived ſafe at Loanda San Paulo; whence the general diſpatched a meſſenger to acquaint the king of Congo with his arrival, and to make him ſome rich preſents. Theſe were no ſooner gone, than the admiral ſailed up the Coanza; and, landing without oppoſition in the kingdom of Angola, ſet about erecting a fortreſs in a convenient ſituation, which was completed in a few days.

17 Defeats the Angolans.

The king being informed of the return of the Portugueſe, and of their fortifying themſelves on advantageous ground, gathered together a numerous army: but his forces, though upwards of 100,000 in number, were utterly defeated by the Portugueſe; vaſt numbers killed, and many more carried into ſlavery. The admiral now ravaged the whole country, putting all to fire and ſword, and making himſelf maſter of every advantageous ſpot of ground. The king, however, had ſtill the good luck to eſcape all the ſtratagems that were laid for him; and once more got ſafe to his inacceſſible fortreſs.

All this time Bandi Angola had himſelf tyrannized, and allowed his favourites to tyrannize, in ſuch a manner, that his ſubjects were become no leſs weary of his government than when they formerly revolted. Being now exaſperated beyond meaſure at the calamitous war of which he had been the occaſion, they formed a deſign of putting an end to his life; and in order to draw him out of his retreat, where he wallowed in all manner of debaucheries, they had recourſe to the following ſtratagem: A deputation was ſent, acquainting him with the revolt of one Cuculo Cabazzo; who, at the head of a numerous band, committed the moſt cruel ravages. They beſought his majeſty either to levy a ſufficient number of troops, and march in perſon againſt him, or to allow them to arm themſelves againſt him. The credulous king complied with this laſt propoſal; and granted them leave to raiſe what forces might be thought neceſſary. Four days after, notice was ſent to the king, that his ſubjects had attacked the rebels, and had been repulſed with loſs; but that, if his majeſty would but condeſcend to animate them with his preſence, the ſight of him would inſpire them with ſuch courage, that they would aſſuredly prove victorious. This had the deſired effect; and the king ſet out a few days after, without any other precaution than his own guards, to head his army, which was encamped on the banks of the Lucalla. He no ſooner appeared in view, than all the chief officers came out to meet him; and, having, under pretence of paying their reſpects, gradually ſeparated him from his guards, they fell upon him, and diſpatched him at once.

18
Bandi Angola murdered.

19
Cruelty of the new king.

Bandi Angola was ſucceeded by his ſon Ngola Bandi, whoſe mother had been a ſlave; and whoſe title to the crown was conſequently diſputable, according to the laws of the country. Of this the new king being well apprized, thought proper to begin his reign by putting to death every perſon who had oppoſed his election. He began with the *Tendula*, or commander of the king's rear-guard; who, by his office, is the chief of the electors, and the perſon who governs the kingdom during the interregnum. Him he ordered to be put to death, with all his family. Theſe were followed by the principal officers of his father's court; all his concubines, together with their parents and near relations, whom he cauſed to be cruelly butchered; together with his half-brother, his father's ſon by a favourite concubine, and then but an infant. He did not ſpare even the ſon of his ſiſter Zingha Bandi, whom ſhe had by one of her paramours. The intereſt of his ſiſter had contributed greatly to raiſe this tyrant to the throne; and his ingratitude, with the murder of her ſon, ſo exaſperated her, that ſhe ſwore to be revenged on him in the ſame way.

20
Makes war on the Portugueſe and is reduced to great diſtreſs.

The Portugueſe were the next objects of his reſentment. Theſe he ſo much dreaded on account of their valour and policy, that he immediately declared war, reſolving not to lay down his arms till he had exterminated them to the laſt man, or driven them totally out of his dominions. His raſhneſs, however, coſt him dear. Myriads of the Angolic poltroons were overthrown by an handful of Portugueſe; and the king himſelf forced to fly, firſt into the iſland of Chiconda in the river Coanza, and then into the deſarts of Oacco. Here his conquerors, out of great clemency, allowed him to live among the wild beaſts, without any other ſuſtenance than what the deſarts afforded. He had the misfortune alſo to loſe his queen and two ſiſters Cambi and Fungi, who were taken priſoners by the Portugueſe, but treated very honourably.

21
His treachery.

22
Sends his ſiſter Zingha on an embaſſy.

The king being informed of the generous treatment of theſe three princeſſes, ſent an embaſſy to treat of their ranſom, and an exchange of priſoners. This was readily agreed to; but all the misfortunes of the king of Angola had not yet taught him wiſdom. The princeſſes were ſent back, laden with preſents; but the king refuſed to perform his part of the agreement, and thereby plunged himſelf into ſtill greater difficulties. A new Portugueſe viceroy being arrived about this time, Ngola was quite at a loſs how to excuſe the non-performance of his part of the treaty. At laſt, he had recourſe to his exaſperated ſiſter Zingha; and having excuſed, as well as he could, the murder of her ſon, propoſed to ſend her on a ſplendid embaſſy to the viceroy; and, as her embracing the religion of the Portugueſe would intitle her more to their favour and confidence, he deſired her to conſent to it for the preſent. To this propoſal Zingha conſented; but without forgetting her reſentment. She ſet out, as plenipotentiary for the king of Angola, with a magnificent retinue, was received with all the honour due to her rank, and lodged in a ſplendid palace prepared for her.

23
Her haughty behaviour.

At the firſt audience Zingha had of Don John (the Portugueſe viceroy), ſhe was greatly ſurpriſed to find a ſtately elbow-chair prepared for him to ſit upon, and for herſelf only a rich tapeſtry ſpread on the floor, with a velvet cuſhion embroidered with gold, and placed over againſt the chair of ſtate. Diſſembling her diſpleaſure, however, ſhe beckoned to one of the ladies of her retinue, commanded her to lay herſelf down on her elbows and knees upon the carpet, and ſat herſelf upon her back during the whole time of the audience. She behaved with ſuch addreſs and dignity, as to gain the admiration of the whole council. A propoſal was made of entering into an alliance offenſive and defenſive with the king of Angola, provided he acknowledged himſelf the vaſſal of the king of Portugal, and ſubmitted to pay a yearly tribute. To this Zingha replied, that ſuch conditions were indeed fit to be impoſed upon thoſe who had been conquered by the ſword; but not upon a great and powerful monarch, who only ſought their friendſhip and alliance: upon which, the treaty was concluded on both ſides, without any other conditions than the exchange of priſoners. The audience being over, Don John took notice to Zingha, as he conducted her out of the hall, that the lady who had ſerved her as a ſeat, continued ſtill in the ſame poſture; upon which ſhe replied, That it did not become the ambaſſadreſs of a great monarch to make uſe of the ſame chair twice, ſo ſhe looked upon her as a piece of caſt-off goods not worthy of further notice.

24
Embraces the Chriſtian religion.

Zingha was ſo taken with the honours done her by the Portugueſe, and ſo intent upon obſerving the order, dreſs, arms, &c. of their troops, that ſhe ſtaid at Loanda a conſiderable time, during which ſhe was inſtructed in the Chriſtian religion, and conſented to be baptized in the year 1622, the 40th of her age. Don John and his ſpouſe were her ſponſors; who diſmiſſed her ſoon after, with all poſſible honours, and highly ſatisfied with her reception and ſucceſs. At her return, ſhe took care to have the articles ratified by her brother; who expreſſed his approbation of them, and the higheſt obligations to her. He even went ſo far as to deſire the Viceroy to ſend him ſome proper perſons to inſtruct him in the Chriſtian religion, which he ſaid he was very deſirous of embracing. This requeſt was immediately granted, and Don Denis de Faria, a negro prieſt, a native of Angola, was diſpatched, along with an officer of diſtinction, to ſtand godfather to the king. Theſe met at firſt with a gracious reception: but when they came to talk of baptiſm, Ngola altered his tone, and told them it was too much below his dignity to receive it from the ſon of one of his ſlaves, and ſent them both back. This was cried up by the courtiers as a princely act: but Zingha repreſented that it could not fail to exaſperate the viceroy; and tried all poſſible means to diſſuade him from it, but in vain. He ſuffered, however, his other two ſiſters, Cambi and Fungi, to be baptized; which was performed in 1625, with a ſplendor ſuited to their dignity.

25 War again declared againſt the Portugueſe.

As no experience ſeems to have been a ſufficient antidote againſt the innate folly of Ngola Bandi, he ſoon after took it into his head to make war on the Portugueſe, and invaded ſome of their territories. This laſt action proved his ruin: his troops were all cut off, and himſelf forced to ſwim for his life to a ſmall iſland in the Coanza, about a mile long, and two bow-ſhoots in breadth; whither the Portugueſe purſued and ſurrounded him, ſo that he had no other chance, but either to fall into their hands, or be devoured by the wild beaſts with which the place ſwarmed. From both theſe dangers he was relieved by a doſe of poiſon, given him, as was ſuppoſed, by his ſiſter Zingha. Before this time, however, he had taken care to ſend his eldeſt ſon to the country of the Giagas, and put him under the care of one of their chiefs called Giaga Caza, whom he beſought to take care of him and protect him from his aunt Zingha, as he rightly imagined ſhe would not fail of attempting his life, in order to ſecure herſelf on the throne.

26 The king poiſoned.

27 Zingha Bandi crowned Queen.

Zingha Bandi was crowned queen of Angola, without oppoſition, in 1627.—She was a very artful woman, endowed with great preſence of mind, firm in her reſolutions, of an intrepid courage, and a great miſtreſs in the art of diſſimulation. She inherited a large ſhare of her brother's jealous and cruel temper, to which ſhe would not heſitate to ſacrifice her neareſt relations, if they gave her the leaſt umbrage.—To this jealouſy therefore ſhe reſolved to ſacrifice her nephew, as well knowing he had a better title to the crown than herſelf. She made uſe of the moſt ſolemn oaths to draw him out of the hands of his guardian, proteſting that ſhe had accepted of the throne with no other view than to preſerve it for him. But Giaga, being well acquainted with her temper, was proof againſt all her oaths and fair ſpeeches.—Zingha, finding this method ineffectual, pretended a deſire of reſigning the crown to her nephew; to which ſhe ſaid ſhe had no other objection, than that ſhe was afraid he was yet incapable of aſſuming the reins of government. She therefore deſired an interview with him, though ever ſo ſhort, that ſhe might ſatisfy herſelf in this particular, and promiſed to detain him no longer than Giaga ſhould think neceſſary. Giaga thought there could be no danger in conſenting to a ſhort interview; and therefore ſent the unfortunate prince to her, attended by a magnificent retinue. The cruel queen no ſooner got him in her power, than ſhe murdered him with her own hand, and cauſed his body to be thrown into the Coanza, ridding herſelf, by that inhuman act, of a dangerous rival, as well as revenging herſelf on her brother, as ſhe had ſworn to do, for the murder of her ſon.

28 She murders her nephew.

Zingha's next ſcheme was to rid herſelf of the Portugueſe, who had eſtabliſhed themſelves in ſuch a manner as to be almoſt entire maſters of the country. They had built fortreſſes on every convenient ſpot that ſuited them, eſpecially near her principal towns, which they could level with the ground with the greateſt eaſe. They had engroſſed all her commerce, were become very wealthy, and their numbers increaſed daily; ſo that they were dreaded not only by her ſubjects, but by all the neighbouring nations. As Zingha was of a martial temper, ſhe did not long heſitate. She quickly made all neceſſary proviſions, ſtrengthened herſelf by alliances with the Giagas and other idolatrous nations, and even with the Dutch, and the king of Congo. With this combined force ſhe attacked the Portugueſe ſo ſuddenly and unexpectedly, that ſhe gained ſome advantages over them, and the Dutch made themſelves maſters of San Paulo de Loanda, and ſoon after of ſome of the beſt provinces in the kingdom. This happened in the year 1641; and the Portugueſe did not recover theſe places till the year 1648, when the Dutch were entirely driven out of Angola.

29 Declares war againſt the Portugueſe.

30 Her bad ſucceſs.

Zingha's ſucceſſes proved ſtill more ſhort-lived. Her allies the Congoeſe were ſo completely overthrown, that they were forced to ſue for peace; which the Portugueſe did not grant till they had obtained a ſufficient number of hoſtages, and obliged the Congoeſe to deliver up to them ſome conſiderable poſts, upon which they immediately erected fortreſſes. Zingha's troops were now defeated in every battle; and theſe defeats followed one another ſo cloſe, that ſhe was ſoon abandoned, not only by her allies, but by her own troops. She was now conſtrained to abandon her dominions, and retire to ſome of the eaſtern deſarts, whither the Portugueſe did not think it worth while to follow her.

Zingha being reduced to ſuch diſtreſs, the Portugueſe, after giving her ſome time to ruminate on her ſituation, ſent her propoſals of peace, upon condition that ſhe ſhould become tributary to the crown of Portugal. This propoſal ſhe rejected with ſcorn; and let them know, that, however her daſtardly ſubjects might ſubmiſſively and ſhamefully behave towards them, their queen diſdained ſubjection to any foreign power. On this haughty anſwer, the Portugueſe, to mortify her ſtill more, ſet up a king in her place. The perſon they pitched upon was named *Angola Oarij*, or *Aaru*, who was of the royal family. Before he was crowned, the Portugueſe obliged him to turn Chriſtian; and he was accordingly baptized by the name of John. The new king, however, ſoon died of grief, at ſeeing himſelf ſo hardly treated by his maſters the Portugueſe. They quickly ſet up another, named *Philip*, who bore the yoke with more patience, and lived to the year 1660.

31 Refuſes to become tributary to them.

32 They ſet up a king.

33 Zingha's apoſtacy and horrid barbarity.

In the mean time Zingha, exaſperated almoſt to madneſs at ſeeing herſelf deprived of eleven of the beſt provinces in her dominions, and her authority in the remaining ſix greatly weakened, renounced the Chriſtian religion, and embraced all the horrid and bloody cuſtoms of the Giagas, whom ſhe outdid even in their own barbarity.—We have already hinted the barbarity of this nation in eating human fleſh. In this Zingha not only joined them, but took pleaſure in devouring the raw fleſh of human victims, and drinking their blood while warm, both at her ſacrifices and at her public meals.—She affected a martial and heroic ſpirit, together with an utter averſion to the male ſex; but, according to the Portugueſe, maintained a number of the ſtrongeſt and luſtieſt youths, in whoſe embraces ſhe gave a full ſcope to her inclinations, and managed matters with ſuch ſecrecy that her intrigues could never be diſcovered. At the ſame time ſhe ordered many of her own ſex to be ripped up, when their incontinency was manifeſted by their pregnancy; and their bodies, with thoſe of the infants, to be caſt to wild beaſts.

But what made her moſt admired, as well as dreaded, by her ſubjects, was a notion that ſhe had by various ſtratagems inculcated upon them, of her being able to penetrate into the moſt ſecret thoughts. To keep up this apprehenſion, ſhe ordered the bones of her deceaſed brother to be brought from the iſland where he was poiſoned, locked up in a cheſt covered with coarſe plates of ſilver, and laid on a fine carpet upon a pedeſtal. A number of ſinghillos or prieſts were ordered to offer ſacrifices to theſe bones, and to keep lamps continually burning before them. To this place ſhe herſelf frequently repaired, to aſſiſt at thoſe rites, which, as ſhe gave out, and every body believed, engaged the ſpirit of the deceaſed to inform her of every thing that was done, ſaid, or even deſigned, either in the kingdom or out of it.—To procure, however, as much real intelligence as poſſible, ſhe kept vaſt numbers of ſpies all over the kingdom, who conſtantly gave her notice of what happened in their reſpective circles; and this ſhe ſo cunningly improved to her own ends, that her ſubjects looked upon her as a kind of deity from whom nothing could be concealed.

34
Her influence over the Giagas.

By ſuch means as theſe, Zingha gained ſuch authority over the Giagas, that they were ready, at the very firſt indication of her will, to follow her through the moſt dreadful dangers, and to engage in the moſt deſperate enterprizes. She now made many ſtrenuous and daring efforts to drive out the Portugueſe; but though ſhe had, in all probability, more valour and ſkill than her enemies, the fire-arms gave them ſuch an advantage, that ſhe was always defeated with great loſs. Perceiving therefore the folly of attempts of this kind, ſhe contented herſelf with making continual inroads into their country, carrying off or deſtroying every thing that fell in her way. Though ſhe ſpared neither Europeans, nor blacks who were ſubjects of the mock-monarchs ſet up by the Portugueſe, yet the caſe of the former was peculiarly dreadful when they happened to be taken priſoners. They were either roaſted by a ſlow fire, or had their fleſh cut off in pieces, and devoured before their faces, in the manner related by Mr Bruce of the Abyſſinian oxen *. In this manner ſhe infeſted the Portugueſe territories for 28 years, ſcarce ever allowing them a moment's ceſſation of arms. Their mock kings were often obliged to ſhelter themſelves from her fury in an innacceſſible rock called *Maopongo*; and they themſelves could never hope to enjoy their ill-gotten dominions with any kind of peace ſo long as this furious queen continued alive. They in vain exhauſted all their politics either to reduce her by force, or to mollify her by preſents and fair offers. The one ſhe rejected with diſdain, and always found means to baffle the other; nor would ſhe hearken to any terms, unleſs they conſented to reſign all their conqueſts. The refuſal of this demand was ſo commonly followed by ſome marks of her reſentment, that it was with the utmoſt difficulty the Portugueſe could prevail on any body to carry their propoſals to her; and as for Zingha, ſhe diſdained to make any to them, except thoſe of the hoſtile kind. The terror of her arms procured her a free paſſage wherever ſhe directed her courſe; all the inhabitants of a province making no leſs haſte to abandon, than ſhe to invade it. Thus ſhe continued to advance, till at length ſhe was got ſo far as the ſmall iſland of Dangii in the river Coanza. The Portugueſe now found themſelves under a neceſſity of raiſing an army of negroes, in order to drive her out of it. Accordingly they ſurrounded the iſland, and intrenched themſelves along the banks on both ſides of the river; but while they were buſy at their work, Zingha attacked them with ſuch advantage, that ſhe killed and wounded ſeveral hundreds of the blacks, and ſome of the white men. Elated with this advantage, ſhe was preparing for another attack; when ſhe perceived, to her ſurpriſe, that the Portugueſe had drawn their lines ſo cloſe, and raiſed them to ſuch a height, that they overlooked her whole camp, and could fire upon her naked ſoldiers as if they ſhot at a mark.—Thus great numbers of her men were cut off, particularly her chief officers.—The queen, now perceiving the danger of her ſituation, amuſed the Portugueſe with propoſals of an accommodation; and having obtained a truce for three days, croſſed the river in the dead of the night, and led her forces to the province of Oacco. The next morning the Portugueſe, ſeeing no human creature upon the iſland, began to apprehend ſome new ſtratagem; but, upon landing ſome of their troops, they perceived themſelves over-reached, and deprived of the faireſt opportunity they ever had of forcing her to ſurrender at diſcretion.

35
Her terrible ravages.

36
Outwits the Portugueſe.

Zingha ſtaid no longer in the province whither ſhe had retired, than till ſhe was aſſured that the Portugueſe were retired from the Coanza; and then, croſſing that river once more, marched directly towards the kingdom of Metamba, which had been invaded by ſome of the neighbouring princes. The ſpeed with which ſhe led her forces thither, and recruited her army with multitudes of Giagas, who were all emulous of fighting under her banner, quickly enabled her to recover ſome of her territories in that kingdom. Beginning now to think herſelf ſucceſsful, ſhe again attacked the Portugueſe; but was defeated with great loſs, ſo as to be obliged to ſend for freſh troops. To complete her misfortune, ſhe received news that the Giaga Caſſangi had taken the advantage of her abſence, to enter the kingdom of Metamba with a numerous army, had carried off the greateſt part of the inhabitants, deſtroyed all the fruits of the earth, plundered the towns of all that was valuable, and ſet fire to the reſt, leaving that kingdom in a manner deſolate. To add to all this, her troops, exaſperated at the loſs of their wives, children, and goods, which were carried to the fartheſt corner of Benguela, were all on the point of revolting.

37
Her complicated misfortunes.

38
The Portugueſe ſend an embaſſy to her.

Notwithſtanding this terrible and complicated diſaſter, Zingha behaved with ſuch reſolution and addreſs, that the Portugueſe, who, according to character, had probably inſtigated the Giaga againſt her, were ſo much afraid of her joining with him in alliance againſt them, that they diſpatched one Anthony Corglio, a learned prieſt and an excellent negotiator, with

* See *Africa*.

Don Gaſpar Borgia an eminent officer, under pretence of negotiating a peace between them, firſt to the Giaga, and afterwards to the queen. They met with a very civil reception from the firſt, who told them that he was very willing to live at peace with that princeſs, and even to let her enjoy the kingdom of Metamba, though he was the rightful heir to it, provided ſhe would lay down her arms. This anſwer encouraged the prieſt to try whether he could prevail on him to embrace the Chriſtian religion; but this was declined by the Giaga in ſuch ſtrong terms, that the prieſt thought proper to deſiſt, and ſet out for Zingha's camp.

39 Their propoſals rejected.

Our ambaſſadors, at their firſt arrival, met with ſuch a polite reception, as made them hope for ſucceſs: but after ſhe had heard their propoſals, ſhe aſſumed a haughty threatening tone; and told them, in the concluſion of her ſpeech, "That it did not become her dignity to lay down her arms, till ſhe had brought the war ſhe had begun to an honourable concluſion: that as to the Giagas, whoſe ſect ſhe had embraced ſome years before, and who had furniſhed her with ſuch a prodigious number of forces to fight in her defence, her honour and intereſt required that ſhe ſhould ſtill keep them in her ſervice, and under her protection: and laſtly, that as to herſelf, ſhe remembered, indeed, that ſhe had formerly embraced Chriſtianity; but that it was not now a proper ſeaſon to propoſe her returning to it, and they ought to remember, that they themſelves were the cauſe of her abandoning it."

Borgia, perceiving that ſhe was not to be wrought upon by religious motives, ſhifted the topic; and told her, that ſhe had gained honour enough in war, and that it was now high time to think of granting peace and tranquillity to the ſubjects of two ſuch powerful kingdoms, and accept of the favour and friendſhip of the king of Portugal, which was offered her by his viceroy. To this the queen made anſwer, that ſhe was perfectly well acquainted with the valour and ſtrength of the Portugueſe, and ſhould eſteem it an honour to be allied to that monarch; but that ſhe thought it juſt that their reſpective claims to the dominions which ſhe juſtly inherited from her anceſtors, and of which he had unjuſtly deprived her, ſhould firſt of all be decided, either by the ſword, or by ſome equitable judges.

Borgia, vainly imagining that he had now obtained enough, ſet off immediately for Loanda San Paulo; but left the prieſt, on ſome pretence or other, to ſee whether, in the time of ſickneſs, he could make any impreſſion on the inflexible mind of Zingha, who now laboured under a lingering diſeaſe. Coglio, however, found all his arts to no purpoſe; and, upon the queen's recovery, ſhe recommenced the war with more fury than ever.

40 Zingha's narrow eſcape.

For ſome time, hoſtilities were carried on with various ſucceſs; Zingha being ſometimes victorious, and ſometimes defeated. In one attempt of the latter kind, before the fortreſs of Maſſangana, ſhe not only loſt a great number of men, but had her two ſiſters Cambi and Fungi taken priſoners, ſhe herſelf eſcaping with the utmoſt difficulty. Exaſperated by this loſs, ſhe led her troops into ſome of the beſt provinces of the Portugueſe; and, abandoning them to the fury of the Giagas, reduced them to a mere wilderneſs. Still, however, ſhe had the mortification to find her loſſes vaſtly greater than what ſhe gained; and had now the additional miſfortunes of loſing her ſiſter Fungi, who was put to death by the Portugueſe for treachery; and ſeeing her allies the Dutch totally expelled out of Angola.

41 Begins to relent.

Zingha being thus oppreſſed with a complication of misfortunes, and conſcious of the crimes ſhe had committed, began ſeriouſly to conſider whether ſuch a continued ſeries of diſaſters was not owing to the diſpleaſure of the God of the Chriſtians. To this opinion ſhe ſeemed to have inclined; and therefore began to treat with more lenity ſuch Chriſtians as fell into her hands, eſpecially if they happened to be prieſts or monks. To theſe ſhe now began to liſten with ſome attention~~; and~~ ordered them, under ſevere penalties~~, to be treated~~ with all poſſible reſpect; yet without loſing in the leaſt that invincible hatred ſhe had conceived againſt thoſe who had ſtripped her of her dominions, or dropping her reſolution never to make peace till ſhe had recovered them.

42 But ſtill reſiſts the artifices of the Portugueſe.

The viceroy, Don Salvador Correa, who had driven out the Dutch, being appriſed of the regard ſhewn to the clergy by Queen Zingha, thought proper to ſend ſome capuchins to her, in hopes that they might now find her more tractable. But Zingha was ſtill proof againſt their utmoſt art; and, when they taxed her with her apoſtacy, gave them the anſwer which ſuch hypocrites deſerved, namely, that ſhe had been driven to it by the injuſtice of the Portugueſe, themſelves; and that if they would conſent to reſtore what they had unjuſtly taken from her, ſhe would not only return to the Chriſtian religion, but encourage it to the utmoſt of her power.

The viceroy, being now afraid that Zingha might make an alliance againſt him with the king of Congo, firſt raiſed a powerful army; and then acquainted that monarch, that, if he deſigned to prevent the total ruin of his dominions, he muſt immediately make reparation for all the damage he had cauſed to the Portugueſe by his alliance with the Dutch. The fame of the Portugueſe valour ſo intimidated the king, that he ſubmitted to a treaty almoſt on the viceroy's own terms; and as ſoon as this treaty was concluded, Don Ruy Pegado, an old experienced officer, was diſpatched to Zingha, offering a firm and laſting alliance with her, provided ſhe renounced the Giagan ſect, and returned to the boſom of the church. To this embaſſy ſhe returned the old anſwer, namely, that the Portugueſe themſelves had been the occaſion of all that had happened; as they had not only ſtripped her of her hereditary dominions, but dared to proclaim one of her vaſſals king of Angola; but, provided theſe dominions were reſtored, ſhe would immediately embrace Chriſtianity.

43 Their infamous conduct.

All this time the furious Queen Zingha went on with her ravages, notwithſtanding the viceroy kept plying her with letters for near three years. At laſt he had recourſe to the execrable artifice of taking advantage of the remorſe for her crimes with which Zingha was ſometimes affected, in order to procure the peaceable enjoyment of his own ill-gotten conqueſts.

It is eaſy to ſee, that had this viceroy, or the prieſts he employed, really intended to convert Zingha to Chriſtianity, they ought to have ſo far ſet her an example as at leaſt to abandon part of the countries of which they had robbed her. But, inſtead of this, they impiouſly made uſe of the ſacred name of our Saviour in order to deter a poor ſavage African from recovering what juſtly belonged to her: A piece of conduct which it is doubtful whether it was more antichriſtian, or mean in itſelf; eſpecially if we conſider that their antagoniſt was a *woman*, who fought againſt them under every poſſible diſadvantage; and, by having recourſe to this ſtratagem, they in effect confeſſed her to be invincible.

44 Her ſtratagems to prevent a revolt of her ſubjects.

Queen Zingha, at laſt, came to incline ſo much to return to the Chriſtian religion, that a general murmur ran through her army; to quiet which, ſhe had recourſe to many ſtratagems, too tedious here to enumerate particularly. The principal one was, to cauſe the ſinghillos or prieſts command her, in the preſence of four of her officers, to return to Chriſtianity; and this, as if they had received it as a revelation from the ſpirit of her deceaſed brother, who, according to their account, was damned to eternity. Five of the ſinghillos having acted a farce of this kind, the queen aſked the officers who were preſent, their opinion of what they had heard and ſeen, and their advice how ſhe ought to act. To this they replied, " that the matter depended wholly upon her will; that, let her act in it as ſhe pleaſed, ſhe would always find her ſubjects ready to approve of and conform to it, and think it moſt for their honour and advantage to follow her example."

45 She renounces the Giagan ſect and returns to Chriſtianity

When ſhe thought, by artifices of this kind, that the minds of her ſubjects were ſufficiently prepared for hearing her ſentiments openly, Zingha drew up her army (in 1655), and putting herſelf at their head, with a majeſtic, yet ſeemingly joyful aſpect, ſhe let fly an arrow, with her uſual ſtrength and vigour, and then turning to them, " Who is there (ſays ſhe) that is ſtrong enough to ſtand againſt my arms, or to reſiſt the force of this arm?" On this, they all fell a-clapping their hands, and cried out three times ſucceſſively, " O glorious and mighty queen, none, none, none, will ever be able to conquer you."—Encouraged by their acclamations, Zingha now made a ſpeech, in which ſhe acquainted them with her renouncing the ſect of the Giagas, and of her return to Chriſtianity; giving at the ſame time liberty to thoſe who choſe to abandon her on this account to go where they would; and ſuch was their attachment to her, that even in ſuch a ſudden and important change in her reſolutions they expreſſed no uneaſineſs, but on the contrary applauded her to the higheſt degree.

46 Treaty with the Portugueſe propoſed.

The Portugueſe, after having been harraſſed in a terrible manner for 28 years, and at laſt obliged baſely to profane the name of their Saviour to procure a peace, began now freely to enjoy the rewards of their villany. A treaty was unanimouſly ſet on foot between the viceroy and Zingha; which, however, was not eaſily concluded. She demanded the releaſe of her ſiſter Cambi, whoſe Chriſtian name was Donna Barbara; and the Portugueſe demanded a ranſom of 200 ſlaves, or an equivalent in money. This Zingha did not well reliſh; and, being preſſed to a compliance, threatened them with a more furious war than any they had yet experienced. Upon this the viceroy was obliged to have recourſe to the uſual method of ſending prieſts to perſuade her to comply through motives of religion. Theſe deteſtable hypocrites effected their purpoſe, and the ſlaves were ſent, as if Chriſtianity required the delivering up innocent people to thoſe who had no lawful authority over them: but not being able to conclude a laſting peace about the ceſſion of the Angolic provinces, they were forced to conclude a ſhort truce, and ſend back her ſiſter.

This princeſs was received by Zingha in a very affectionate manner; and, ſome time after, the queen, her mind being probably weakened through the infirmities of old age, not only was thoroughly reconciled to the Portugueſe, but looked upon them as her beſt friends. She encouraged the Chriſtian religion; had a church built in her capital; made ſeveral laws againſt Paganiſm; and, *to encourage marriage*, ſhe herſelf wedded a handſome young fellow in the 75th year of her age.

The Portugueſe now imagining they would at laſt gain their point, propoſed to her the following terms, as the baſis of a laſting treaty between the two nations.

47 The Port gueſe term

1. " That they ſhould yield to her, *as a preſent*, ſome of the countries of which they had already robbed her.

2. " That, in conſideration of the ſaid preſent, which ſhould in noways be interpreted as an inveſtiture, the queen ſhould pay yearly a certain acknowledgment to the king of Portugal, who ſhould be at liberty to withdraw the ſaid preſent whenever ſhe failed of making the ſaid acknowledgment.

3. " That a free commerce ſhould be opened between thoſe two ſtates, as well for ſlaves, as for other merchandizes.

4. " That the queen ſhould moleſt none of the lords that were feudatory to the Portugueſe, whatever damages and ravages they might have committed during the late wars between them.

5. " That ſhe ſhould reſtore all the Portugueſe ſlaves that had taken refuge in her dominions.

6. " That ſhe ſhould deliver up the Giaga Colanda, who had revolted from the Portugueſe, upon condition that his crime ſhould go unpuniſhed."

The queen, having now a thorough view of the deep-rooted villany of thoſe with whom ſhe had to do, conceived ſuch diſpleaſure againſt the Portugueſe, that ſhe fell ſick. During this ſickneſs, father Anthony, her chief confident, and a creature of the viceroy, never left off ſoliciting her to make her peace with God, and to accept of the terms offered her by the Portugueſe: but Zingha, though worn out with age and ſickneſs, had ſtill the good ſenſe to perceive, that there was no connection between making her peace with God, and complying with ſuch infamous terms; and therefore gave the following anſwer, which, under ſuch circumſtances, ſhews a magnanimity ſcarce equalled in any age or in any country.

48 The Que noble anſwer.

1. " That as to her converſion, as it was neither owing to any deſire of obtaining a peace, or other worldly motives, but the Divine Grace by which ſhe was recalled, ſhe was reſolved to perſevere in it to her laſt breath.

2. " That, as to her going over to the Giagan ſect, ſhe had in a great meaſure been forced to it by the Portugueſe viceroy.

3. " That the king of Portugal would do a generous act in reſtoring ſome of her Angolic dominions; but it would be more ſo, were he to reſtore them all.

4. " That as to her paying homage to him, neither her mind nor heart were baſe enough to conſent to it; and that as ſhe had refuſed the propoſal while ſhe lived among the Giagas, much more did ſhe think herſelf above it, now ſhe was a Chriſtian queen, and owed neither tribute nor homage to any but to the Supreme Power,

from whom ſhe had received both her being and her kingdom: That, nevertheleſs, if ſhe could be convinced that there was any thing in her dominions that would be acceptable to his Portugueſe majeſty, ſhe would voluntarily make him a preſent of it; and as to the reſt of the articles, ſuch was her deſire of making a firm and laſting peace with them, that ſhe ſhould make no difficulty of conſenting to them."

This anſwer was not altogether ſatisfactory to the viceroy; but the prieſt, finding it impoſſible to make any impreſſion upon her mind, eaſily prevailed upon him to conſent to the following terms.

49
Articles of
the treaty.

1. "That the river Lucalla ſhould be the boundary between the dominions of the Portugueſe and of Queen Zingha.

2. "That neither ſide ſhould thenceforth give any reception to the fugitive ſlaves of the other, but ſend them back without any delay, together with the priſoners which had been taken during the laſt war.

3. "That the queen ſhould remain wholly free and exempt from all tribute and homage whatever, provided ſhe agreed to the other articles."

50
The peace
igned.

Theſe terms were at laſt ſigned by the queen and viceroy in the month of April 1657, and ratified by the king of Portugal in the month of November the ſame year.—The only difficulty the queen had concerning this treaty was with regard to the Giaga Colanda; and the manner in which ſhe extricated herſelf from it, with her ſubſequent behaviour, cannot fail to give us an high idea of the mental abilities of our heroine.

51
ingha's ho-
ourable be-
aviour.

This Giagan chief, weary of the Portugueſe yoke, had retired from them, at the head of 1000 ſtout ſoldiers, and a much greater number of ſlaves, ſome leagues beyond the river Lucalla, and put himſelf under the queen's protection. This ſhe readily granted, as he was very able to be ſerviceable to her in caſe the perfidious conduct of the Portugueſe ſhould oblige her to renew the war. She could not therefore but look upon it as unjuſt and diſhonourable, to deliver up a brave chief who had devoted himſelf to her ſervice, and whom ſhe had taken under her ſpecial protection, to a nation whoſe perfidy ſhe was ſo well acquainted with. To ſave her honour, therefore, ſome time before the ratification of the treaty, ſhe ſent privately for the Giaga, and acquainted him with the demand of the Portugueſe; telling him, at the ſame time, that though ſhe doubted not of the viceroy's keeping his word, and forgiving his offence, yet ſhe adviſed him to go out of her dominions, and ſettle himſelf and his men in ſome diſtant country from the Portugueſe frontiers; but forbad him, on pain of her higheſt diſpleaſure, to commit the leaſt outrage or hoſtility within their dominions.

The Giaga thanked her majeſty, and ſeemed to acquieſce with her advice, but did not follow it. On the contrary, he had no ſooner reached his fortreſs, than he ſet himſelf about fortifying it in ſuch a manner as looked rather like defiance than defence; and, having gathered a conſiderable army, ſoon ſpread a general terror around him. Of this the Portugueſe failed not to complain to the queen; who immediately marched againſt him, ſurpriſed and defeated his army; and he himſelf being killed in the action, his head was cut off and ſent to the Portugueſe.

52
feats and
s the Gi-
Colanda

This was among the laſt memorable actions performed by this famous queen; who, now finding herſelf unfit for the fatigues of war, contented herſelf (in 1658), with diſpatching an old experienced general againſt a neighbouring prince who had invaded her territories. He proved no leſs ſucceſsful than herſelf, and quickly forced the aggreſſor to ſubmit to her terms. She now gave herſelf up to ſtudy the beſt method of propagating Chriſtianity among her ſubjects; and for this purpoſe ſent a ſolemn embaſſy to Rome, to pay homage to the Pope in her name, and to requeſt a freſh ſupply of miſſionaries. To this letter ſhe received an anſwer from his Holineſs in 1662; and it was read in the church, that ſame year, in the moſt public and ſolemn manner. The day appointed was the 15th of July; on which ſhe repaired to the church at the head of a numerous retinue, and having the letter hanging about her neck in a purſe made of cloth of gold. The concourſe was ſo great, that the church could not contain one half of the people, ſo that none were admitted but perſons of rank. The father having finiſhed the maſs, read the letter at the altar in the Portugueſe language; and the ſecretary interpreted it in that of the country. The queen, who had ſtood all the while it was reading, went towards the altar, and on her knees received it from the father; and having kiſſed it, and ſworn afreſh upon the goſpel to continue in obedience to the church of Rome, kiſſed the letter again, put it into the purſe, and returned to the palace amidſt the ſhouts and acclamations of many thouſands of her ſubjects. On that day ſhe gave a magnificent treat to the Portugueſe reſident, and to all her court, in two great porticos, and ſhe herſelf vouchſafed to eat after the European manner; that is, ſitting on a ſtately elbow chair, with a high table before her, covered with the fineſt linen, and with diſhes, plates, knives, and forks, all of ſilver gilt. She beſtowed ſome largeſſes upon her chief officers, releaſed a good number of ſlaves, and at night appeared at the head of her ladies of honour, both ſhe and they dreſſed in the Amazonian manner. They performed a kind of combat, in which the queen, tho' upwards of 80 years of age, behaved with as great vigour and activity as any woman of 30 could have done.

53
Encourages
Chriſtianity

54
Ceremonies
at receiving
a letter from
the pope.

55
Zingha dies.

Her life, however, was not lengthened in proportion to her vigour and activity: for in the month of September ſhe was ſeized with an inflammation in her throat; which, in December, having ſeized her breaſt and lungs, ſhe expired on the 17th of that month, and was ſucceeded by her ſiſter Barbara.

56
Succeeded
by her ſiſter
Barbara.

The deceaſed queen was buried with extraordinary pomp; and, out of regard to her, Barbara was inaugurated a ſecond and third time, with the greateſt pomp, and the moſt joyful acclamations.—She was a very zealous Chriſtian, but far ſhort of her ſiſter's abilities, and had the misfortune of being in the decline of life, lame, and almoſt blind. Beſides this, ſhe had been married to a proud, ill-natured huſband; who had dared, even in the late queen's time, to treat her not only with contempt, but with brutiſh cruelty; though to her he owed all his fortune and advancement, being himſelf no more than the ſon of a ſlave.

57
Cruelty of
her huſband
Mona Zin-
gha to her.

This ungrateful wretch, whoſe name was Mona Zingha, ſoon after his marriage with the princeſs Barbara, uſed her with ſuch cruelty, that ſhe was obliged to take refuge in the palace, from whence he had the inſolence immediately to fetch her. This ſo exaſperated queen

Zingha, that ſhe had well nigh ordered him to be cut in pieces before her face; but pardoned him at the requeſt of father Anthony, who probably knew he was privy to ſome religious ſecrets which he might, in a caſe of ſuch emergency, have diſcloſed. On Barbara's acceſſion to the throne, however, he not only redoubled his cruelty to her, in hopes of getting the management of affairs entirely into his own hands, but invented the moſt helliſh accuſations againſt Anthony himſelf, with a deſign to extirpate both him and his religion. He gave out that the late queen had been poiſoned by ſome favourite European diſhes, with which brother Ignatio uſed to regale her during her laſt illneſs; and attributed his wife's lameneſs and blindneſs to ſome ſorceries or charms uſed by the convent againſt her. He had even perſuaded, or rather forced, his queen to conſent that ſome of the ſinghillos or prieſts ſhould be brought to countercharm her diſtemper.

58 He accuſes Father Anthony.

59 Who reprimands the Queen.

Father Anthony, far from being intimidated at the accuſations brought againſt him, repaired immediately to the palace; where he boldly reprimanded the queen for giving ear to theſe jugglers, threatening at the ſame time to leave her dominions, and carry off with him all the croſſes, and other religious utenſils, from which alone they could have any benefit. The queen returned a very ſubmiſſive anſwer; and promiſed to deliver up the counter-charms which ſhe at that time had upon her, before ſunſet; which ſhe accordingly did, and ſent them to the convent by the hands of her ſecretary. This ſo exaſperated her huſband, and all the Giagan ſect, that they reſolved upon the deſtruction of all the prieſts and Europeans, and even the queen herſelf. This, however, was found improper to be attempted; and Mona Zingha was ſo much chagrined at his diſappointment, that he retired to his own eſtate; giving out, that he deſigned to meddle no more with ſtate-affairs; but, in reality, to concert meaſures for engroſſing the ſovereignty to himſelf, and to deprive his wife of her life and crown.

60 Mona Zingha revives the Giagan rites.

61 And poiſons Father Anthony.

To accompliſh his wicked purpoſe, he ſent a meſſenger to her, deſiring her to repair to his houſe, where he had ſomething of importance to communicate; but ſhe declining the invitation by the advice of father Anthony, he found himſelf diſappointed, and begged leave to retire to a neighbouring province, which was under his government; but here he was again diſappointed, and forbid to ſtir out of the province of Metamba. The queen was, however, guilty of an error not long after, in ſending Mona Zingha at the head of an army to quell a revolt on the frontiers. On his returning victorious, he thought himſelf ſtrong enough to revive the ancient Giagan rites, and therefore ordered 100 ſlaves to be ſacrificed to the manes of the deceaſed queen. Though the queen was immediately appriſed of his intention, and diſpatched a meſſenger expreſsly commanding him to deſiſt; yet Mona, by diſtributing ſome preſents, particularly ſome European wines, among the counſellors, effected his purpoſe with impunity. He did not forget to ſend ſome of this wine to father Antony: but, to prevent ſuſpicion, preſented him only with a ſmall quantity, to be uſed, as he ſaid, at the maſs; adding, that, if it proved agreeable, he would ſupply him with a larger quantity. The unſuſpecting prieſt drank about two glaſſes of it; and in about a quarter of an hour was ſeized with violent convulſions in his bowels, and other ſymptoms of being poiſoned. By proper aſſiſtance, however, he recovered; yet ſo far was he diſabled by this doſe, that he was obliged to abandon his miſſion.

62 The Queen dies.

63 Horrid cruelties of Mona Zingha.

The queen's infirmities in the mean time daily increaſing, Mona Zingha was ſoon delivered from all further oppoſition on her part, by her death, which happened on the 24th of March, 1666. Upon this, Mona Zingha made all poſſible haſte to get himſelf elected king; and immediately renounced the Chriſtian religion, raiſing a perſecution at the ſame time againſt its profeſſors. He even wrote to the Portugueſe viceroy, acquainting him with his having renounced Chriſtianity, which he had only embraced out of complaiſance to his queen, and with his deſign to revive the Giagan rites. To ſhew that he meant to be as good as his word, he ordered all the children under ſix years of age, that could be found, to be ſacrificed in honour of their infernal deities. He alſo recalled the ſinghillos, and heaped many favours upon them; ſo that they became entirely devoted to his purpoſes. He alſo cauſed many of his ſubjects to be privately poiſoned; and then gave out, that their unaccountable deaths were owing to their having abandoned the religion of their anceſtors, and embraced Chrſtianity; which he ſtyled the religion of a parcel of famiſhed ſtrangers, who, thro' their extreme miſery, had been forced to leave their native country, and ſeek for a livelihood in the richeſt provinces of Africa.

By theſe and ſuch like ſtratagems he almoſt entirely extirpated Chriſtianity, and any appearances of civilization which had been introduced among his ſubjects. His carreer, however, was ſtopped by Don John the princeſs Barbara's firſt huſband, from whom ſhe had been divorced on account of his having another wife. He ſoon compelled the uſurper to fly into an iſland in the Coanza; but not having the precaution to reduce him entirely, Mona Zingha found means to retrieve his affairs, and at laſt defeated and killed Don John himſelf, by which he became maſter of the throne without any further oppoſition. He was no ſooner re-eſtabliſhed, than he began to purſue his butcheries with more fury than ever; when, on a ſudden, Don Franciſco, the ſon of Don John, appeared at the head of an army in oppoſition to the uſurper; and in the firſt engagement Mona Zingha being defeated and killed, Don Franciſco became ſole maſter of the empire.

64 He is defe ed and kil ed.

Here we are obliged to conclude our hiſtory; no further accounts, which can be depended upon, having ever appeared; neither is it known whether this prince kept to the terms of the alliance made by Queen Zingha with the Portugueſe or not.—Certain it is, however, that the Portugueſe have preſerved their conqueſts, and for ſome time allowed the natives of theſe provinces which are under their power to chuſe a king for themſelves, or rather they choſe him for them, as we have already noticed. Theſe kings enjoyed only a mere ſhadow of royalty; their whole grandeur conſiſting in being allowed to breed peacocks, and adorn themſelves with their feathers, which was forbidden to their ſubjects under pain of perpetual ſlavery.—The laſt of theſe kings was named Ngola Sedeſio, who, diſliking an empty name of royalty, revolted from the Portugueſe, and carried on a long war with them; but being at laſt defeated and killed, his head was cut off, ſalted, and ſent to Liſbon in pickle. After this the Portugueſe

65 Low ſtate the kings up by the Portugu

tugueſe ſeem not to have thought it ſafe to truſt their Angolic ſubjects even with the name of a king of their own, but have veſted the power entirely in their viceroy; but as to the extent of his dominions, and how matters ſtand between him and that race of Angolic princes who have preſerved their liberty, we are entirely in the dark.

Diviſion into provinces.

Being ſo much in the dark as to theſe particulars, it is impoſſible we can ſay any thing with regard to the diviſion of the preſent kingdom, or the extent and number of its provinces. When in its greateſt ſplendor, the kingdom of Angola contained the 17 following provinces: Cheſſama, Sumbi, Benguela, Rimba, Sietta, High and Low Bembea, Temba, Oacco, Cabezzo, Lubolo, Loanda, Bengo, Danda, Moſiche, Higher and Lower Ilamba, Oraij, and Embacca. The provinces conquered by the Portugueſe during the wars abovementioned were, Danda, Moſiche, Bengo, the higher and lower Ilamba, Oarij, Embacca, Benguela, Sietta, Cabezzo, Lubolo, and Oacco. Of all theſe we have given a particular deſcription under their reſpective names.

Rivers.

The principal rivers in this kingdom are thoſe already mentioned, viz. the Danda and Coanza. The Coanza is large, deep, and rapid. It empties itſelf into the Atlantic ocean about Latitude 9° 20'. S. twelve leagues ſouth of Loando the capital of the kingdom. It is navigable for 150 miles, and abounds with variety of fiſh. It forms ſeveral iſlands, has ſome cataracts, and one in particular which bears its name. As for its ſource, and the length of ground it croſſes from eaſt to weſt before it comes to the Portugueſe ſettlement, it is abſolutely unknown, as well as the countries thro' which it runs. Its mouth, which runs between the capes Palmerino and Lego, is above a league wide; the northern ſhore is the deepeſt, and along which the veſſels ſail. The fall of this river into the ocean is ſo rapid, that the ſea appears quite muddy for two or three leagues below it. Its mouth is not eaſily perceived from the open ſea, by reaſon of an iſland quite covered with high trees which lies juſt before it. The two principal iſlands formed by this river are called *Maſſander* and *Motchiamia*. The one is ſix leagues long, and about two miles broad: it is very fertile in maize, millet, and ſome other grains, which are reaped at three different ſeaſons of the year. It produces likewiſe vaſt quantities of manhioc, a root, of which they make a coarſe kind of meal, which ſerves inſtead of bread. Here alſo grow great numbers of palm and other fruit trees of various kinds. The iſland of Motchiamia is four or five miles long, and one in breadth, moſtly plain, and producing variety of roots and herbs. It likewiſe abounds in cattle; and there were formerly five or ſix Portugueſe families ſettled upon it, who drove a a conſiderable trade in theſe commodities, and likewiſe in ſlaves.

Concerning the river Danda we know little or nothing: only, that though its mouth is not above 70 or 80 miles diſtant from that of the Coanza, yet their diſtance grows ſo conſiderably wider as you penetrate further into the inlands, as to be much above twice if not thrice that ſpace; though how much, is not exactly known.

As for cities, there are none in this kingdom, except what belong to the Portugueſe; and even of theſe we know little or nothing. Queen Zingha indeed founded a city in the kingdom of Metamba, of which a deſcription is given under that article. The manner, religion, and dreſs, *&c.* of the inhabitants, being a mixof thoſe of the Congoeſe and Giagas, fall to be mentioned under theſe two articles.

Angola *Pea*, the name of a ſhrub much cultivated in the Weſt Indies, whither it was brought from Africa, of which it is a native. It grows to the height of four feet, lives four years, and is uſeful throughout its whole duration. It bears huſks, which contain five or ſix grains of a ſpecies of a very wholeſome and very nouriſhing pea. Every part belonging to this ſhrub is remarkable for ſome particular virtue. Its bloſſom is good for a cough; its leaves, when boiled, are applied to wounds; and of the aſhes of this plant is made a lixivium, which cleanſes ulcers, and diſſipates external inflammations of the ſkin. It flouriſhes equally in lands naturally barren, and in thoſe which have been exhauſted. For this reaſon, the beſt managers amongſt the coloniſts never fail to ſow it on all thoſe parts of their eſtates, which in other hands would remain uncultivated.

ANGON, in the ancient military art, a kind of javelin uſed by the French. They darted it at a conſiderable diſtance. The iron head of this weapon reſembled a flower-de-luce. It is the opinion of ſome writers, that the arms of France are not flowers-de-luce, but the iron point of the angon or javelin of the ancient French.

ANGOR, among ancient phyſicians, a concentration of the natural heat; the conſequence of which is a pain of the head, palpitation, and ſadneſs.

ANGOT, a province or kingdom of Abyſſinia, formerly rich and fertile, but almoſt ruined by the Gallas, a wandering nation in the internal parts of Africa, who diſpoſſeſſed the Abyſſinian monarchs of all that was worth poſſeſſing.

ANGOULESME, a city of France, the capital of the duchy of Angoumois, and the ſee of a biſhop. It is ſeated on the top of a hill, ſurrounded with rocks, at the foot of which runs the river Charante. The inhabitants are ſaid to be about 8000, and to drive a conſiderable trade in paper, which is their manufacture. E. Long. 0. 10. N. Lat. 45. 39.

ANGOUMOIS, a province of France, bounded on the north by Poitou, on the eaſt by Limouſin and March, on the ſouth by Perigord, and on the weſt by Saintonge. Through this province run the rivers Touvre and Charante. This laſt is full of excellent fiſh; and though it often overflows its banks, it is ſo far from doing any damage, that it greatly enriches the ſoil. The Touvre is full of trouts. The air is generally warmer than at Paris, though the country is hilly. The ſoil produces plenty of wheat, rye, oats, Spaniſh corn, ſaffron, grapes, and all ſorts of fruits. Here are ſeveral iron mines, which yield a very good ſort of iron.

ANGOURA, **Angora**, or **Angori**, a city of Aſia, in Anatolia, formerly called *Ancyra*, and ſtill full of remarkable antiquities, which are ſo many marks of its ancient magnificence. It is at preſent one of the beſt cities in Anatolia; its ſtreets are full of pillars and old marbles, among which are ſome of porphyry and jaſper. The greateſt part of the pillars are ſmooth and cylindrical; ſome are channelled ſpirally; but the moſt ſingular are oval, with plate-bands before and behind from the top to the bottom of the pedeſtal. The houſes are now made of clay, which is ſometimes intermixed with fine pieces of marble. The walls of the city are low, with very mean battlements. The maſonry of the walls is intermixed with pillars, architraves, capitals, and other ancient fragments, eſpecially that of the towers and gates. The caſtle of Angora has a triple incloſure; and the walls are of large pieces of white marble, and a ſtone much like porphyry.

The baſha of Angora has about 30 purſes income; and there are here about 300 janizaries, under the command of a ſardar. The Turks are ſaid to be 40,000, the Armenians 4000 or 5000, and the Greeks 600. The Armenians have ſeven churches, beſides a monaſtery; and the Greeks two. They breed the fineſt goats in the world; and their hair, which is of a dazzling white, is almoſt as fine as ſilk, and nine inches in length: it is worked into very fine ſtuffs, particularly camblet. All the inhabitants are employed in this manufacture. Several large caravans paſs through this city to different places. E. Long. 32. 5. N. Lat. 39. 30*.

ANGOY, a kingdom of Loango in Africa, bounded on the north by Cacongo, and on the ſouth by Congo; from the former of which it is ſeparated by the river Cabinda, and from the latter by the river Zaire. It is but of ſmall extent; being only a vaſſal province of Cacongo, till the mani or prince, who had married a Portugueſe's daughter, was perſuaded by his father-in-law to make himſelf independent. This he effected at a favourable juncture, the king of Loango having but juſt before revolted from the king of Congo, and the king of Cacongo from the new king of Loango. The country is full of woods and thickets; and has no towns of any note, except one called Bomangoy, ſituated on the north banks of the Zaire, and not far from its mouth. Its chief port is Cabinda, called alſo Kabenda, or Cubenda, ſituated on the mouth of a river of the ſame name about five leagues north of Cape Palmerino, on the north ſide of the Zaire's mouth. The bay is very commodious for trade, or wooding and watering along the ſhore. It is flat and marſhy in ſome places; but aſcends gradually about three miles inland, and then forms itſelf into a ridge of hills. On the aſcent of theſe is ſituated a town belonging to the father-in-law of the king above mentioned, where he conſtantly kept a ſtock of wood ready cut, to ſell to foreign ſhips at an eaſy rate. From theſe wood-piles, ſouth-weſt along the bay, lie ſcattered a number of fiſhermens huts, on each ſide a ſmall freſh water river which falls into the bay; and thence all the water for ſhips is brought in caſks to the mouth of the river, which is ſo ſhallow, that even at full flood it can only be entered by a yawl carrying a caſk or two. The town ſtands on the round point of the bay looking to the weſtward; and the Engliſh have a factory on the ſouth-weſt of the road. For a deſcription of the town itſelf, ſee the article CABINDA.

The country round the bay is moſtly barren; owing chiefly to the lazineſs of the inhabitants, which often occaſions a ſcarcity of proviſions. The wild beaſts ſwarm ſo in the woods, that they deſtroy all the tame kinds; ſo there are no cattle bred here but hogs. From the woods in this country ſome monkeys have been brought away, which in ſhape and ſtature reſembled the human ſpecies. Civet-cats abound here in great plenty, and parrots may be bought for three or four ordinary knives. The coaſts abound ſo with oyſters, that the ſailors quickly load their boats with them; they being found lying in great heaps like ſmall rocks. The natives follow the occupation of fiſhing more than any other. They fiſh both on the ſea and in the rivers, making uſe of drag-nets, which have long canes fixed at equal diſtances, inſtead of corks, to ſhew when any fiſh is caught. Theſe nets are made of a peculiar kind of root, which, after being beaten, may be ſpun like hemp.

The dreſs of the inhabitants is the ſame with that of the Congoeſe. They allow polygamy, and the beſt beloved wife hath the command of the reſt; but is no leſs liable to be turned out, if ſhe proves unfaithful. The ladies of the blood-royal have the privilege of chuſing their huſbands out of any, even the meaneſt rank; and have even the power of life and death over them; as likewiſe over their paramours, if any of them are caught tripping: but the huſbands are by no means entitled to expect the ſame fidelity from their royal ladies. Women of the lower rank are obliged, when they receive a ſtranger, to admit them for a night or two into their embraces. This obliged the miſſionaries, who travelled through this country, to give notice of their approach to any of their houſes, that none of the female ſex might enter within their doors.—Their religion conſiſts chiefly in a variety of ſuperſtitious cuſtoms; ſuch as powdering their public and domeſtic idols with the duſt of a kind of red wood, on the firſt day of the moon, and paying a kind of worſhip to that planet. If, on that night, it happens to ſhine clear and bright, they cry out, "Thus may I renew my life as thou doſt;" but if the air is cloudy, they imagine the moon hath loſt her virtue, and pay her no reſpect. We do not hear of their offering any ſacrifices to their idols; though they commonly conſult them about the ſucceſs of their enterpriſes, thefts, or ſuch like. The king of Congo ſtill ſtiles himſelf ſovereign of Angoy; but the king of this little ſtate pays neither tribute nor homage to any foreign power.

ANGRA, a city of Tercera one of the Azores, the capital not only of that iſland, but of all the reſt, and is the reſidence of the governor. It is ſeated on the ſouth ſide, near the middle of the longeſt diameter of the iſland, on the edge of the ſea. The harbour is the only tolerable one in the whole iſland, being equally ſecure againſt ſtorms and the efforts of an enemy. It is of the form of a creſcent; the extremities of which are defended by two high rocks, that run ſo far into the ſea as to render the entrance narrow, and eaſily covered by the batteries on each ſide. From this harbour the town is ſaid to derive its name, the word *Angra* ſignifying a creek, bay, or ſtation for ſhipping; and this is the only convenient one among all the Azores. The opening of the port is from the eaſt to the ſouth-weſt; and, according to Frezier, it is not above four cable's-length in breadth, and not two of good bottom. Here ſhips may ride in great ſafety during the ſummer; but as ſoon as the winter begins, the ſtorms are ſo furious, that the only ſafety for ſhipping is the putting to ſea with all poſſible expedition. Happily, however, theſe ſtorms are preceded by infallible ſigns, with which experience has made the inhabitants perfectly well acquainted. On theſe occaſions

* See *Ancyra*

ſions the Pico, a high mountain in another of the Azores, is overcaſt with thick clouds, and grows exceedingly dark; but what they look upon as the moſt certain ſign is the fluttering and chirping of flocks of birds round the city for ſome days before the ſtorm begins.

The town is well-built and populous, is the ſee of a biſhop, under the juriſdiction of the archbiſhop of Liſbon. It hath five pariſhes, a cathedral, four monaſteries, as many nunneries, beſides an inquiſition and biſhop's court, which extends its juriſdiction over all the Azores, Flores, and Corvo. It is ſurrounded by a good wall, a dry ditch of great depth and breadth, and defended by a ſtrong caſtle rendered famous by the impriſonment of king Alphonſo by his brother Peter in 1668. Though moſt of the public and private buildings have a good appearance externally, they are but indifferently furniſhed within; but for this poverty the Portugueſe excuſe themſelves, by ſaying, that too much furniture would prove inconvenient in ſo warm a climate.

At Angra are kept the royal magazines for anchors, cables, ſails, and other ſtores for the royal navy, or occaſionally for merchantmen in great diſtreſs. All maritime affairs are under the inſpection of an officer called *Deſembergrador*, who hath ſubordinate officers and pilots for conducting ſhips into the harbour, or to proper watering-places. The Engliſh, French, and Dutch, have each a conſul reſiding here, though the commerce of any of theſe nations with the Azores is very inconſiderable.

ANGRIVARII, (Tacitus), a people of Germany, ſituated between the Weſer and the Ems, and eaſtward reaching beyond the Weſer, as far as the Cheruſci, on which ſide they raiſed a rampart (Tacitus); to the ſouth, having the Tubantes on the Ems, and on the Weſer where it bends to the foreſt Bacemis; to the weſt, the Ems and the confines of the Bructeri; and to the north, the territory of the Angrivarii lay between the Chamavi and Anſibarii. Ptolemy places them between the Cauchi and Suevi or Catti. Suppoſed now to contain a part of the county of Schaumburg, the half of the biſhoprick or principality of Minden; to the ſouth, the greateſt part of the biſhoprick of Oſnabrug, the north part of the county of Teclenburg, and a part of the county of Ravenſberg. A trace of the name of the people ſtill remains in the appellation *Engern*, a ſmall town in the county of Ravenſberg.

ANGROGNA, a town of Piedmont, belonging to the king of Sardinia. E. Long. 7. 2. N. Lat. 48. 42.

ANGUILLA, one of the Weſt-India or Carribbee iſlands, lying in about 15° N. Lat. It has its name from its ſnake-like form; and is about ten leagues in length, and three in breadth. It was firſt diſcovered by the Engliſh in 1650, when it was filled with alligators and other noxious animals; but they, finding the ſoil fruitful, and proper for raiſing tobacco and corn, ſettled a colony on it, and imported live cattle, which have ſince multiplied exceedingly. But the colony not being ſettled under any public encouragement, each planter laboured for himſelf, and the iſland became a prey to every rapacious invader, which diſheartened the inhabitants ſo much, that all induſtry was loſt among them. Their chief ſuffering was from a party of wild Iriſh, who landed here after the Revolution, and treated them worſe than any of the French pirates who had attacked them before. The people of Barbadoes, and other Engliſh Carribbees, knowing the value of the ſoil, ſeveral of them removed to Anguilla, where they remained for many years, and even carried on a profitable trade, though without any government either civil or eccleſiaſtical. In 1745, their militia, though not exceeding 100 men, defended a breaſt-work againſt 1000 French who came to attack them; and at laſt obliged them to retire with the loſs of 150 men, beſides carrying off ſome of their arms and colours as trophies of their victory. Since that time the inhabitants have ſubſiſted moſtly by farming; though they ſtill plant ſugar, and the iſland is ſaid to be capable of great improvements.

ANGUINA. See TRICOSANTHES.

ANGUILLIFORM, an appellation given by zoologiſts, not only to the different ſpecies of eels, but to other animals reſembling them in ſhape.

ANGUINUM OVUM, a fabulous kind of egg, ſaid to be produced by the ſaliva of a cluſter of ſerpents, and poſſeſſed of certain magical virtues. The ſuperſtition in reſpect to theſe was very prevalent among the ancient Britons, and there ſtill remains a ſtrong tradition of it in Wales. The account Pliny * gives of it is as follows:

"Præterea eſt ovorum genus in magna Galliarum "fama, omiſſum Græcis. Angues innumeri æſtate "convoluti, ſalivis faucium corporumque ſpumis arti"fici complexu glomerantur; anguinum appellatur. "Druidæ ſibilis id dicunt in ſublime jactari, ſagoque "oportere intercipi, ne tellurem attingat: profugere "raptorem equo: ſerpentes enim inſequi, donec ar"ceantur amnis alicujus interventu."—Of which the following may ſerve as a tranſlation: (from *Maſon's Caractacus;* the perſon ſpeaking, a Druid.)

But tell me yet
From the grot of charms and ſpells,
Where our matron ſiſter dwells,
Brennus, has thy holy hand
Safely brought the Druid wand,
And the potent *Adder-ſtone*,
Gender'd 'fore the autumnal moon?
When, in undulating twine,
The foaming ſnakes prolific join;
When they hiſs, and when they bear
Their wond'rous egg aloof in air:
Thence before to earth it fall,
The *Druid* in his hallow'd pall,
Receives the prize,
And inſtant flies,
Follow'd by the envenom'd brood,
'Till he croſs the cryſtal flood.

This wondrous egg ſeems to be nothing more than a bead of glaſs, uſed by the Druids as a charm to impoſe on the vulgar, whom they taught to believe, that the poſſeſſor would be fortunate in all his attempts, and that it would gain him the favour of the great.

Our modern Druideſſes (ſays Mr Pennant, from whom we extract) give much the ſame account of the *ovum anguinum, glain neidr*, as the Welſh call it, or the *adder-gem*, as the Roman philoſopher does; but ſeem not to have ſo exalted an opinion of its powers, uſing it only to aſſiſt children in cutting their teeth, or to cure the chin-cough, or to drive away an ague.

Theſe beads are of a very rich blue colour; ſome plain, others ſtreaked. For their figure, ſee Plate XXIV. (B). fig. 22. n° 1, 2, 3.

ANGUIS, or SNAKE, in zoology, a genus belonging to the order of amphibia ſerpentes. The characters of the anguis are theſe: They are ſquamous or ſcaly in the belly and under the tail; without any ſcuta. There are 15 ſpecies of the anguis, *viz.* 1. The eryx, a native of Britain and likewiſe of America, is about a ſpan in length, and about the thickneſs of a man's finger. One from Aberdeenſhire, deſcribed by Mr Pennant, was 15 inches long; tongue broad and forked; noſtrils ſmall, round, and placed near the tip of the noſe; eyes lodged in oblong fiſſures above the angle of the mouth; belly of a bluiſh lead colour, marked with ſmall white ſpots irregularly diſpoſed: The reſt of the body of a greyiſh brown, with three longitudinal duſky lines; one extending from the head along the back to the point of the tail; the others broader, and extending the whole length of the ſides. It was entirely covered with ſmall ſcales; largeſt on the upper part of the head. 2. The fragilis, blind-worm, or ſlow-worm, grows to about a foot in length, and to the thickneſs of a man's little finger: the irides are red; the head is ſmall; the neck ſtill more ſlender; from that part the body grows ſuddenly, and continues of an equal bulk to the tail, which ends quite blunt. The colour of the back is cinereous, marked with very ſmall lines compoſed of minute black ſpecks: the ſides are of a reddiſh caſt; the belly duſky; both marked like the back. The tongue is broad and forky; the teeth are minute, but numerous; the ſcales ſmall. The motion of this ſerpent is ſlow, from which, and from the ſmallneſs of the eyes, are derived its names. It reſembles the viper in the manner of producing its young, which are put forth alive. It is frequent with us in gardens and paſtures, where it lives principally under ground feeding on worms. Like others of the genus, they lie torpid during winter, and are ſometimes found in vaſt quantities twiſted together. 3. The ventralis, or glaſs-ſnake of Cateſby, has 127 ſquamæ on the belly, and 223 on the tail. The head is very ſmall, and the tongue of a ſingular form *. The upper part of the body is of a colour blended brown and green, moſt regularly and elegantly ſpotted with yellow, the undermoſt part of which is brighteſt. The ſkin is very ſmooth; and ſhining with ſmall ſcales, more cloſely connected, and of a different ſtructure from thoſe of other ſerpents. A ſmall blow with a ſtick will cauſe the body to ſeparate, not only at the place ſtruck, but at two or three other places, the muſcles being articulated in a ſingular manner quite through to the vertebra. They appear earlier in the ſpring than any other ſerpent, and are numerous in the ſandy woods of Virginia and Carolina. They are generally ſaid to be harmleſs. 4. The jaculus, or dart-ſnake, is about three hand-breadths long, and about the thickneſs of one's little finger. Its colour is a milky grey on the back, variegated with ſmall black ſpots like ſo many eyes; and on the belly it is perfectly white. The neck is wholly black; and from that two milk-white ſtreaks run all the way along the back to the tail: the black ſpots alſo are each ſurrounded with a ſmall circle of white. It has its name from its vibrating its body in the manner of a dart. It is a native of Egypt, Libya, and the iſlands of the Mediterranean. 5. The quadrupes: The body of this ſpecies is cylindrical, with 14 or 15 longitudinal aſh-coloured ſtreaks; the teeth are extremely ſmall; it has no ears: the feet are at a great diſtance from each other, very ſhort, with five toes and ſmall nails; but the toes are ſo minute, that they can hardly be numbered: It is a native of Java. 6. The bipes, is a native of the Indies; it has two ſhort feet, with two toes, near the anus. In every ſcale of the bipes there is a brown point. 7. The meleagris, is likewiſe a native of the Indies; it has ſmall teeth, but no ears. This ſpecies has a great reſemblance to the former *. 8. The colubrina, an inhabitant of Egypt, is beautifully variegated with pale and yellow colours. 9. The maculata, a native of America, is yellow, and interſperſed with aſh-coloured lines on the back: the head is ſmall in proportion to the body †. 10. The reticulata, a native of America, has browniſh ſcales, with a white margin. 11. The ceraſtes, with 200 ſquamæ on the belly, and 15 on the tail, is a native of Egypt. 12. The lumbricalis, a native of America, has 230 ſquamæ on the belly, and 7 on the tail; its colour is a yellowiſh white. 13. The platura: The head is oblong and without teeth; the body is about a foot and a half long, black above and white below; the tail is about one ninth of the length of the animal, much compreſſed or flatted, and variegated with black and white; the ſcales are roundiſh, ſmall, not imbricated, but they cannot be numbered. 14. The laticauda, a native of Surinam: the tail is compreſſed, acute, pale, with browniſh belts. 15. The ſcytale, a native of the Indies, with 220 ſquamæ on the belly, and 13 on the tail. The head is ſmall and oval, and the eyes are little; the body is cylindrical, about a foot and a half long, covered with oval obtuſe ſcales: the tail is thick and obtuſe like the head; its colour is white, interſperſed with browniſh rings; the margins of the ſcales are of an iron colour; and the top of the head is blue ‡.—According to Linnæus, none of this genus are poiſonous.

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* Lib. xxix. c. 3.

* Plate xxii. fig. 5.

*Plate xxiii. fig. 1.

† Fig. 2.

‡ Fig 3.

ANGURIA, the WATER-MELON; a genus of the diandria order, belonging to the monoecia claſs of plants.

Species. Of this genus, Linnæus reckons three ſpecies, the trilobata, pedata, and trifoliata; but only one is known in this country, by the name of *Citrul.* The fruit is cultivated in Spain, Portugal, Italy, and other warm countries of Europe; as alſo in Africa, Aſia, and America; where it is eſteemed on account of its wholeſome cooling quality; but in Britain it is held in little eſtimation.

Culture. To have this fruit good, ſome ſeeds muſt be procured of three or four years old; new ſeeds being apt to produce vigorous plants, which are ſeldom ſo fruitful as thoſe of a moderate ſtrength. Theſe are to be ſown in the hot-bed for early cucumbers. Some new dung is to be prepared in the beginning of February, which ſhould be thrown into a heap to heat, as is practiſed for early cucumbers. The bed is then to be made in the ſame manner as for the muſk-melon, covering the dung about five inches thick with loamy earth; but as theſe plants require much more room than either cucumbers or common melons, there ſhould be but one plant put into a three-light frame. A hill of the ſame loamy earth ſhould therefore be raiſed a foot and a half high, in the middle light of each frame; into which, when the bed is of a proper temper for heat, the plants ſhould be carefully planted, obſerving to water and ſhade them until they have taken good root. As to other particulars, their management differs very little from that of the muſk-melon: only they muſt frequently have freſh air admitted to them; and,

Plate XXIII

Fig. 1. ANGUIS MELEAGRIS

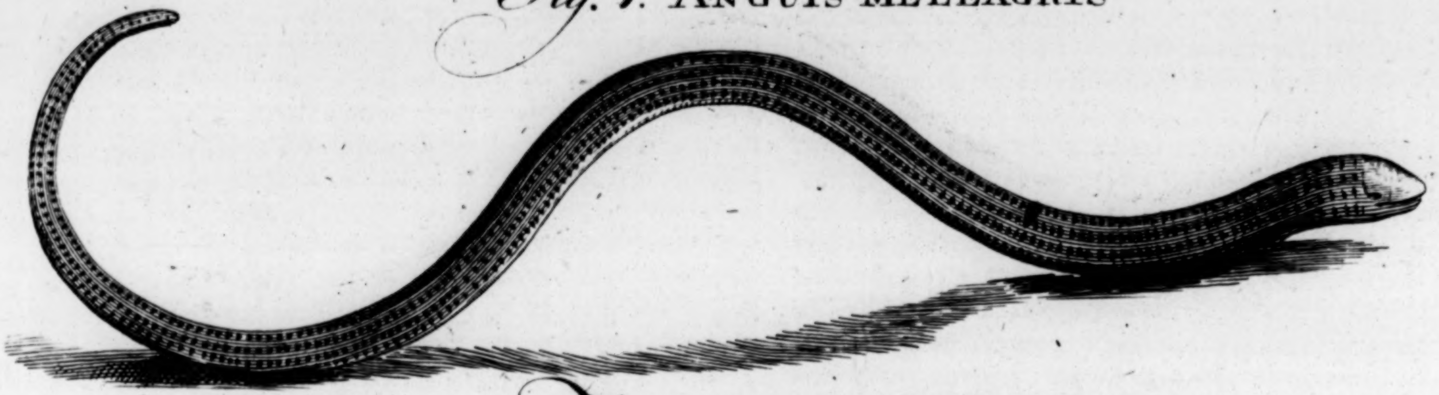


Fig. 2. ANGUIS MACULATA

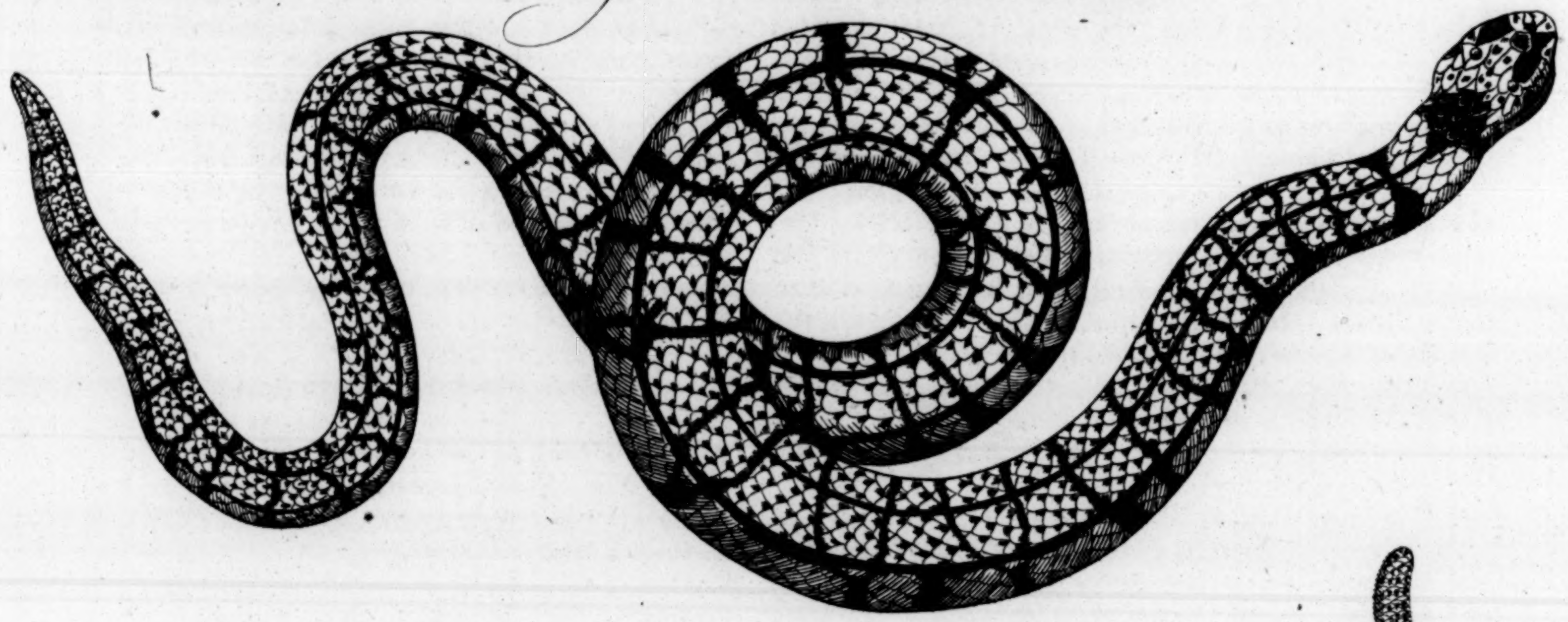


Fig. 3. ANGUIS SCYTALE

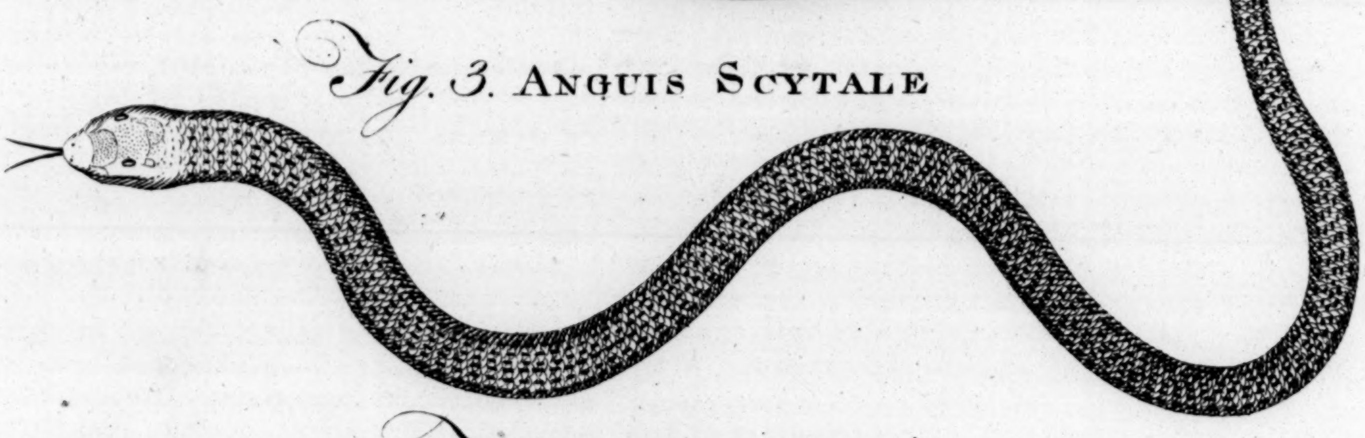
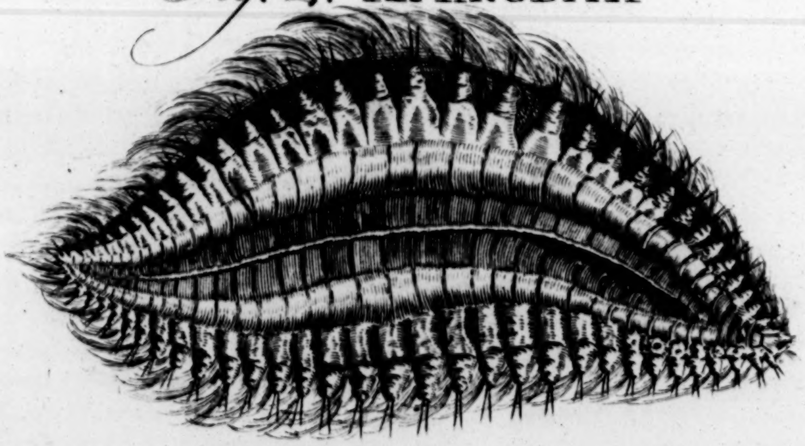


Fig. 4. APHRODITA



A Bell Sculpt

3 MA 53

when the nights are cold, the glaſſes muſt be covered with mats to keep the beds warm.

ANGUS. See FORFARSHIRE.

ANGUSTICLAVIA, in Roman antiquity, a tunica embroidered with little purple ſtuds. It was worn by the Roman knights, as the laticlavia was by the ſenators.

ANHALT, an iſland of Denmark, in North Jutland, lying in the Categut, eight miles from the coaſt of Jutland, ten from Zealand, and ſeven from Holland. It is dangerous for ſeamen, for which reaſon there is a light-houſe.

ANHALT, a principality of Germany, in the circle of Upper Saxony, about 42 miles in length, and eight in breadth. It is bounded on the S. by the county of Mansfield, on the W. by the duchy of Halberſtadt, on the E. by the duchy of Saxony, and on the N. by the duchy of Magdeburg. It abounds in corn, and is watered by the Salde and Mulda; its principal trade is in beer.

ANHELATIO, or **ANHELITUS**, among phyſicians, a ſhortneſs of breath.

ANIAN, the name of a ſtrait formerly ſuppoſed to lie between the north-eaſt of Aſia, and the north-weſt of America; but now found to exiſt only in imagination.

ANIAN is alſo the name of a barren ſandy deſert lying on the eaſt coaſt of Africa. It is ſo exceſſively hot and otherwiſe inhoſpitable, that it contains but very few inhabitants, except ſome wandering Arabs who live in camps.

ANJENGO, a ſmall town and factory on the coaſt of Malabar, in the peninſula on this ſide the Ganges, belonging to the Eaſt India company. Their merchandiſe conſiſts chiefly in pepper and callicoes. E. Long. 76. 1. N. Lat. 7. 0.

ANIL, in botany, a ſynonyme of a ſpecies of indigofera. See INDEGOFERA.

ANIMA, among divines and naturaliſts, denotes the ſoul, or principle of life, in animals. See SOUL.

ANIMA, among chemiſts, denotes the volatile or ſpiritous parts of bodies.

ANIMA *Hepatis*, is a name by which ſome call *ſal martis*, or *ſalt of iron*, on account of its ſuppoſed efficacy in diſeaſes of the liver.

ANIMA *Saturni*, a white powder obtained by pouring diſtilled vinegar on litharge, of conſiderable uſe in enamelling. See ENAMEL.

ANIMADVERSION, in matters of literature, is uſed to ſignify, ſometimes correction, ſometimes remarks upon a book, &c. and ſometimes a ſerious conſideration upon any point.

ANIMAL, in natural hiſtory, an organized and living body, which is alſo endowed with ſenſation: thus, minerals are ſaid to grow or increaſe, plants to grow and live, but animals alone to have ſenſation.

It is this property of ſenſation alone that can be deemed the eſſential characteriſtic of an animal; and by which the animal and vegetable kingdoms ſeem to be ſo eſſentially ſeparated, that we cannot even imagine the leaſt approximation of the one to the other. Thoſe naturaliſts, indeed, who have ſuppoſed the diſtinction between animals and vegetables to conſiſt in any thing elſe than what we have already mentioned, have found themſelves greatly embarraſſed; and have generally agreed, that it was extremely difficult, if not impoſſible, to ſettle the boundaries between the animal and vegetable kingdoms. But this difficulty will be eaſily ſeen to ariſe from their taking the characteriſtic marks of the animal kingdom, from ſomething that was evidently common to both. Thus, Boerhaave attempted to diſtinguiſh an animal from a vegetable, by the former having a mouth, which the latter has not: but here, as the mouth of an animal is only the inſtrument by which nouriſhment is conveyed to its body, it is evident, that this can be no eſſential diſtinction, becauſe vegetables alſo require nouriſhment, and have inſtruments proper for conveying it into their bodies; and where the end is the ſame, a difference in the means can never be eſſential. The fixing the difference in an animal's having a gula, ſtomach, and inteſtines, as is done by Dr Tyſon, is as little to the purpoſe.

The power of moving from one place to another, hath by many been thought to conſtitute their difference; and indeed, in moſt caſes, it is the obvious mark by which we diſtinguiſh an animal from a vegetable: but Lord Kaimes hath given ſeveral very curious inſtances of the locomotive power of plants; ſome of which, as he ſays, would do honour to an animal.—" Upon the ſlighteſt touch, the ſenſitive plant ſhrinks back and folds up its leaves, ſimilar to a ſnail; which on the ſlighteſt touch retires within its ſhell. A new ſpecies of the ſenſitive plant hath been lately diſcovered*. If a fly perch upon one of its flower-leaves, it cloſes inſtantly, and cruſhes the inſect to death. There is not an article in botany more admirable than a contrivance, viſible in many plants, to take advantage of good weather, and to protect themſelves againſt bad. They open and cloſe their flowers and leaves in different circumſtances: ſome cloſe before ſunſet, ſome after: ſome open to receive rain, ſome cloſe to avoid it. The petals of many flowers expand in the ſun; but contract at night, or on the approach of rain. After the ſeeds are fecundated, the petals no longer contract. All the trefoils may ſerve as a barometer to the huſbandman; they always contract their leaves on an impending ſtorm. Some plants follow the ſun, others turn from it. Many plants, on the ſun's receſs, vary the poſition of their leaves, which is ſtyled the *ſleep of plants*. A ſingular plant † was lately diſcovered in Bengal. Its leaves are in continual motion all day long; but when night approaches, they fall down from an erect poſture to reſt.

" A plant has a power of directing its roots for procuring food. The red whortle-berry, a low evergreen plant, grows naturally on the tops of our higheſt hills, among ſtones and gravel. This ſhrub was planted in an edging to a rich border, under a fruit wall. In two or three years, it over-ran the adjoining deep-laid gravel walk; and ſeemed to fly from the border, in which not a ſingle runner appeared. An effort to come at food in a bad ſituation, is extremely remarkable in the following inſtance. Among the ruins of Newabbey, formerly a monaſtery in Galloway, there grows on the top of a wall a plane-tree about 20 feet high. Straitened for nouriſhment in that barren ſituation, it ſeveral years ago directed roots down the ſide of the wall, till they reached the ground ten feet below; and now the nouriſhment it afforded to thoſe roots during the time of their deſcending is amply repaid, having every year ſince that time made vigorous ſhoots. From the top of

* See *Dionæa*.

† A ſpecies the *Hedyſarum*. See that article.

the wall to the ſurface of the earth, theſe roots have not thrown out a ſingle fibre; but are now united in a ſingle root.

"Plants, when forced from their natural poſition, are endowed with a power to reſtore themſelves. A hop-plant, twiſting round a ſtick, directs its courſe from ſouth to weſt, as the ſun does. Untwiſt it, and tie it in the oppoſite direction: it dies. Leave it looſe in the wrong direction: it recovers its natural direction in a ſingle night. Twiſt a branch of a tree ſo as to invert its leaves, and fix it in that poſition: if left in any degree looſe, it untwiſts itſelf gradually, till the leaves be reſtored to their natural poſition. What better can an animal do for its welfare? A root of a tree meeting with a ditch in its progreſs, is laid open to the air. What follows? It alters its courſe like a rational being, dips into the ground, ſurrounds the ditch, riſes on the oppoſite ſide to its wonted diſtance from the ſurface, and then proceeds in its original direction. Lay a wet ſpunge near a root laid open to the air; the root will direct its courſe to the ſpunge. Change the place of the ſpunge; the root varies its direction. Thruſt a pole into the ground at a moderate diſtance from a ſcandent plant: the plant directs its courſe to the pole, lays hold of it, and riſes on it to its natural height. A honeyſuckle proceeds in its courſe, till it be too long for ſupporting its weight; and then ſtrengthens itſelf by ſhooting into a ſpiral. If it meet with another plant of the ſame kind, they coaleſce for mutual ſupport; the one ſcrewing to the right, the other to the left. If a honeyſuckle twig meets with a dead branch, it ſcrews from the right to the left. The claſpers of briony ſhoot into a ſpiral, and lay hold of whatever comes in their way for ſupport. If, after compleating a ſpiral of three rounds, they meet with nothing, they try again by altering their courſe."———

By comparing theſe and other inſtances of ſeeming voluntary motion in plants, with that ſhare of life wherewith ſome of the inferior kinds of animals are endowed, we can ſcarce heſitate at aſcribing the ſuperiority to the former; that is, putting ſenſation out of the queſtion. Muſcles, for inſtance, are fixed to one place as much as plants are; nor have they any power of motion, beſides that of opening and ſhutting their ſhells: and in this reſpect they have no ſuperiority over the motion of the ſenſitive plant; nor doth their action diſcover more ſagacity, or even ſo much as the roots of the plane-tree mentioned by Lord Kaimes.

Mr Buffon, who ſeems to be deſirous of confounding the animal and vegetable kingdoms, denies ſenſation to be any eſſential diſtinction. "Senſation (ſays he) more eſſentially diſtinguiſhes animals from vegetables: but ſenſation is a complex idea, and requires ſome explication. For if ſenſation implied no more than motion conſequent upon a ſtroke or an impulſe, the ſenſitive plant enjoys this power. But if, by ſenſation, we mean the faculty of perceiving and comparing ideas, it is uncertain whether brute animals are endowed with it. If it ſhould be allowed to dogs, elephants, *&c.* whoſe actions ſeem to proceed from motives ſimilar to thoſe by which men are actuated, it muſt be denied to many ſpecies of animals, particularly to thoſe which appear not to poſſeſs the faculty of progreſſive motion. If the ſenſation of an oyſter, for example, differed only in degree from that of a dog; why do we not aſcribe the ſame ſenſation to vegetables, though in a degree ſtill inferior? This diſtinction, therefore, between the animal and vegetable, is neither ſufficiently general nor determined.

"From this inveſtigation we are led to conclude, that there is no abſolute and eſſential diſtinction between the animal and vegetable kingdoms; but that nature proceeds, by imperceptible degrees, from the moſt perfect to the moſt imperfect animal, and from that to the vegetables; and the freſh water polypus may be regarded as the laſt of animals, and the firſt of plants."

It were to be wiſhed, that philoſophers would on ſome occaſions conſider, that a ſubject may be dark as well on account of their inability to ſee, as when it really affords no light. Our author boldly concludes, that there is no eſſential difference between a plant and an animal, becauſe we aſcribe ſenſation to an oyſter, and none to the ſenſitive plant; but we ought to remember, that, though we cannot perceive a diſtinction, it may nevertheleſs exiſt. Before Mr Buffon, therefore, had concluded in this manner, he ought to have proved that ſome vegetables were endowed with ſenſation.

It is no doubt, however, as much incumbent on thoſe who take the contrary ſide of the queſtion, to prove that vegetables are not endowed with ſenſation, as it was incumbent on Mr Buffon to have proved that they are. But a little attention will ſhew us, that the difficulty here proceeds entirely from our inability to ſee the principle of ſenſation. We perceive this principle in ourſelves, but no man can perceive it in another. Why then does every individual of mankind conclude that his neighbour has the ſame ſenſations with himſelf? It can only be from analogy: Every man perceives his neighbour formed in a manner ſimilar to himſelf; he acts in a ſimilar manner on ſimilar occaſions; *&c.* Juſt ſo it is with brute animals. It is no more doubtful that they have ſenſations, than that we have them ourſelves. If a man is wounded with a knife, for inſtance, he expreſſes a ſenſe of pain, and endeavours to avoid a repetition of the injury. Wound a dog in the ſame manner, he will alſo expreſs a ſenſe of pain; and, if you offer to ſtrike him again, will endeavour to eſcape, before he feels the ſtroke. To conclude, here, that the action of the dog proceeded from a principle different from that of the man, would be abſurd and unphiloſophical to the laſt degree.

We muſt further take notice, that there are ſenſations eſſentially diſtinct from one another; and in proportion as an animal is endowed with more or fewer of theſe different ſpecies, it is more or leſs perfect as an animal: but, as long as one of them remains, it makes not the leaſt approach to the vegetable kingdom; and, when they are all taken away, is ſo far from becoming a vegetable, that it is only a maſs of dead matter. The ſenſes of a perfect animal, for inſtance, are five in number. Take away one of them, ſuppoſe ſight; he becomes then a leſs perfect animal, but is as unlike a vegetable as before. Suppoſe him next deprived of hearing: his reſemblance to a vegetable would be as little as before; becauſe a vegetable can neither feel, taſte, nor ſmell, and we ſuppoſe him ſtill to enjoy theſe three ſenſes. Let us, laſtly, ſuppoſe him endowed only with the ſenſe of feeling, which, however, ſeems to include that of taſte; and he is no more a vegetable than formerly, but only an imperfect animal. If this ſenſe is then taken away, we connect him not with the vegetable kingdom, but with what Mr Buffon calls *brute-matter*. It is to this kingdom, and not to the vegetable, that animals plainly approximate as they deſcend. Indeed, to ſuppoſe an approximation between the vegetable and animal kingdoms, is very abſurd: for, at that rate, the moſt imperfect animal ought to be the moſt perfect plant; but we obſerve no ſuch thing. All animals, from the higheſt to the loweſt, are poſſeſſed of vegetable life; and that, as far as we can perceive, in an equal degree, whether the animal-life is perfect or imperfect: nor doth there ſeem to be the ſmalleſt connexion between the higheſt degree of vegetation and the loweſt degree of ſenſation. Though all animals, therefore, are poſſeſſed of vegetable life, theſe two ſeem to be as perfectly diſtinct and incommenſurate to one another, as any two things we can poſſibly imagine.

The power of vegetation, for inſtance, is as perfect in an onion or leek, as in a dog, an elephant, or a man: and yet, though you threaten a leek or an onion ever ſo much, it pays no regard to your words, as a dog would do; nor, though you wound it, does it avoid a ſecond ſtroke. It is this principle of ſelf-preſervation in all animals, which, being the moſt powerful one in their nature, is generally taken, and with very good reaſon, as the true characteriſtic of animal-life. This principle is undoubtedly a conſequence of ſenſation; and as it is never obſerved to take place in vegetables, we have a right to ſay that the foundation of it, namely ſenſation, belongs not to them.—There is no animal, which makes any motion in conſequence of external impulſe, where danger is threatened, but what puts itſelf in a poſture of defence; but no vegetable whatever does ſo. A muſcle, when it is touched, immediately ſhuts its ſhell; and as this action puts it in a ſtate of defence, we conclude that it proceeded from the principle of ſelf-preſervation. When the ſenſitive plant contracts from a touch, it is no more in a ſtate of defence than before; for whatever would have deſtroyed it in its expanded ſtate, will alſo do it in its contracted ſtate. We conclude, therefore, that the motion of the ſenſitive plant proceeds only from a certain property called by phyſicians *irritability*; and which, though our bodies poſſeſs it in an eminent degree, is a characteriſtic neither of animal nor vegetable life, but belongs to us in common with brute-matter. It is certain, that an electrified ſilk-thread ſhews a much greater variety of motions than any ſenſitive plant. If a bit of ſilk-thread is dropt on an electrified metal-plate, it immediately erects itſelf; ſpreads out the ſmall fibres like arms; and, if not detained, will fly off. If a finger is brought near it, the thread ſeems greedily to catch at it. If a candle approaches, it claps cloſe to the plate, as if afraid of it.—Why do we not conclude that the thread in this caſe is really afraid of the candle? For this plain reaſon, That its ſeeming flight is not to get away from the candle, but to get towards the electrified metal; and, if allowed to remain there, will ſuffer itſelf to be burnt without offering to ſtir.—The ſenſitive plant, in like manner, after it has contracted, will ſuffer itſelf to be cut in pieces, without making the leaſt effort to eſcape. The caſe is not ſo with the meaneſt animal. An hedge-hog, when alarmed, draws its body together, and expands its prickles, thereby putting itſelf in a poſture of defence. Throw it into water; and the ſame principle of ſelf-preſervation prompts it to expand its body, and ſwim. A ſnail, when touched, withdraws itſelf into its ſhell; but if a little quicklime is ſprinkled upon it, ſo that its ſhell is no longer a place of ſafety, it is thrown into agonies, and endeavours to avail itſelf of its locomotive power in order to eſcape the danger. In muſcles and oyſters, indeed, we cannot obſerve this principle of ſelf-preſervation ſo ſtrongly, as nature has deprived them of the power of progreſſive motion: but, as we obſerve them conſtantly to uſe the means which nature has given them for ſelf-preſervation, we can have no reaſon to think that they are deſtitute of that principle upon which it is founded.

But there is no need of arguments drawn from the inferior creation.—We ourſelves are poſſeſſed both of the animal and vegetable life, and certainly muſt know whether there is any connection between vegetation and ſenſation or not.—We are conſcious that we exiſt; that we hear, ſee, *&c.*: but of our vegetation we are abſolutely inconſcious. We feel a pleaſure, for inſtance, in gratifying the calls of hunger, and thirſt; but of the proceſs by which our aliment is formed into chyle, the chyle mixed with the blood, the circulation of that fluid, and the ſeparation of all the humours from it, we are altogether ignorant. If we then, who are more perfect than other vegetables, are utterly inſenſible of our own vegetable life, why ſhould we imagine that the leſs perfect vegetables are ſenſible of it?

To illuſtrate our reaſoning here by an example.—The direction of the roots of the plane-tree mentioned by Lord Kaimes, ſhews as much ſagacity, if we are to look only to the outward action, as can be obſerved in any motion of the moſt perfect animal whatever; nevertheleſs, we have not the leaſt ſuſpicion, either that the tree ſaw the ground at a diſtance, or that it was informed of its being there by the reſt of its roots. If a wound is made in the body of a man, and a loſs of ſubſtance is to be repaired, the ſame ſagacity will be obſerved in the arrangement of the fibres, not only as if they were animated, but they will diſpoſe of themſelves ſeemingly with a degree of wiſdom far ſuperior to what we have any idea of; yet this is done without our having the leaſt knowledge either how it is done, or of its being done at all. We have therefore in ourſelves a demonſtration, that vegetable life acts without knowing what it does: and if vegetables are ignorant of their moſt ſagacious actions, why ſhould we ſuſpect that they have a ſenſation, let it be ever ſo obſcure, of any of their inferior ones, ſuch as contracting from a touch, turning towards the ſun, or advancing to meet a pole?

Thus we may eaſily give Mr Buffon a reaſon why we aſcribe ſenſation to an oyſter, and none to a vegetable; namely, becauſe we perceive the vegetable do nothing but what is alſo performed in our own bodies, without our having the leaſt ſenſation of it; whereas an oyſter puts itſelf in a defenſive poſture on the approach of danger; and this being an action ſimilar to our own upon a like occaſion, we conclude that it proceeds from the ſame principle of ſenſation. Here it may alſo be obſerved, that though the inferior animals are deficient in the number, they are by no means ſo in the acuteneſs, of their ſenſations; on the contrary, though a muſcle or an oyſter is probably endowed with no other ſenſe than that of feeling, yet this ſenſe is ſo exquiſite, that it will contract upon the ſlighteſt touch, ſuch as we would be altogether inſenſible of.

As to that power of contractility, or irritability, which is obſerved in ſome plants; our ſolids have it, when deprived both of vegetable and animal life: for a muſcle, cut out of a living body, will continue to contract, if it is irritated by pricking it, after it has neither ſenſation nor vegetation.

A very good moral reaſon may alſo be adduced why we do not believe vegetables to be endowed with ſenſation.—Had they been ſo, we muſt ſuppoſe them to ſuffer pain when they are cut or deſtroyed; and, if ſo, what an unhappy ſtate muſt they be in, who have not the leaſt power to avoid the injuries daily offered them? In fact, the goodneſs of the Deity is very conſpicuous in not giving to vegetables the ſame ſenſations as to animals; and, as he hath given them no means of defence, though we had not been told it by himſelf, we might have known that he gave them for food to animals; and, in this caſe, to have endowed them with ſenſation would have been a piece of cruelty. Though animals without number prey upon one another, yet all of them have ſome means of defence; from whence we may juſtly conclude, that their mutual deſtruction was not an original appointment of the creator, but what he foreſaw would happen in a courſe of time, and which he therefore gave every one of them ſome means of guarding againſt. It may no doubt be here objected, that the giving ſome means of ſelf defence to every animal cannot be reckoned a ſufficient proof that it was not the original deſign of the Creator that they ſhould be deſtroyed, ſeeing theſe means are not always effectual for their preſervation.—This objection, however, cannot be completely obviated without a ſolution of the queſtion concerning the origin of evil among the works of a perfectly good Being. But whatever difficulty there may be in ſolving this queſtion, it is certain, that, as ſome means of ſelf-defence is given to every animal, it has been the original deſign of the Creator, that, in all caſes, one ſpecies of animals ſhould not be deſtroyed at the pleaſure of any other ſpecies; and as no means of ſelf-defence is given to any vegetable, it is as plain, that they have been deſtined for a prey to every ſpecies of animals that had acceſs to them. Philoſophers have inſiſted much on the neceſſity of one animal's devouring another, that there might be room ſufficient for all; but this, ſo far from being a ſyſtem worthy of the divine wiſdom, ſeems to us to be a reflection upon it, as if the author of nature could not have found means to preſerve the life of one part of his creatures, without the deſtruction and miſery of the reſt. The ſacred writings leave us at no loſs to ſee how this carnivorous diſpoſition came in; and, in the next world, this piece of perfection, (as the ſanguinary philoſophers abovementioned would have it to be), ſeems to be left out; for there, it is ſaid, “They ſhall not hurt “nor deſtroy, the lion ſhall eat ſtraw like the ox, and “there ſhall be no more pain.”

When ſpeaking of the food of plants, we took occaſion to mention a certain power, totally different from that of attraction or repulſion, by which the food of a plant, after it was attracted, or otherwiſe brought to it, was aſſimilated to its ſubſtance. This power, which we there diſtinguiſh by the name of *tranſmutation*, belongs in a more eminent degree to animals. The alimentary ſubſtance is changed into two kinds of matter. (1.) An excrementitious one, which paſſes off through the inteſtines; and (2.) A fluid, which is the direct pabulum of the animal. Different ſubſtances, however, are not equally changeable by this proceſs. The human ſtomach is not capable of acting upon any animal ſubſtance till it has loſt its vital principle: the ſtomachs of ſome animals cannot act upon creatures of their own ſpecies: ſome have an apparatus for grinding their food after it is ſwallowed, &c. and there are no animals but what are ſubject to death by taking certain ſubſtances into their ſtomach. Some ſubſtances alſo, though they reſiſt the action of the ſtomach, and paſs unchanged into the ſyſtem, produce no bad effects. Thus, madder will turn the bones of animals red; rhubarb will communicate its purgative nature to the milk, and its deep yellow colour to the urine.—All theſe changes, however, ſeem to belong to the vegetative part of our ſyſtem: for as every one of them are performed without our knowledge of the manner how; and not only ſo, but while we are abſolutely unconſcious of their being done; we can have no reaſon to ſuppoſe, that the *animal* life, properly ſo called, is at all connected with them, any farther than as they are at preſent the means of preſerving the creature alive, and making the connexion betwixt the principle of life and this viſible creation.

The deſcription, hiſtory, and claſſing of animals, makes not only a conſiderable, but the moſt excellent, part of Natural Hiſtory, known by the name of *Zoology*. See the article ZOOLOGY.

For particulars relating to different animals, their analogous ſtructure, ſagacity, inſtinct, peculiarities, &c. ſee COMPARATIVE *Anatomy*, INSTINCT, MIGRATION, PAIRING, AMPHIBIOUS, BIRD, FISH, QUADRUPED, *&c.* SINGING, NIDIFICATION, VIVIPAROUS, OVIPAROUS, *&c.*

ANIMAL, uſed adjectively, denotes any thing belonging to, or partaking of, the nature of animals. Thus, animal actions, thoſe that are peculiar to animals; ſuch are ſenſation and muſcular motion.

ANIMAL *Earth*. See CHEMISTRY, n° 38.

ANIMAL FLOWER, in zoology, a name given to ſeveral ſpecies of animals belonging to the genus of *Actinia* of Linnæus (A). They have likewiſe been diſtinguiſhed by the names of *Urtica Marina*, or *Sea-nettle*, from their ſuppoſed property of ſtinging; and *Sea-anemone*, from their claws or tentacles being diſpoſed in regular circles, and tinged with a variety of bright lively colours, reſembling the petals of ſome of our moſt beautiful flowers. As to one ſpecies particularly, mentioned by Abbe Diequemarre, (Phil. Tranſ. for 1773, art 37.) the pureſt white, carmine, and ultramarine, are ſaid to be ſcarce ſufficient to expreſs their brilliancy. The bodies of ſome of them are hemiſpherical, of others cylindrical, and of others ſhaped like a fig. Their ſubſtance likewiſe differs; ſome are ſtiff and gelatinous, others fleſhy and muſcular; but all of them are capable of altering their figure when they extend their bodies and claws in ſearch of food. They are found in many of the rocky coaſts of the Weſt In-

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(A) The name of this genus happened to be omitted in the order of the alphabet. It belongs to the order of Vermis Molluſca; and its characters are theſe: The body is oblong, round, affixing itſelf to ſome other ſubſtance; the top dilatable, ſurrounded with numberleſs tentacula; mouth the only aperture, and furniſhed with crooked teeth.

dia iſlands, and likewiſe on ſome parts of the coaſt of England.

They have only one opening, which is in the centre of the uppermoſt part of the animal; round this are placed rows of fleſhy claws; this opening is the mouth of the animal, and is capable of great extenſion. The animals themſelves, though exceedingly voracious, will bear long faſting. They may be preſerved alive a whole year, or perhaps longer, in a veſſel of ſea-water, without any viſible food; but, when food is preſented, one of them will ſucceſſively devour two muſcles in their ſhells, or even ſwallow a whole crab as large as a hen's egg. In a day or two the crab-ſhell is voided at the mouth, perfectly cleared of all the meat. The muſcle-ſhells are likewiſe diſcharged whole, with the two ſhells joined together, but entirely empty, ſo that not the leaſt particle of fiſh is to be perceived on opening them. An anemone of one ſpecies will even ſwallow an individual of another ſpecies; but, after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening alſo it produces its young ones alive, already furniſhed with little claws, which, as ſoon as they fix themſelves, they begin to extend in ſearch of food.

One of the extremities of the ſea-anemone reſembles, as we have ſaid, the outward leaves of that flower; while its limbs are not unlike the ſhag or inner part of it. By the other extremity it fixes itſelf, as by a ſucker, to the rocks or ſtones lying in the ſand; but it is not totally deprived of the power of progreſſive motion, as it can ſhift its ſituation, though very ſlowly.

A particular ſpecies of animal-flowers has been found in ſome of the iſlands ceded to Britain at the laſt treaty of peace with France; and the following account of them was publiſhed in the Philoſophical Tranſactions, vol. 57. by Mr Ellis, in a letter to Lord Hillſborough.

“ This compound animal, which is of a tender fleſhy ſubſtance, conſiſts of many tubular bodies, ſwelling gently towards the upper part, and ending like a bulb or very ſmall onion; on the top of each is its mouth, ſurrounded by one or two rows of tentacles, or claws, which when contracted look like circles of beads.

“ The lower part of all theſe bodies have a communication with a firm fleſhy wrinkled tube, which ſticks faſt to the rocks, and ſends forth other fleſhy tubes, which creep along them in various directions. Theſe are full of different ſizes of theſe remarkable animals, which riſe up irregularly in groupes near to one another.

“ This adhering tube, that ſecures them faſt to the rock, or ſhelly bottom, is worthy of our notice. The knobs that we obſerve, are formed in ſeveral parts of it by its inſinuating itſelf into the inequalities of the coral rock, or by graſping pieces of ſhells, part of which ſtill remain in it, with the fleſhy ſubſtance grown over them.

“ This ſhews us the inſtinct of nature, that directs theſe animals to preſerve themſelves from the violence of the waves, not unlike the anchoring of muſcles, by their fine ſilken filaments that end in ſuckers; or rather like the ſhelly baſis of the ſerpula, or worm-ſhell, the tree-oyſter, and the ſlipper barnacle, &c. whoſe baſes conform to the ſhape of whatever ſubſtance they fix themſelves to, graſping it faſt with their teſtaceous claws, to withſtand the fury of a ſtorm.

“ When we view the inſide of this animal diſſected lengthwiſe, we find like a little tube leading from the mouth to the ſtomach, from whence there riſe eight wrinkled ſmall guts, in a circular order, with a yellowiſh ſoft ſubſtance in them; theſe bend over in the form of arches towards the lower part of the bulb, from whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleſhy adhering tube, where ſome of them may be perceived entering into a papilla, or the beginning of an animal of the like kind, moſt probably to convey it nouriſhment till it is provided with claws: the remaining part of theſe ſlender guts are continued on in the fleſhy tube, without doubt for the ſame purpoſe of producing and ſupporting more young ones from the ſame common parent.

“ The many longitudinal fibres that we diſcover lying parallel to each other, on the inſide of the ſemi-tranſparent ſkin, are all inſerted in the ſeveral claws round the animal's mouth, and are plainly the tendons of the muſcles for moving and directing the claws at the will of the animal: theſe may be likewiſe traced down to the adhering tube.

“ As this ſpecimen has been preſerved in ſpirits, the colour of the animal, when living, cannot be certainly known; it is at preſent of a pale yellowiſh brown.

“ With regard to its name, it may be called *Actinia Sociata*, or the *Cluſter Animal-flower*.”

The abbé Dicquemarre, by many curious, though cruel experiments related in the Phil. Tranſ. for 1773, has ſhewn that theſe animals poſſeſs, in a moſt extraordinary degree, the power of reproduction; ſo that ſcarce any thing more is neceſſary to produce as many ſea-anemonies as we pleaſe, than to cut a ſingle one into as many pieces. A ſea-anemone being cut in two by a ſection through the body, that part, where the limbs and mouth are placed, eat a piece of a muſcle offered to it ſoon after the operation, and continued to feed and grow daily for three months after. The food ſometimes paſſed through the animal; but was generally thrown up again, conſiderably changed, as in the perfect ſea-anemone. In about two months, two rows of limbs were perceived growing out of the part where the inciſion was made. On offering food to this new mouth, it was laid hold of and eat; and the limbs continually increaſing, the animal gradually became as perfect as thoſe which had never been cut. In ſome inſtances, however, he found, that, when one of theſe creatures was cut through, new limbs would be produced from the cut place, thoſe at the mouth remaining as before; ſo that a monſtrous animal was the conſequence, having two mouths, and feeding at both ends. Having put ſome of them into a pan of water, ſet over a ſlow fire, he found that they loſt their life at 50 degrees of Reamur's thermometer. To avoid the imputation of cruelty in theſe experiments, the author argues the favourable conſequences that have attended his operations on the ſea-anemonies which have been ſo fortunate as to fall into his hands; as he hath not only multiplied their exiſtence, but alſo renewed their youth; which laſt, he adds, “ is ſurely no ſmall advantage.”

In Hughe's Natural Hiſtory of Barbadoes an account is alſo given of ſeveral ſpecies of animal-flowers. They are there deſcribed as only found in a baſon in one particular cave; and of the moſt remarkable ſpecies mentioned by him we have the following deſcription.

"In the middle of the baſon, there is a fixed ſtone, or rock, which is always under water. Round its ſides, at different depths, ſeldom exceeding 18 inches, are ſeen, at all times of the year, iſſuing out of little holes, certain ſubſtances that have the appearance of fine radiated flowers, of a pale yellow, or a bright ſtraw colour, ſlightly tinged with green, having a circular border of thick-ſet petals, about the ſize of, and much reſembling, thoſe of a ſingle garden-marigold, except that the whole of this ſeeming flower is narrower at the diſcus, or ſetting on of the leaves, than any flower of that kind.

"I have attempted to pluck one of theſe from the rock, to which they are always fixed; but never could effect it. For as ſoon as my fingers came within two or three inches of it, it would immediately contract cloſe together its yellow border, and ſhrink back into the hole of the rock; but, if left undiſturbed for about four minutes, it would come gradually in ſight, expanding, though at firſt very cautiouſly, its ſeeming leaves, till at laſt it appeared in its former bloom. However, it would again recoil, with a ſurpriſing quickneſs, when my hand came within a ſmall diſtance of it. Having tried the ſame experiment by attempting to touch it with my cane, and a ſmall ſlender rod, the effect was the ſame.

"Though I could not by any means contrive to take or pluck from the rock one of theſe animals entire; yet I once cut off (with a knife which I had held for a long time out of ſight, near the mouth of an hole out of which one of theſe animals appeared) two of theſe ſeeming leaves. Theſe, when out of the water, retained their ſhape and colour; but, being compoſed of a membrane-like ſubſtance, ſurpriſingly thin, it ſoon ſhrivelled up, and decayed."

The reproductive power of the Barbadoes animal-flower is prodigious. Many people coming to ſee theſe ſtrange creatures, and occaſioning ſome inconvenience to a perſon through whoſe grounds they were obliged to paſs, he reſolved to deſtroy the objects of their curioſity; and, that he might do ſo effectually, cauſed all the holes out of which they appeared, to be carefully bored and drilled with an iron inſtrument, ſo that we cannot ſuppoſe but their bodies muſt have been entirely cruſhed to a pulp: nevertheleſs, they again appeared in a few weeks, from the very ſame places.

Plate XXIV. fig. 1. repreſents the actinia ſociata, or cluſtered animal-flower, deſcribed by Mr Ellis, with its radical tube adhering to a rock: (a) One of the animals ſtretching out its claws. Fig. 2. A perpendicular diſſection of one of the bodies, to ſhew the gullet, inteſtines, ſtomach, and fibres or tendons that move the claws: (a) A young one ariſing out of the adhering tube. Fig. 3. The actinia aſter, or animal-flower of the newly ceded iſlands. Fig. 4. The actinia anemone, or ſea-anemony from the ſame place. Fig. 5. The under part of the ſame by which it adheres to the rocks. Fig. 6. The actinia helianthus, or the ſea-ſun-flower from ditto. Fig. 7. The under part of the ſame. Fig. 8. The actinia dianthus, or ſea-carnation, from the rocks at Haſtings in Suſſex. This animal adheres by its tail, or ſucker, to the under part of the projecting rocks oppoſite to the town; and, when the tide is out, has the appearance of a long white fig: this is the form of it when put into a glaſs of ſea-water. It is introduced here as a new variety of this animal not yet deſcribed.

ANIMAL *Spirits*. See NERVOUS *Fluid*.

ANIMAL *Subſtances*. See CHEMISTY, n° 62, 519.

ANIMAL *Syſtem* denotes the whole claſs of beings endowed with animal life, otherwiſe called *Animal Kingdom*.

Pairing of ANIMALS. See PAIRING.

ANIMALCULE, in general, ſignifies a little animal; and thus the term might be applied to every animal which is conſiderably inferior in ſize to ourſelves. It hath been cuſtomary, however, to diſtinguiſh by the name of *animalcules* only ſuch animals as are of a ſize ſo diminutive, that their true figure cannot be diſcerned without the aſſiſtance of glaſſes; and more eſpecially it is applied to ſuch as are altogether inviſible to the naked eye, and cannot even be perceived to exiſt but by the aſſiſtance of microſcopes.

1
Common acceptation of the word.

By the help of magnifying glaſſes, we are brought into a kind of new world; and numberleſs animals are diſcovered, which from their minuteneſs muſt otherwiſe for ever have eſcaped our obſervation: and how many kinds of theſe inviſibles there may be, is ſtill unknown; as they are diſcerned of all ſizes, from thoſe which are barely inviſible to the naked eye, to ſuch as reſiſt the action of the microſcope, as the fixed ſtars do that of the teleſcope, and with the beſt magnifiers hitherto invented appear only as ſo many moving points.

2
Different ſizes of animalcules.

The ſmalleſt living creatures our inſtruments can ſhew are thoſe that inhabit the waters: for though poſſibly animalcules equally minute, or perhaps more ſo, may fly in the air, or creep upon the earth, it is ſcarce poſſible to bring ſuch under our examination; but water being tranſparent, and confining the creatures in it, we are able, by applying a drop of it to our glaſſes, to diſcover, to a certain degree of ſmallneſs, all that it contains.—Some of the moſt curious of theſe animalcules, which have been deſcribed by microſcopical obſervers, we ſhall here give an account of.

3
Hair-like inſect.

1. *The Hair-like Inſect*. This is ſo called by Mr Baker on account of its ſhape; being extremely ſlender, and frequently an hundred and fifty times as long as broad. The body or middle part, which is nearly ſtraight, appears, in ſome, compoſed of ſuch rings as the windpipe of land-animals is made up of; but in others, ſeems rather ſcaled, or made up of rings that obliquely croſs one another. Its two ends are hooked or bent, pretty nearly in the ſame degree, but in a direction oppoſite to one another; and as no eyes can be diſcerned, it is difficult to judge which is the head or tail. Its progreſſive * motion is very ſingular, being performed by turning upon one end as a centre, and deſcribing almoſt a quarter of a circle with the other, as repreſented in the figure. Its motions are very ſlow, and require much patience and attention in the obſerver. Theſe creatures are ſo ſmall, that millions of millions of them might be contained in an inch ſquare. When viewed ſingly, they are exceedingly tranſparent, and of a beautiful green colour; but when numbers of them are brought together, they become opaque, loſe their green colour, and grow entirely black.

* Pl. XXIV. (A) fig. 1.

4
Its extreme ſmallneſs, &c.

5
Delights in ſociety.

Notwithſtanding the extreme minuteneſs of theſe animalcules, they ſeem to be fond of ſociety; for, after viewing for ſome time a parcel of them taken up at

random,

Plate XXIV

ANIMAL FLOWERS

Fig. 2.

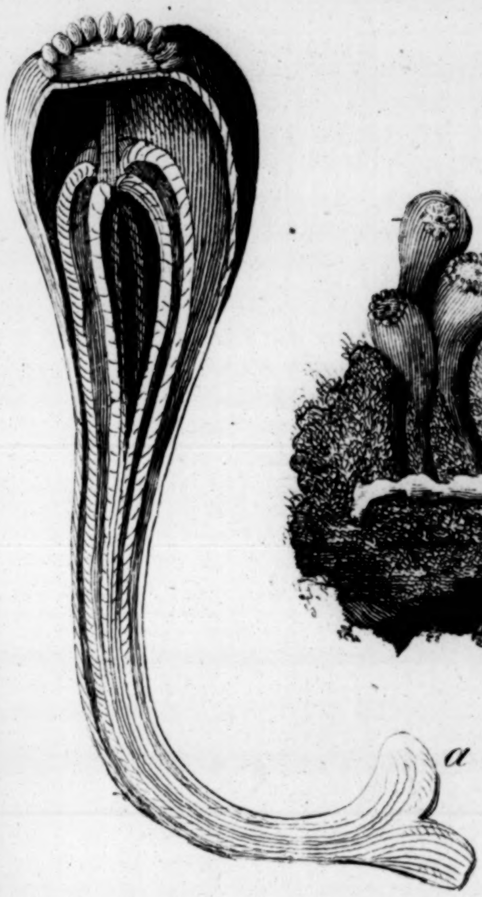


Fig. 1.

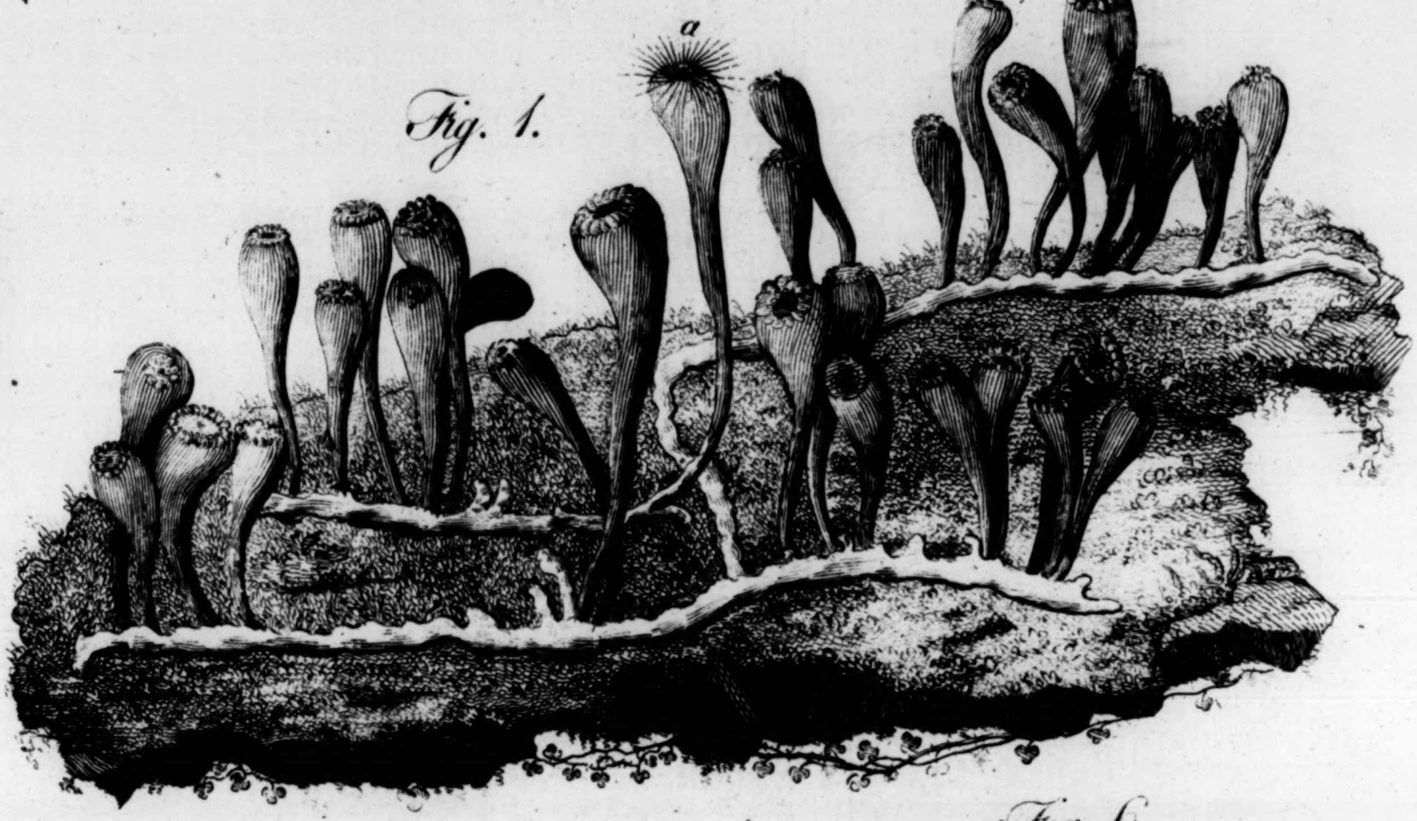


Fig. 6.

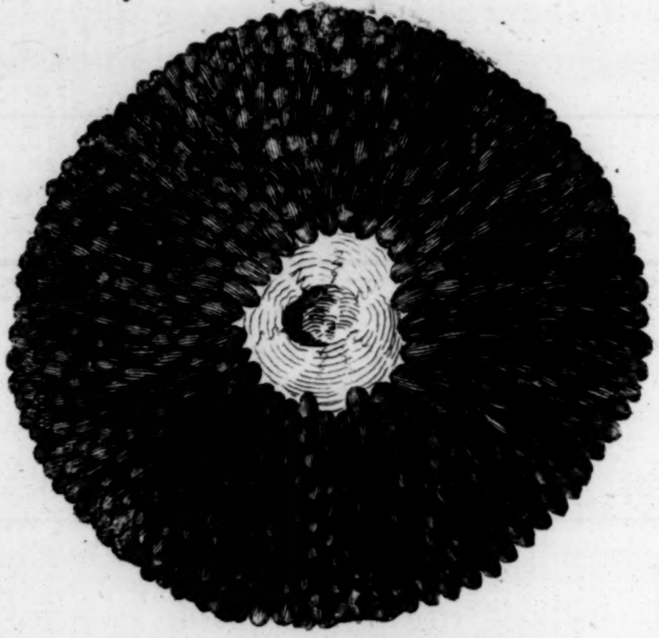


Fig. 4.

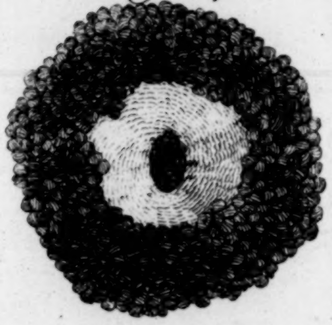


Fig. 3.

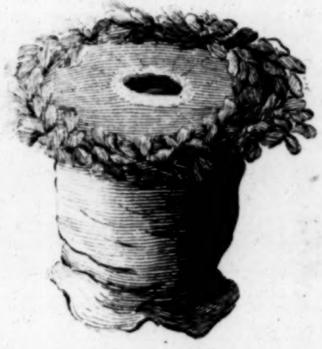


Fig. 7.

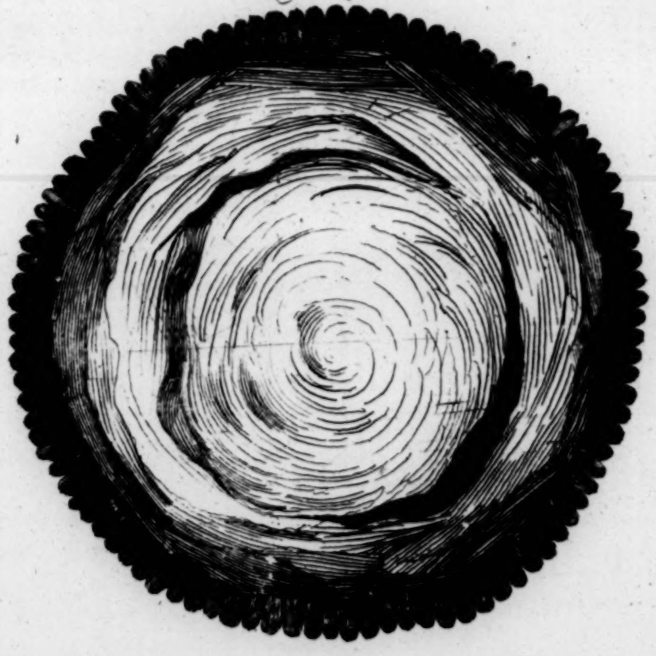


Fig. 8.

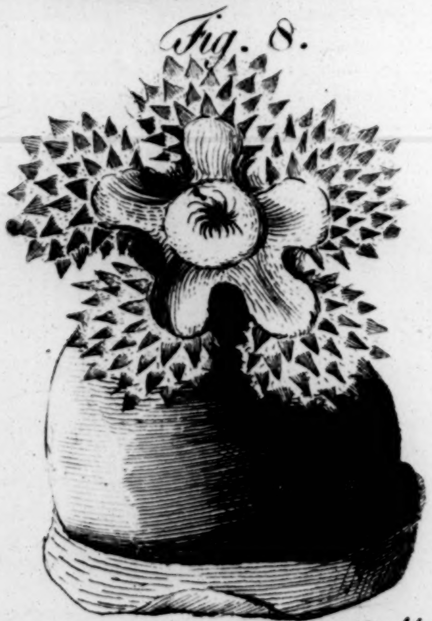
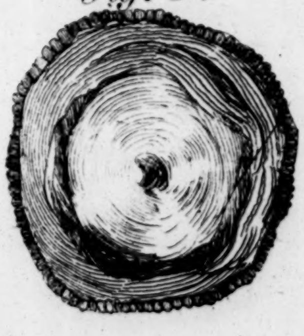


Fig. 5.



A Bell Sculp

3 MA 53

Plate XXIV (A)

† Fig. 2.

random, they will be ſeen diſpoſing themſelves in a kind of regular order †. If a multitude of them are put into a jar of water, they will form themſelves into a regular body, and aſcend ſlowly to the top, where, after they have remained for ſome time expoſed to the air, their green colour changes to a beautiful ſky-blue. When they are weary of this ſituation, they form themſelves into a kind of rope, which ſlowly deſcends as low as they intend; but if they happen to be cloſe to the ſide of the jar, they will deſcend upon it. They are ſo nearly of the ſpecific gravity of water itſelf, that they will either remain at the bottom, float on the ſurface, or be ſuſpended in the middle, according as they are originally placed, or as they themſelves have a mind.

‡ Fig. 3.

6
Seems poſſeſſed of a conſiderable degree of ſagacity.

A ſmall quantity of the matter containing theſe animalcules ‡ having been put into a jar of water, it ſo happened, that one part went down immediately to the bottom, whilſt the other continued floating on the top. When things had remained for ſome time in this condition, each of theſe ſwarms of animalcules began to grow weary of its ſituation, and had a mind to change its quarters. Both armies, therefore, ſet out at the ſame time, the one proceeding upwards, and the other downwards; ſo that, after ſome hours journey, they met in the middle. A deſire of knowing how they would behave on this occaſion engaged the obſerver to watch them carefully; and to his ſurpriſe he ſaw the army that was marching upwards, open to the right and left, to make room for thoſe that were deſcending. Thus, without confuſion or intermixture, each held on its way; the army that was going up, marching in two columns to the top, and the other proceeding in one column to the bottom, as if each had been under the direction of wiſe leaders.

7
Found in prodigious quantity.

The hair-like inſect was firſt diſcovered in a ditch at Norwich, one end of which communicates with the river there, and the other end with a ſecond ditch into which ſeveral kennels empty themſelves. The length of this ditch, when Mr Baker wrote his account of this animalcule, was at leaſt 100 yards, and its breadth nine. The bottom, for more than a foot thick, was covered with a blackiſh green ſubſtance, in appearance like mud, made up for the moſt part of theſe inſects; but, ſuppoſing only an half or a quarter part of it to be compoſed of them, according to the dimenſions we have given, their numbers muſt exceed all imagination.

8
Eels in paſte viviparous.

2. *Eels in paſte*, &c. When paſte is allowed to ſtand till it becomes ſour, it is then found to be the habitation of numberleſs animalcules, which may be diſcerned by the naked eye; and though their form cannot be perfectly diſtinguiſhed, their motion is very perceptible, and the whole paſte will ſeem to be animated. Fig. 4. repreſents one of theſe anguillæ magnified. The moſt remarkable property of theſe inſects is, that they are viviparous. If one of them is cut thro' near the middle, ſeveral oval bodies of different ſizes will be ſeen to iſſue forth. Theſe are young anguillæ, each of them coiled up and incloſed in its proper membrane, which is ſo exquiſitely fine, as ſcarce to be diſcernible by the greateſt magnifier, while it incloſes the embryo animal. The largeſt and moſt forward immediately break through this covering, unfold themſelves, and wriggle about in the water nimbly; others get out, uncoil, and move themſelves about more ſlowly; and the leaſt mature continue entirely without motion. The *uterus*, or veſſel that contains all theſe oval bodies, is compoſed of many ringlets, not unlike the aſpera arteria of land-animals, and ſeems to be conſiderably elaſtic; for as ſoon as the animalcule is cut in two, the oval bodies are thruſt out with ſome degree of violence, from the ſpringing-back or action of this bowel. An hundred and upwards of the young ones have been ſeen to iſſue from the body of one ſingle eel, whereby the prodigous increaſe of them may be accounted for; as probably ſeveral ſuch numerous generations are produced in a ſhort time. They ſeem to be all prolific; and unleſs trial happens to be made upon one that has brought forth all its young, or when the paſte has been kept for a very long time, the experiment will always ſucceed.—This property of theſe eels being viviparous, renders it highly improbable that they ever become flies.

Plate XXIV (A)

9
Similar creatures found in blighted wheat.

Animalcules of a ſimilar kind are likewiſe found in vinegar; and like thoſe already deſcribed, are found to be viviparous. But it is not only in acid matters that ſuch appearances are obſerved. In ſome fields of wheat, many grains may be obſerved, that appear blackiſh outwardly, as if ſcorched; but, when opened, are found to contain a ſoft white ſubſtance, which, attentively conſidered, appears to be nothing elſe than a congeries of threads or fibres lying cloſe to each other in a parallel direction, much reſembling the unripe down of ſome thiſtles on cutting open the flower-heads before they begin to blow. This fibrous matter diſcovers not the leaſt ſign of life or motion, unleſs water is applied; but immediately on wetting, provided the grains of wheat have been newly gathered, the ſuppoſed fibres ſeparate, and appear to be living creatures. Their motions at firſt are very languid; but gradually become more vigorous, twiſting and wriggling themſelves ſomewhat in the manner of the eels in paſte, but always ſlower than they, and with a great deal of leſs regularity.

10
How diſcoverable.

11
Precautions neceſſary in making the experiment.

If the grains of wheat are grown dry by keeping, and in that condition are cut open, the fibrous matter is very diſtinguiſhable; and, on putting water to it, will ſeparate with great readineſs, and ſeem like fine tubes or threads tapering at both ends: but not the leaſt motion will be perceived till they have been in water for ſeveral hours, and ſometimes they will never move at all. But if the ſame grains are ſteeped in water for three or four hours, or buried for ſome days in the earth till they are fully ſaturated with moiſture, and then opened with a penknife; on taking out a ſmall portion of the white matter carefully, and ſpreading it thin upon a ſlip of glaſs, the animalcules will be ſeen bundled together, and extended longitudinally, but without motion: and though, upon the application of water, they will not revive ſo ſoon as thoſe taken from freſh grains, whoſe moiſture has never been exhaled; yet, after remaining an hour or two in water, they are conſtantly found alive and vigorous, even though the grains have been kept in a dry condition for ſeveral years.—It is neceſſary, however, to adapt, in ſome meaſure, the time of continuing the grains in water or earth to the age and dryneſs of them: for if they are not opened before they are too much ſoftened, the animalcules will be dead; and unleſs the huſks are opened to let thoſe creatures out after they have been ſteeped, they inevitably periſh in them: otherwiſe, they will continue alive in water for many months; and, ſhould the water dry away, may be revived again by giving them a freſh ſupply.

12 Proteus why ſo called.

13 Where found.

3. *The Proteus.* This animalcule has been dignified by Mr Baker with the name of *Proteus*, on account of its aſſuming a great number of different ſhapes, ſo as ſcarce to be known as the ſame animal in its various transformations; and indeed unleſs it be carefully watched while paſſing from one ſhape to another, it will often become ſuddenly inviſible, as happened more than once to Mr Baker.

When water, wherein any ſort of vegetable has been infuſed, or animals preſerved, has ſtood quietly for ſome days, or weeks, in any glaſs or other veſſel, a ſlimy ſubſtance will be collected about the ſides: ſome of which being taken up with the point of a penknife, placed on a ſlip of glaſs in a drop of water, and looked at through the microſcope, will be found to harbour ſeveral kinds of little animals that are ſeldom found ſwimming about at large; among which the proteus is one.

14 Its ſhape, colour, &c.

Its ſhape is better underſtood from the figure, than from any deſcription that could be given. Its ſubſtance and colour ſeems to reſemble that of a ſnail; and its whole ſhape ſeems to bear a conſiderable reſemblance to that of a ſwan. It ſwims to and fro with great vivacity: but will now and then ſtop for a minute or two; during which time its long neck is uſually employed as far as it can reach, forwards, and on every ſide, with a ſomewhat ſlow, but equable motion, like that of a ſnake, frequently extending thrice the length of its body, and ſeemingly in ſearch of food.

There are no eyes, nor any opening in the head like a mouth, to be diſcerned: but its actions plainly prove it to be an animal that can ſee; for though multitudes of different animalcules ſwim about in the ſame water, and its own progreſſive motion is very ſwift, it never ſtrikes againſt any of them, but directs its courſe between them with a dexterity wholly unaccountable ſhould we ſuppoſe it deſtitute of ſight.

15 Its transformations.

When the proteus is alarmed, it ſuddenly draws in its long neck, repreſented in fig. 5. and 6. transforming itſelf into the ſhape repreſented in fig. 7. when it becomes more opaque, and moves about very ſlowly with the large end foremoſt. When it has continued ſome time in this poſture, it will often, inſtead of the head and neck it had formerly, put forth a new one, with a kind of wheel machinery, repreſented fig. 8. the motions of which draw a current of water to it from a conſiderable diſtance. Having often pulled in and thruſt out this ſhort head, ſometimes with and ſometimes without the wheel-work, the creature, as if weary, will remain motionleſs for a while; then its head and long neck will be very ſlowly protruded, as in fig. 9. and it ſoon reſumes its former agility. Sometimes it diſpoſes of its neck and head as repreſented in fig. 10.

16 Vorticella, where found

4. *The Wheel-Animal, or Vorticella.* This wonderful animalcule is found in rain-water that has ſtood ſome days in leaden gutters, or in hollows of lead on the tops of houſes; or in the ſlime or ſediment left by ſuch water; and perhaps may alſo be found in other places: but if the water ſtanding in gutters of lead, or the ſediment left behind it, has any thing of a red colour in it, one may be almoſt certain of finding them therein. Though it diſcovers no ſigns of life except when in the water, yet it is capable of continuing alive for many months after it is taken out of the water, and kept in a ſtate as dry as duſt. In this ſtate it is of a globular ſhape, exceeds not the bigneſs of a grain of ſand, and no ſigns of life appear: but, being put into water, in the ſpace of half an hour, a languid motion begins, the globule turns itſelf about, lengthens itſelf by ſlow degrees, aſſumes the form of a lively maggot, and moſt commonly in a few minutes afterwards puts out its wheels; ſwimming vigorouſly through the water, as if in ſearch of food; or elſe, fixing itſelf by the tail, works the wheels in ſuch a manner as to bring its food to it.

Fig. 23. and 24. ſhew the wheel-animal in its globular form; fig. 11. and 12. in its maggot ſtate; and fig. 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22. ſhew the different appearances of its wheels, and alſo its various intermediate changes between the globular and maggot ſtate.

17 Its wheel-work deſcribed.

The moſt remarkable part of this animalcule is its wheel-work. This conſiſts of a couple of ſemicircular inſtruments, round the edges of which many little fibrillæ move themſelves very briſkly, ſometimes with a kind of rotation, and ſometimes in a trembling or vibrating manner. When in this ſtate, it ſometimes unfaſtens its tail, and ſwims along with a great deal of ſwiftneſs, ſeemingly in purſuit of its prey. Sometimes the wheels ſeem to be entire circles, armed with ſmall teeth like thoſe of the balance-wheel of a watch, appearing projected forwards beyond the head, and extending ſideways ſomewhat wider than its diameter. The teeth or cogs of theſe wheels ſeem to ſtand very regularly at equal diſtances: but the figure of them varies according to their poſition, the degree of their protruſion, and perhaps the will of the animal itſelf. They appear ſometimes like minute oblong ſquares, riſing at right angles from the periphery of a circle, like ancient battlements on a round tower; at other times they terminate in ſharp points, and all together reſemble a kind of Gothic crown. They are often ſeen in a kind of curvular direction, all bending the ſame way, and ſeeming like ſo many hooks; and now and then the ends of them will be perceived to be clubbed like mallets. This figure, however, as well as the firſt, they aſſume but rarely.

18 Shew all the marks of a real rotation.

As theſe wheels are every where exceſſively tranſparent, except about their circular rim or edge, where the cogs are ſet; it is very difficult to determine by what contrivance they are turned about, or what their real figure is, though they ſeem exactly to reſemble wheels moving round upon an axis. It is alſo hardly poſſible to be certain whether thoſe circular bodies in which the teeth are ſet, are of a flat form, or hollow and conical; but they ſeem rather to be of a conical figure. The difficulty of conceiving how an articulation could be contrived ſo as to cauſe a real rotation, hath cauſed many people imagine that there was a deception in this caſe: but Mr Baker aſſures us, that, when the wheels are fully protruded, they never fail to ſhew all the viſible marks of a regular rotation; and, in ſome poſitions, the ſame cogs or teeth may be traced by the eye during a complete revolution.

19 Shews great quickneſs of ſenſation.

All the actions of this creature ſeem to imply ſagacity and quickneſs of ſenſation. At the leaſt touch or motion in the water, they inſtantly draw in their wheels; and Mr Baker conjectures, that their eyes are lodged ſomewhere about the wheels: becauſe, while in the maggot-ſtate, its motions are ſlow and blundering; but, after the wheels are protruded, they are performed with great regularity, ſwiftneſs, and ſteadineſs.

Fig. 15.
20
Deſcription of its internal parts.

Notwithſtanding the minuteneſs of this animalcule, the microſcope generally diſcovers others in the ſame drop of water, compared with which the wheel-animal may be ſaid to be a whale. The tranſparency of its body, therefore, allows its internal parts to be ſeen, which cannot be perceived in the minuteſt animalcules on account of the ſmallneſs of their ſize. *a*, Is the appearance of the head; and, though it is every where tranſparent, a ring or circle more particularly remarkable for its clearneſs is commonly perceived about the middle of the forehead, a little above the mouth. This, Mr Baker thinks, might juſtly be called the ſeat of the brain. Many veſſels which ſeem to take their origin from thence are diſcernible in the head, wherein ſome tranſparent fluid appears continually agitated by a kind of fluctuating motion.

The thorax, *b*, is joined to the head by a very ſhort neck, *c*, and appears to be about the ſixth part of the whole length of the animal. In the middle of the thorax is placed the heart, *d*, where its ſyſtole and diaſtole is plainly viſible. It is ſeen through the back of the inſect, ſhutting and opening alternately with great regularity and exactneſs. Its ſize is proportionable to the creature's bigneſs; and its ſhape, during the ſyſtole, is nearly circular, being compoſed ſeemingly of two ſemilunar parts, which then approach each other laterally, and form between them a roundiſh or horſe-ſhoe like figure, whoſe upper ſide is flat, and the under one convex. The diaſtole is performed by a ſeeming ſeparation, or opening, of theſe two ſemilunar parts, whereby the tranſverſe diameter of the heart is very much enlarged. This ſeparation begins exactly in the middle of the lower part next the tail; and opens to ſuch a conſiderable width upwards, that the two parts, when at their utmoſt diſtenſion, ſeem only joined by an arched veſſel at their anterior end. The alternate motions of contraction and dilatation are performed with great ſtrength and vigour, in pretty much the ſame time as the pulſations of the arteries of a man in health. The motions of the heart are communicated to all the internal parts of the thorax; and ſeem to extend a great deal further; for a ſtrict examination diſcovers, at the ſame time, throughout the whole animal, contractions and dilatations going on, that are apparently correſpondent thereto. Theſe motions of the heart, however, are ſometimes ſuſpended, or imperceptible, for two or three minutes; after which they are renewed, and go on again with the ſame regularity as before. From the under part of the thorax proceeds a ſmall tranſparent horn repreſented at *a* fig. 11. and 12. It is never viſible but when the animal turns on its back or ſide.

The blood or circulating fluid of the wheel-animal is ſo abſolutely colourleſs, that the current of it through the veſſels is indiſtinguiſhable by glaſſes. A ſort of irregular agitation of ſome fluid is indeed perceived, which is perhaps a compound motion of currents running different ways, and forming ſuch an appearance, tho' no ſingle current is any where diſtinctly viſible.

Immediately below the thorax is another annular diviſion, *e*, joining upwards to the thorax, and downwards to the abdomen, the entrance whereof it ſerves occaſionally to enlarge or diminiſh. The abdomen, *f*, is by much the largeſt part of the animal, and contains the ſtomach and inteſtines. When the inſect is full of food, theſe bowels appear opaque and of a blood-red colour, extending quite through the belly and great part of the tail, and exhibiting a variety of contractions and dilatations. The belly is capable of ſtretching out greatly in length, or being ſhortened very much, and widening its diameter. It aſſumes many ſhapes, and becomes occaſionally a caſe for all the other parts of the body.

21
Other kinds of wheel-animals.

Beſides the abovementioned one, there are found in the waters ſeveral other ſpecies of animals furniſhed with wheels, ſome of which appear to have a rotatory, and others a vibratory, motion. Fig. 25. repreſents a kind found in the ditch at Norwich, where the hair-like inſect is produced. They differ from the foregoing only in having very long tails. Fig. 26, 27, and 28, repreſent a ſpecies of wheel-animals, which are alſo covered with ſhells. The body of this ſpecies conſiſts of three parts, in like manner as the other; only the thorax and abdomen, in this, are not ſeparated by any gut, or intermediate veſſel, but are joined immediately together. The heart is plainly perceived, having a regular ſyſtole and diaſtole, at *a*, as in the former ſpecies. Theſe creatures occaſionally draw themſelves intirely within their ſhells; and the ſhell then appears terminated by ſix ſhort ſpikes on one ſide, and two on the other.

22
Manner of producing their young ones.

The young ones of this ſpecies are carried in oval ſacculi, or integuments, faſtened externally to the lower-part of their ſhells ſomewhere about the tail: theſe ſacculi are ſometimes opaque only at one end, and ſeemingly empty at the other; ſometimes they appear opaque in the middle, with a tranſparency all round, as in fig. 26. When a young one is about to burſt its integuments, the parent aſſiſts it greatly, by wagging its tail, and ſtriking the oval bag, ſo that the young one's head becomes as it were forced into the water, though the tail cannot be ſo ſoon diſengaged. In this condition the young one ſets its wheels a-going, and exerts all its endeavours to free itſelf from its confinement. When it has got clear, it ſwims away, wagging its tail as the old one does, and leaving the integument adhering to the ſhell of the parent. The old one then uſes a number of efforts to get rid of this incumbrance, ſtriking againſt it with her tail, fixing the end of her tail upon it, and then darting her body forward; with ſeveral very odd motions not eaſy to be deſcribed. This kind of wheel-animals are great tormentors of the water-flea, *Pulex aquaticus arboreſcens* of Swammerdam; of which a figure is given from that author (Plate XXIV. B): fig. 2. ſhews the natural ſize of the flea; and fig. 1. ſhews it magnified, with ſome of the wheel-animals adhering to it. Theſe inſects are often found in great numbers in the ſame waters: and when that is the caſe, it is not uncommon to diſcover five or ſix of theſe cruſtaceous wheel-animals faſtened by their tail to the ſhell or horns of the flea; cauſing it, ſeemingly, a vaſt deal of uneaſineſs; nor can they be driven away, or ſhaken off, by all the efforts the flea can uſe for that purpoſe.

Fig. 28. *b*.

23
Infeſt the Pulex Aquaticus.

24
Bell-flower animal.

5. *The Bell-flower Animal*, or *Plumed Polype*. Theſe animalcules dwell in colonies together, from ten to fifteen, (ſeldom falling ſhort of the former number, or exceeding the latter), in a ſlimy kind of mucilaginous or gelatinous caſe; which, out of the water, has no determined form, appearing like a little lump of ſlime; but,

Plate XXIV (A)

25 Where diſcovered.

but, when expanded therein, has ſome reſemblance to the figure of a bell with its mouth upwards; and is uſually about half an inch long, and a quarter of an inch in diameter. Theſe bells, or colonies, are to be found adhering to the large leaves of duckweed, and other aquatic plants. They may be moſt eaſily diſcovered by letting a quantity of water, with duckweed in it, ſtand quietly for three or four hours in glaſs-veſſels in a window, or other place whence a ſtrong light comes: for then, if any are about the duckweed, they will be found, on careful inſpection, extending themſelves out of their caſes, and making an elegant appearance.

The bell, or caſe, which theſe animals inhabit, being very tranſparent, all the motions of its inhabitants may be diſcerned through it diſtinctly. It ſeems divided internally into ſeveral apartments, or rather to contain ſeveral ſmaller ſacculi, each of which incloſes one of theſe animals. The openings at the tops of theſe ſacculi, are but juſt ſufficient to admit the creature's head and a ſmall part of its body to be thruſt out beyond them, the reſt remaining always in the caſe. It can, however, occaſionally retire into its caſe altogether; and never fails to do ſo when alarmed by any ſudden motion of the water, or of the veſſel which contains it.

26 Motions of the whole colony.

Beſides the particular and ſeparate motion which each of theſe creatures is able to exert within its own caſe, and independent of the reſt; the whole colony together has a power of altering the poſition of the bell, or even of removing it from one place to another; and hence this bell is ſometimes found ſtanding perfectly upright, as in fig. 29 and 33, and ſometimes bending the upper part downwards, as in fig. 30. As theſe animalcules ſeem not to chuſe to ſtay together in ſocieties whoſe number exceeds 15; when the colony happens to increaſe in number, the bell may be obſerved to ſplit gradually, beginning from about the middle of the upper or anterior extremity, and proceeding downwards towards the bottom, as in fig. 32. till they at laſt ſeparate intirely, and become two complete colonies independent of each other, one of which ſometimes removes to another part of the veſſel.

27 Deſcription of an individual.

The arms of each individual of this colony are ſet round the head, to the number of 40, having each the figure of an Italic *ſ*, one of whoſe hooked ends is faſtened to the head; and all together, when expanded, compoſe a figure ſhaped ſomewhat like a horſe's ſhoe, convex on the ſide next the body, but gradually opening and turning outwards, ſo as to leave a conſiderable area within the outer extremities of the arms. When the arms are thus extended, the creature, by giving them a vibrating motion, can produce a current in the water, which brings the animalcules, or whatever other minute bodies are within the ſphere of its action, with great velocity to its mouth, ſituated between the arms; where they are taken in if liked, or driven away by a contrary motion. The food is conveyed immediately from the mouth or opening between the arms, through a narrow neck, into a paſſage ſeemingly correſpondent to the œſophagus in land-animals; down which it paſſes into the ſtomach, where it remains for ſome time, and then is voided upwards, in ſmall round pellets, thro' a gut whoſe exit is near the neck. The body conſiſts of three diviſions; in the uppermoſt of which are contained all the abovementioned inteſtines, which are only to be diſcerned when the creature is full, at which time they become opaque. The other two diviſions, which are probably fixed to the bell, ſeem to be of no other uſe than to give the creature a power of contraction and extenſion. The arms are not able to contract like thoſe of the common polypi; but, when the animal retires into its caſe, they are brought together in a cloſe and curious order, ſo as to be eaſily drawn in. Though their general appearance when expanded is that of a cup whoſe baſe and top are of an horſe-ſhoe form, they ſometimes ſeparate into four parts, and range themſelves as in fig. 36. ſo as to reſemble four ſeparate plumes of feathers. Tho' their eyes cannot be diſcovered, yet Mr Baker thinks they have ſome perception of the light: for, when kept in the dark, they always remain contracted; but, on being expoſed to the light of the ſun or of a candle, they conſtantly extend their arms, and ſhew evident ſigns of being pleaſed.

28 Seem to have a perception of light.

Fig. 29. repreſents one complete colony or bell ſtanding erect, with all the animals out of their kingdom, and their arms extended, exhibiting all together a very pretty appearance. *a* repreſents two oval bodies, ſuppoſed by Mr Baker to be eggs.

Fig. 30. ſhews all the creatures withdrawn into their cells, and the end of the bell hanging downwards.

Fig. 33. ſhews the bell erect, with only one of the animals coming out, in order to ſhow its connection with the bell.

Fig. 34. ſhews the head and arms of a ſingle polype cloſing together, and diſpoſing themſelves in order to be drawn into the bell.

Fig. 35. ſhews one complete animal greatly magnified, to ſhow its ſeveral parts more diſtinctly; *viz. a*, the head, reſembling an horſe-ſhoe; *bb*, the arms ſeen from one ſide; *c*, the narrow neck; *d*, the œſophagus; *e*, the ſtomach; *f*, the gut or laſt inteſtine thro' which the food paſſes after being digeſted in the ſtomach; *g*, the anus, where the fæces are diſcharged in little pellets; *h i*, that part of the bell which ſurrounds the body of the animal, and cloſes upon it when it retires down.

Fig. 37. the head and arms ſeen in front.

29 Globe-animal.

6. *The Globe-animal.* This animalcule, repreſented fig. 38. ſeems exactly globular, having no appearance of either head, tail, or fins. It moves in all directions, forwards or backwards, up or down, either rolling over and over like a bowl, ſpinning horizontally like a top, or gliding along ſmoothly without turning itſelf at all. Sometimes its motions are ſlow, at other times very ſwift; and, when it pleaſes, it can turn round, as it were upon an axis, very nimbly, without removing out of its place. The whole body is tranſparent, except where the circular black ſpots are ſhewn in the figure. Some of the animals have no ſpots, and others from one to ſeven. The ſurface of the whole body appears, in ſome, as if all over dotted with points; in others, as if granulated like ſhagreen; but their more general appearance is, as if beſet thinly round with ſhort moveable hairs or briſtles, which probably are the inſtruments by which their motions are performed. Theſe animalcules may be ſeen by the naked eye, but appear only like moving points.

30 Pipe-animal.

7. *The Pipe-animal.* Theſe creatures are found on the coaſt of Norfolk, living in ſmall tubes or caſes of ſandy matter, in ſuch multitudes as to compoſe a maſs ſometimes of three feet in length. Fig. 39. ſhews a piece

3 MA 53

Plate XXIV. (A)

ANIMALCULES

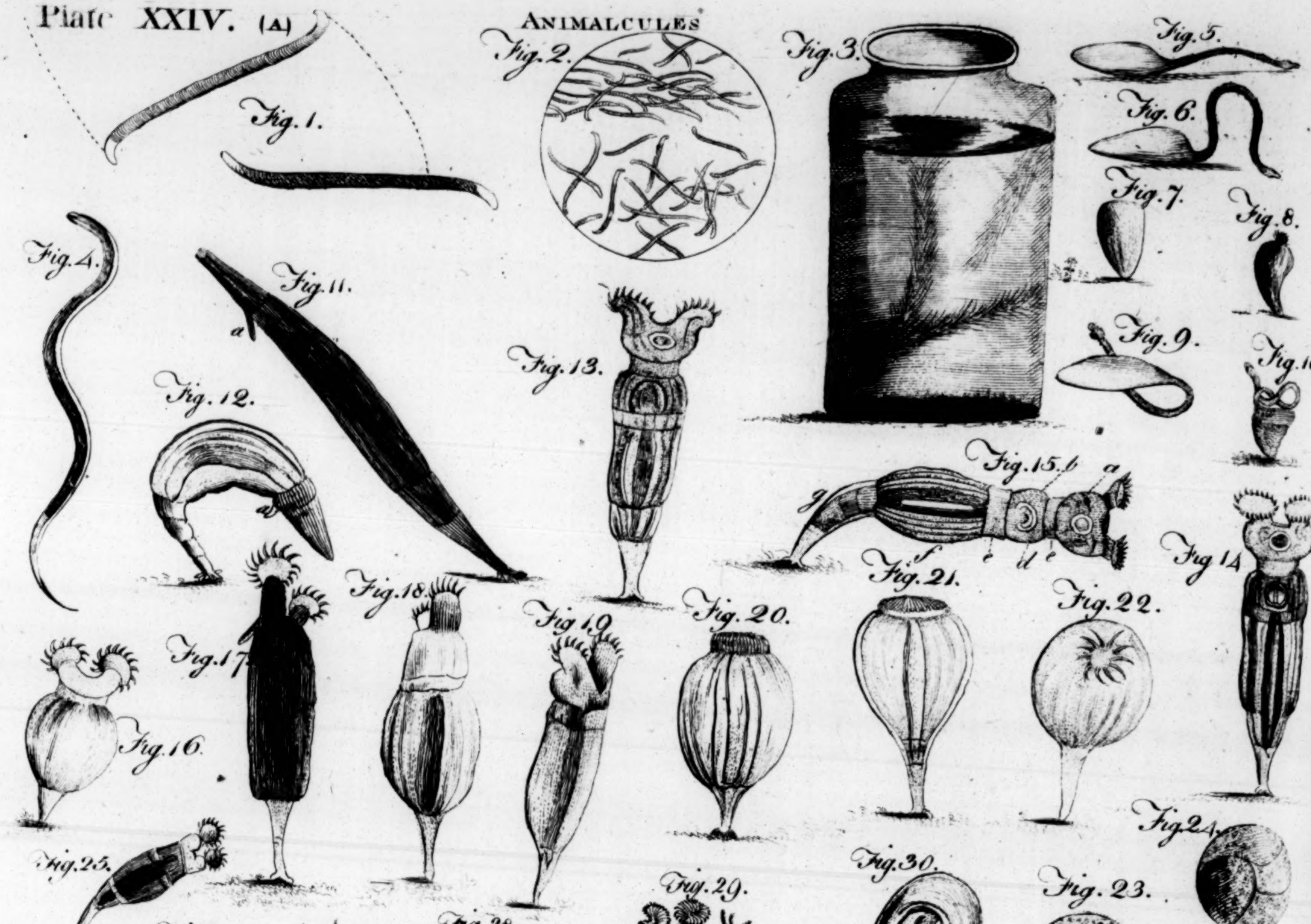


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
a
Fig. 12.
Fig. 13.
Fig. 14
Fig. 15.
a
b
c
d
e
f
g
Fig. 16.
Fig. 17.
Fig. 18.
Fig. 19.
Fig. 20.
Fig. 21.
Fig. 22.
Fig. 23.
Fig. 24.
Fig. 25.
Fig. 26.
a
b
Fig. 27.
a
Fig. 28.
a
Fig. 29.
Fig. 30.
Fig. 31.
Fig. 32.
Fig. 33.
Fig. 34.
Fig. 35
a
b
c
d
f
g
h
Fig. 36.
Fig. 37.
Fig. 38.
Fig. 39.
a
Fig. 40.
a
c
Fig. 41.
Fig. 42.
Fig. 43.

A Bell Sculp.

.8.
Fig. 10
Fig. 43

Animal-cule.

ate XXIV A)

piece of ſuch a congeries broke off, where *a a a a* repreſent the mouths or openings of the pipes wherein the little animals make their abode. Fig. 40. ſhews one ſingle pipe, with its inhabitant, ſeparated from the reſt, and magnified nine or ten times in diameter. The pipe or caſe *b* is made of ſand, intermixed here and there with minute ſhells, and all cemented together by a glutinous ſlime, probably iſſuing from the animal's own body *c*, which is compoſed of muſcular ringlets like thoſe of a worm, capable of great extenſion or contraction. The anterior end or head, *d*, is exceedingly beautiful, having round it a double row of little arms diſpoſed in a very regular order, and probably capable of extenſion, in order to catch its food, and bring it to its mouth.—Some of theſe tubes are found petrified, and conſtitute one ſpecies of *ſyringoides*.

31 ometimes und petri- d.

32 ſect with -like ms.

8. *An Inſect with net-like-arms*. The properties and ſhape of this little animal are very extraordinary. It is found only in caſcades, where the water runs very ſwift. There theſe inſects are found in cluſters, ſtanding erect on their tails; and reſembling, when all together, the combs of bees at the time they are filled with their aureliæ. On being taken out of the water, they ſpin threads, by which they hang exactly in the ſame manner as the garden-ſpider. Fig. 42. ſhews one of theſe inſects magnified. Its body appears curiouſly turned as on a lathe; and at the tail are three ſharp ſpines, on which it raiſes itſelf, and ſtands upright in the water: but the moſt curious apparatus is about its head, where it is furniſhed with two inſtruments like fans or nets, which ſerve to provide its food. Theſe it frequently ſpreads out and draws in again; and when drawn up they are folded together with the utmoſt nicety and exactneſs, ſo as to be indiſcernible when brought cloſe to the body. At the bottom of theſe fans a couple of claws are faſtened to the lower part of the head, which, every time the nets are drawn in, conduct to the mouth of the animal whatever is taken in them. When the creature doth not employ its nets, it thruſts out a pair of ſharp horns, as in fig. 41. where the inſect is ſhewn magnified about 400 times.

Some of theſe creatures being kept with water in a vial, moſt of them died in two days; and the reſt, having ſpun themſelves tranſparent caſes, (which were faſtened either to the ſides of the glaſs, or to pieces of graſs put into it,) ſeemed to be changed into a kind of chryſalis: but before taking this form, they appeared as in fig. 43. which ſhape they likewiſe aſſumed when weary with catching their food, or when lying in wait for it. None of them lived above three days;

33 rpriſing operty of iling wa- .

and though freſh water was given them two or three times a-day, yet in a few hours it would ſtink to a degree ſcarce conceivable, and that too at ſeveral yards diſtance, though, in proportion to the water, all the included inſects were not more than as 1 to 1,150,000. This makes it probable, that it is neceſſary for them to live in a rapid ſtream, leſt they ſhould be poiſoned by the effluvia iſſuing from their own bodies, as no doubt they were in the vial.

34 aquatic m.

9. *A curious aquatic worm*. This animalcule is ſhewn, magnified, at fig. 31. It is found in ditch-water; and is of various ſizes, from $\frac{1}{40}$ to $\frac{1}{2}$ an inch in length. About the head it has ſomewhat of a yellowiſh colour; but all the reſt of the body is perfectly colourleſs and tranſparent, except the inteſtines, which are conſiderably opaque, and diſpoſed as in the figure. Along its ſides are ſeveral papillæ, with long hairs growing from them: it has two black eyes, and is very nimble. But the moſt remarkable thing in this creature, is a long horn or proboſcis; which, in the large ones, may be ſeen with the naked eye, if the water is clear, and is ſometimes $\frac{1}{10}$ of an inch in length: this it waves to and fro as it moves in the water, or creeps up the ſide of the glaſs; but it is not known whether it is hollow, or of what uſe it is to the creature itſelf.

Animal-cule.

Plate XXIV (B)

35 Its horn or proboſcis.

36 Spermatic animals, when diſcovered.

10. *Spermatic Animals*, and *Animalcula Infuſoria*. The diſcovery of living animalcules in the ſemen of moſt animals, is claimed by Mr Lewenhoek and Mr Nicholas Hartſoeker; who both ſay, they publiſhed it about the end of the year 1677, or beginning of 1678: but Mr Lewenhoek having given the moſt particular deſcription of, and made by far the greateſt number of experiments concerning them, the diſcovery is commonly attributed to him.

37 General appearance the ſame in every animal.

According to this naturaliſt, theſe animalcules are found in the ſemen maſculinum of every kind of animal; but their general appearance is very much the ſame, nor doth their ſize differ in proportion to the bulk of the animal to which they belong. The bodies of all of them ſeem to be of an oblong oval form, with long tapering ſlender tails iſſuing from them; and as by this ſhape they reſemble *tadpoles*, they have been frequently called by that name; tho' the tails of them, in proportion to their bodies, are much longer than the tails of tadpoles are: and it is obſervable, that the animalcules in the ſemen of fiſhes, have tails much longer and more ſlender, than the tails of thoſe in other animals; inſomuch, that the extremity of them is not to be diſcerned without the beſt glaſſes, and the utmoſt attention. Fig. 21. N° 1, 2, 3, 4, repreſent the ſpermatic animalcula of the rabbit; and N° 5, 6, 7, 8, thoſe of a dog; according to Mr Lewenhoek.

Plate XXIV (B)

38 Inconceivable numbers and minuteneſs.

The numbers of theſe animalcula are inconceivable. On viewing with a microſcope, the milt, or ſemen maſculinum of a living cod-fiſh, innumerable multitudes of animalcules were found therein, of ſuch a diminutive ſize, that he ſuppoſed at leaſt 10,000 of them capable of being contained in the bulk of a grain of ſand; whence he concludes, that the milt of this ſingle fiſh contained more living animalcules than there are to be found people living in the whole world. To find the comparative ſize of theſe animalcules, Mr Lewenhoek placed an hair of his head near them; which hair, through his microſcope, appeared an inch in breadth; and he was ſatisfied, that at leaſt 60 ſuch animalcules could eaſily lie within that diameter; whence, their bodies being ſpherical, it follows, that 216,000 of them are but equal to a globe whoſe diameter is the breadth of a hair. He obſerved, that, when the water wherewith he had diluted the ſemen of a cod-fiſh was exhaled, the little bodies of the animalcules burſt in pieces; which did not happen to thoſe in the ſemen of a ram: and this he imputes to the greater firmneſs and conſiſtency of the latter, as the fleſh of a land-animal is more compact than fiſh.

39 Are continually in motion.

Theſe animalcules appear to be very vigorous, and tenacious of life; for they may be obſerved to move long after the animal from which they are taken is dead. They have this peculiarity alſo, that they are continually in motion, without the leaſt reſt or intermiſſion, provided there is fluid ſufficient for them to ſwim about in. Theſe animalcula are peculiar to the ſemen; nothing that has the leaſt token of life being diſcovered, by the beſt glaſſes, either in the blood, ſpittle, urine, gall, or chyle. Great numbers, however, are to be found in the whitiſh matter that ſticks between the teeth; ſome of which are of an oval figure, and others reſemble eels.

40 Animalcula Infuſoria.

The *Animalcula Infuſoria*, take their name from their being found in all kinds either of vegetable or animal infuſions. Indeed, there is ſcarce any kind of water, unleſs impregnated with ſome mineral ſubſtance, but what will diſcover living creatures.—Mr Lewenhoek ſays, that at firſt he could diſcern no living creatures in rain-water; but after ſtanding ſome days, he diſcovered innumerable animalcules, many thouſands of times leſs than a grain of ſand, and in proportion to a mite as a bee is to a horſe.—In other rain-water, which had likewiſe ſtood ſome time, he found the ſmalleſt ſort he had ever ſeen; and, in a few days more, met with others eight times as big as theſe, and almoſt round.—In another quantity of rain-water, that had been expoſed like the former, he diſcovered a kind of animalcules with two little horns in continual motion. The ſpace between the horns was flat, though the body was roundiſh, but tapering a little towards the end; where a tail appeared, four times as long as the body, and the thickneſs of a ſpider's web. He obſerved ſeveral hundreds of theſe within the ſpace a grain of ſand would occupy. If they happened on the leaſt filament or ſtring, they were entangled in it; and then would extend their bodies into an oblong round, and ſtruggle hard to diſengage their tails. He obſerved a ſecond ſort of an oval figure, and imagined the head to ſtand at the ſharpeſt end. The body was flat, with ſeveral ſmall feet moving exceeding quick, but not diſcernible without a great deal of attention. Sometimes they changed their ſhape into a perfect round, eſpecially when the water began to dry away. He met alſo with a third ſort, twice as long as broad, and eight times ſmaller than the firſt: yet in theſe he diſcerned little feet, whereby they moved very nimbly. He perceived likewiſe a fourth ſort, a thouſand times ſmaller than a louſe's eye, and which exceeded all the reſt in briſkneſs: he found theſe turning themſelves round, as it were upon a point, with the celerity of a top. And he ſays, there were ſeveral other ſorts.

41 Mr Lewenhoek's account of animalcules in rain-water.

42 Surpriſing production of theſe animalcules.

The production of *animalcula infuſoria* is very ſurpriſing. In four hours time, an infuſion of cantharides has produced animalcula leſs than even the tails of the ſpermatic animals we have already deſcribed. Neither do they ſeem to be ſubject to the fate of other animals; but, ſeveral kinds of them at leaſt, by dividing themſelves in two, to enjoy a ſort of immortality. Nor do the common methods by which other animals are deſtroyed, ſeem to be effectual for deſtroying their vital principle. Hot mutton-gravy, ſecured in a vial with a cork, and afterwards ſet among hot aſhes to deſtroy as effectually as poſſible every living creature that could be ſuppoſed to exiſt in it, has nevertheleſs been found ſwarming with animalcules after ſtanding a few days. In the Philoſophical Tranſactions, Vol. LIX. we have the following curious account, given us by Mr Ellis, of animalcules produced from an infuſion of potatoes and of hempſeed.

43 Mr Ellis's account of animalcules from infuſion of potatoes.

“ On the 25th of May 1768, Fahrenheit's thermometer 70°, I boiled a potatoe in the New-River water till it was reduced to a mealy conſiſtence. I put part of it, with an equal proportion of the boiling liquor, into a cylindrical glaſs-veſſel that held ſomething leſs than half a wine-pint, and covered it cloſe immediately with a glaſs-cover. At the ſame time, I ſliced an unboiled potatoe; and, as near as I could judge, put the ſame quantity into a glaſs-veſſel of the ſame kind; with the ſame proportion of New River water not boiled; and covered it with a glaſs cover; and placed both veſſels cloſe to each other.

“ On the 26th of May, 24 hours afterwards, I examined a ſmall drop of each, by the firſt magnifier of Wilſon's microſcope, whoſe focal diſtance is reckoned at $\frac{1}{50}$th part of an inch; and, to my amazement, they were both full of animalcula of a linear ſhape, very diſtinguiſhable, moving to and fro with great celerity; ſo that there appeared to be more particles of animal than vegetable life in each drop.

“ This experiment I have repeatedly tried, and always found it to ſucceed in proportion to the heat of the circumambient air; ſo that even in winter, if the liquors are kept properly warm, at leaſt in two or three days the experiment will ſucceed.

“ What I have obſerved are infinitely ſmaller than ſpermatic animals, and of a very different ſhape: the truth of which, every accurate obſerver will ſoon be convinced of, whoſe curioſity may lead him to compare them; and I am perſuaded he will find they are no way akin.

“ At preſent I ſhall paſs over many other curious obſervations, which I have made on two years experiments, in order to proceed to the explaining a hint which I received laſt January from Mr De Sauſſure of Geneva, when he was here; which is, that he found one kind of theſe animalcula infuſoria that increaſe by dividing acroſs into nearly two equal parts.

“ I had often ſeen this appearance in various ſpecies a year or two ago, as I found upon looking over the minutes I had taken when I made any new obſervation; but always ſuppoſed the animal, when in this ſtate, to be in coition.

“ Not hearing, till afer M. De Sauſſure left this kingdom, from what infuſion he had made his obſervation; his friend Dr de la Roche of Geneva informed me, the latter end of February laſt, that it was from hempſeed.

44 From an infuſion of hempſeed.

“ I immediately procured hempſeed from different ſeeds-men in diſtant parts of the town. Some of it I put into New-River water, ſome into diſtilled water, and ſome I put into very hard pump water. The reſult was, that in proportion to the heat of the weather, or the warmth in which they were kept, there was an appearance of millions of minute animalcula in all the infuſions; and, ſome time after, ſome oval ones made their appearance, as at fig. 3. *b c*. Theſe were much larger than the firſt, which ſtill continued; theſe wriggled to and fro in an undulatory motion, turning themſelves round very quick all the time that they moved forwards. I was very attentive to ſee theſe animals divide themſelves; and at laſt I perceived a few of the appearance of fig. 3. *a*, as it is repreſented by the firſt magnifier of Wilſon's microſcope; but I am ſo well convinced by experience, that they would ſeparate, that I did not wait to ſee the operation: however, as the following ſketches, which I have drawn from five other ſpecies, will very fully explain

45 Divide themſelves in two.

plain this extraordinary phenomenon, there will be no difficulty in conceiving the manner of the firſt. See fig. 4, 5, 6, 7, 8.

Plate XXIV (B)

"The proportion of the number of theſe animals which I have obſerved to divide in this manner, to the reſt, is ſcarce 1 to 50; ſo that it appears rather to ariſe from hurts received by ſome few animalcula among the many, than to be the natural manner in which theſe kinds of animals multiply; eſpecially if we conſider the infinite quantity of young ones which are viſible to us through the tranſparent ſkins of their bodies, and even the young ones that are viſible in thoſe young ones while in the body of the old ones.

"But nothing more plainly ſhews them to be zoophytes, than this circumſtance, That when, by accident, the extremity of their bodies has been ſhrivelled for want of a ſupply of freſh water, the applying more freſh water has given motion to the part of the animal that was ſtill alive; by which means, this ſhapeleſs figure has continued to live and ſwim to and fro all the time it was ſupplied with freſh water.

46 Beroe deſcribed.

"I cannot finiſh this part of my remarks on theſe animals, without obſerving, that the excellent Linnæus has joined the *beroe* with the *volvox*, one of the animalcula infuſoria. The beroe is a marine animal, found on our coaſts; of a gelatinous tranſparent nature, and of an oval or ſpherical form, about half an inch to an inch diameter; divided like a melon into longitudinal ribs, each of which is furniſhed with rows of minute fins; by means of which, this animal, like the animalcula infuſoria, can ſwim in all directions with great ſwiftneſs. In the ſame manner I have ſeen moſt of thoſe minute animals move ſo ſwift that we could not account for it, without ſuppoſing ſuch a proviſion in nature, which is really true, but cannot be ſeen till the animals grow faint for want of water; then, if we attend, we may with good glaſſes plainly diſcover them.

47 Method of diſcovering the fins of animalcules.

"I have lately found out, by mere accident, a method to make their fins appear very diſtinctly, eſpecially in the larger kind of animalcula, which are common to moſt vegetable infuſions; ſuch as the terebella. This has a longiſh body, with a cavity or groove at one end, like a gimlet: by applying, then, a ſmall ſtalk of the horſe-ſhoe geranium, (or geranium zonale of Linnæus), freſh broken, to a drop of water in which theſe animalcula are ſwimming, we ſhall find that they will become torpid inſtantly; contracting themſelves into an oblong oval ſhape, with their fins extended like ſo many briſtles all round their bodies. The fins are in length about half the diameter of the middle of their bodies. Before I diſcovered this expedient, I tried to kill them by different kinds of ſalts and ſpirits; but though they were deſtroyed by this means, their fins were ſo contracted, that I could not diſtinguiſh them in the leaſt. After lying in this ſtate of torpidity for two or three minutes, if a drop of clean water is applied to them, they will recover their ſhape, and ſwim about immediately, rendering their fins again inviſible."

Fig. 3, 4, 5, 6, 7, 8. repreſent different ſpecies of animalcula infuſoria, mentioned by Mr Ellis as belonging to the genus of volvox of Linnæus.

Fig. 3. repreſents the volvox ovalis, or egg-ſhaped volvox; at (b) and (c) it is expreſſed in its natural ſhape; at (a) the manner in which it becomes two animals, by ſeparating acroſs the middle. This was found in the infuſion of hempſeed; but is found in other vegetable infuſions, particularly that of tea-ſeed.

Fig. 4. is the volvox torquilla, or wryneck. At (a) is repreſented its divided ſtate; at (b) and (c) its natural ſtate: this is common to moſt vegetable infuſions, as is the following.

Fig. 5. is the volvox volutans, or the roller. At (a) the animal is ſeparated, and becomes two diſtinct beings, each ſwimming about and providing for itſelf: this is often the prey of another ſpecies of this genus, eſpecially while it is weak by this ſeparation, not being ſo active for ſome time till it can recover itſelf. At (c) the animal appears to be hurt on one ſide; this impreſſion in a little time is ſucceeded by another in the oppoſite ſide, as at (b), which ſoon occaſions a diviſion. At (d) is the ſide-view, and at (e) the front-view, of the natural ſhape of the animal.

Fig. 6. is the volvox oniſcus, or wood-louſe. At (a) is the natural ſhape of it, as it appears full of little hairs both at the head and tail; with thoſe at the head, it whirls the water about to draw its prey to it; the feet, which are many, are very viſible, but remarkably ſo in a ſide-view at (d). At (b) it is repreſented beginning to divide; and at (c) the animals are ready to part: in this ſtate, as if in exquiſite pain, they ſwim round and round, and to and fro, with uncommon velocity, violently agitated till they get aſunder. This was found in an infuſion of different kinds of pine-branches.

Fig. 7. is the volvox terebella, or the gimlet. This is one of the largeſt of the kind, and is very viſible to the naked eye. It moves along ſwiftly, turning itſelf round as it ſwims, juſt as if boring its way. (a) and (b) are two views of its natural ſhape, (c) ſhews the manner of its dividing. When they are ſeparated, the lower animal rolls very awkwardly along, till it gets a groove in the upper part. (d) repreſents one of them lying torpid, by means of the juice of the horſe-ſhoe geranium, with its fins extended. This animal is found in many infuſions, particularly of graſs or corn.

Fig. 8. is the volvox vorax, or glutton. This animal was found in an infuſion of the Tartarian pine; it varies its ſhape very much, contracting and extending its proboſcis, turning it to and fro, in various directions, as at a, b, c, d, e. It opens its proboſcis underneath the extremity, when it ſeizes its prey. The leſs active animals, that have lately been divided, ſuch as thoſe at fig. 3. (a), and at fig. 4. (a), ſerve it as food, when they come in its way: theſe it ſwallows down inſtantly, as it is repreſented at fig. 8. h and i. At (f) it is ready to divide, and at (g) it is divided; where the hinder part of the divided animal has got a proboſcis or beak, to procure nouriſhment for itſelf, and ſoon becomes a diſtinct being from the fore part.

Thus we have given as full an account as our limits would admit, of the moſt curious kinds of animalcules that have hitherto been obſerved. We cannot, however, diſmiſs this ſubject, without taking notice of ſome of the moſt remarkable hypotheſes which have been formed concerning their nature and origin.

48 Doctrine of equivocal generation exploded.

Before the invention of microſcopes, the doctrine of equivocal generation, both with regard to animals and plants of ſome kinds, was univerſally received: but this inſtrument ſoon convinced every intelligent perſon, that thoſe plants which formerly were ſuppoſed to be produced by equivocal generation aroſe from ſeeds, and the animals, in like manner, from a male and female. But as the microſcope threw light upon one part of nature, it left another involved in darkneſs; for the origin of the animalcula infuſoria, or of the ſpermatic animals already mentioned, remains as yet as much unknown as that of many other kinds was when the doctrine of equivocal generation reigned in full force.

49
Suppoſed diſcovery concerning generation.

The diſcovery of ſpermatic animalcules was thought to throw ſome light on the myſterious affair of generation itſelf, and theſe minute creatures were imagined to be each of them individuals of the ſame ſpecies with the parent. Here the infinite number of theſe animalcules was an objection, and the difficulty remained as great as before; for, as every one of theſe animalcules behoved to be produced from a male and female, to explain their origin by animalcular generation in the ſame manner, was only explaining generation by itſelf.

This hypotheſis, therefore, having proved unſatiſfactory, others have been invented. Mr Buffon, particularly, hath invented one, by which he at once annihilates the whole animalcular world; and in this he hath been followed by ſeveral very ingenious philoſophers. For a particular account of this, ſo far as it concerns generation, we muſt refer to that article; but as he gives ſuch a particular account of his having examined the human ſemen, that we cannot doubt of his accuracy, we ſhall here contraſt his account with that of Mr Lewenhoeck already mentioned.

50
M. Buffon's experiments on the human ſemen.

Having procured the ſeminal veſſels of a man who died a violent death, he extracted all the liquor from them while they were ſtill warm; and having examined a drop of it with a double microſcope, it had the appearance fig. 9. Large filaments appeared, which in ſome places ſpread out into branches, and in others intermingled with one another. Theſe filaments clearly appeared to be agitated by an internal undulatory motion, like hollow tubes, which contained ſome moving ſubſtance. He ſaw diſtinctly this appearance changed for that fig. 10. Two of theſe filaments, which were joined longitudinally, gradually ſeparated from each other in the middle, alternately approaching and receding, like two tenſe cords fixed by the ends, and drawn aſunder in the middle. Theſe filaments were compoſed of globules that touched one another, and reſembled a chaplet of beads. After this, he obſerved the filaments ſwelled in ſeveral places, and perceived ſmall globular bodies iſſue from the ſwelled parts, which had a vibratory motion like a pendulum. Theſe ſmall bodies were attached to the filaments by ſmall threads, which gradually lengthened as the bodies moved. At laſt, the ſmall bodies detached themſelves entirely from the filaments, drawing after them the ſmall thread, which looked like a tail. When a drop of the ſeminal liquor was diluted, theſe ſmall bodies moved in all directions very briſkly; and had he not ſeen them ſeparate themſelves from the filaments, he would, he ſays, have thought them to be animals. The ſeminal matter was at firſt too thick, but gradually became more fluid; and, in proportion as its fluidity increaſed, the filaments diſappeared, but the ſmall bodies became exceedingly numerous. Each of them had a long thread or tail attached to it, from which it evidently endeavoured to get free. Their progreſſive motion was extremely ſlow, during which they vibrated to the right and left, and at each vibration they had a rolling unſteady motion in a vertical direction.

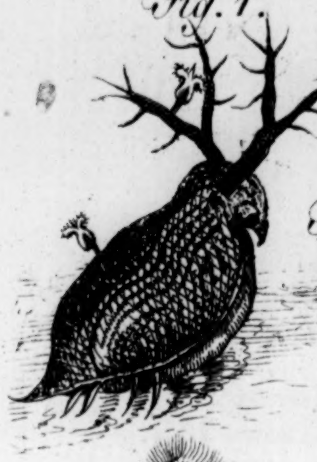
At the end of two or three hours, the ſeminal matter becoming ſtill more fluid, a greater number of theſe moving bodies appeared. They were then more free of incumbrances; their tails were ſhorter; their progreſſive motion was more direct, and their horizontal motion greatly diminiſhed. In five or ſix hours, the liquor had acquired almoſt all the fluidity it could acquire, without being decompoſed. Moſt of the ſmall bodies were now diſengaged from their threads; their figure was oval. They moved forward with conſiderable quickneſs, and, by their irregular motions backward and forward, they had now more than ever the appearance of animals. Thoſe that had tails adhering to them, ſeemed to have leſs vivacity than the others; and of thoſe that had no tails, ſome altered both their figure and their ſize. In twelve hours, the liquor had depoſited at the bottom of the vial a kind of aſh-coloured gelatinous ſubſtance, and the fluid at top was almoſt as tranſparent as water. The little bodies being now entirely freed from their threads, moved with great agility, and ſome of them turned round their centres. They alſo often changed their figures, from oval becoming round, and often breaking into ſmaller ones. Their activity always increaſed as their ſize diminiſhed. In 24 hours, the liquor had depoſited a greater quantity of gelatinous matter, which, being with ſome difficulty diluted in water, exhibited an appearance ſomewhat reſembling lace. In the clear ſemen itſelf only a few ſmall bodies were now ſeen moving; next day, theſe were ſtill farther diminiſhed; and after this nothing was to be ſeen but globules, without the leaſt appearance of motion. Moſt of the abovementioned appearances are ſhewn fig. 10, 11, 12, 13, 14, 15, 16. Fig. 17. and 18. repreſent an appearance of the globules in another experiment, in which they arranged themſelves in troops, and paſſed very quickly over the field of the microſcope. In this experiment they were found to proceed from a ſmall quantity of geatinous mucilage.

From theſe experiments, Mr Buffon concludes, that what have been called ſpermatic animals, are not creatures really endowed with life, but ſomething proper to compoſe a living creature; and he diſtinguiſhes them by the name of *organic particles*. The ſame individual kinds of animals he declares he has found in the fluids ſeparated from the ovaria of females; and for the truth of this appeals to the teſtimony of Mr Needham, who was an eye-witneſs of his experiments. He alſo brings an additional proof of his doctrine from Mr Needham's obſervations on the milt of the *calmar*, a ſpecies of cuttle-fiſh. Here the ſpermatic animals, at leaſt what have the only appearance of life, are vaſtly larger than in any other creature, ſo as to be plainly viſible to the naked eye. When magnified, they appear as at fig. 19. and 20. *a*. Their firſt appearance is at fig. 19. *a* and *b*, when they reſemble ſprings incloſed in a tranſparent caſe. Theſe ſprings were equally perfect at firſt as afterwards; only in time they contracted themſelves, and became like a kind of ſcrew. The head of the caſe is a ſpecies of valve which opens outward, and through which every thing within may be forced out. It contains, beſides, another valve *b*, a little barrel *c*, and a ſpongy

51
Needham's experimen on the mi of the cal-mar.

3 MA 53

Fig. 1.



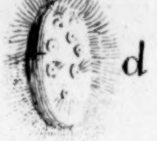
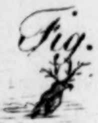


Fig. 2.



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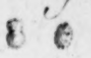

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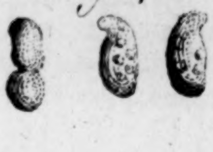
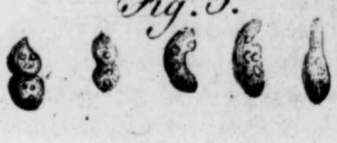


Fig. 5.



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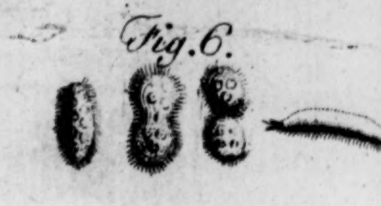

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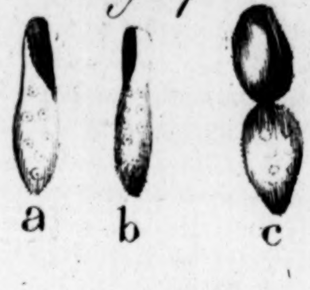


Fig. 8.

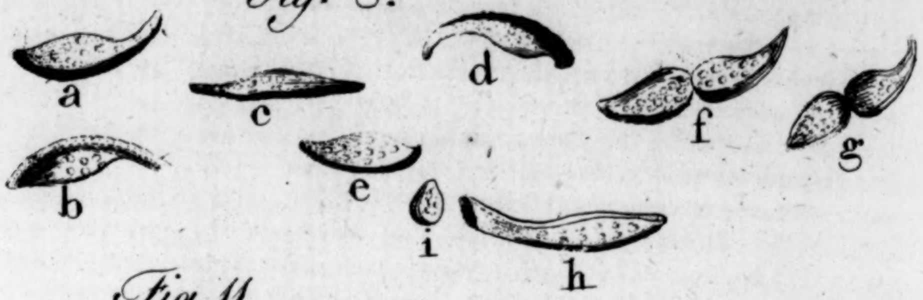


Fig. 9.

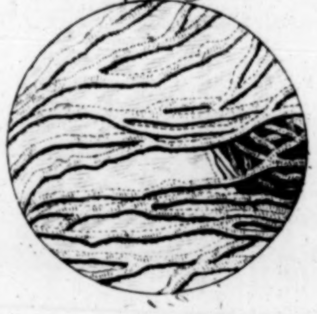


Fig. 10.

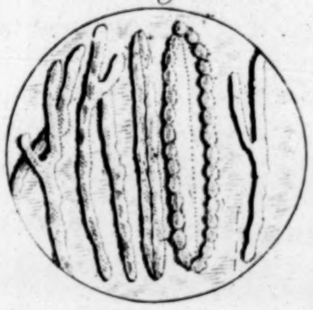


Fig. 11.

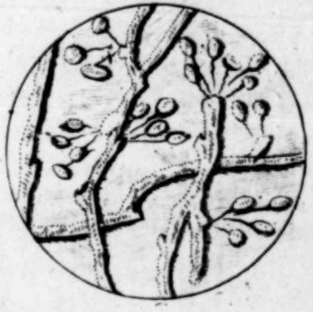


Fig. 12.

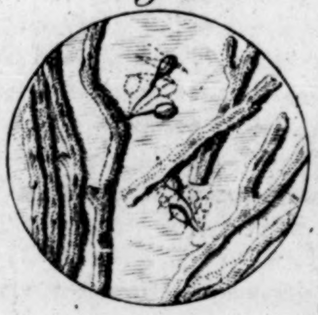


Fig. 13.

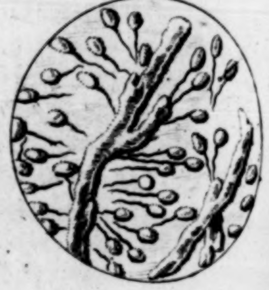


Fig. 14.

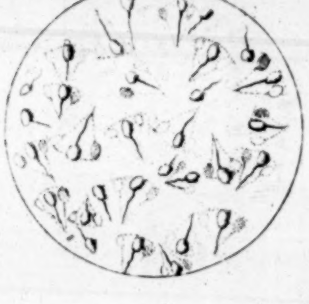


Fig. 15.

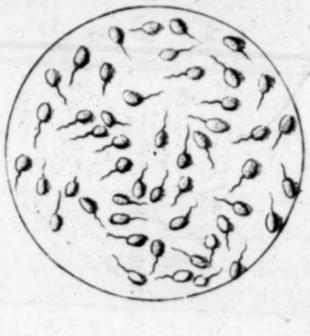


Fig. 16.

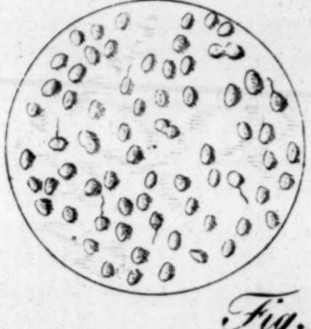


Fig. 17.

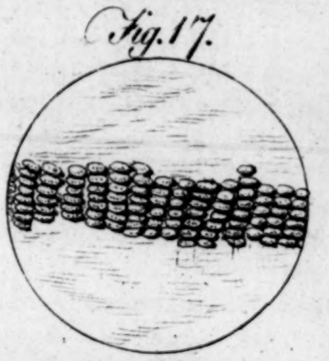


Fig. 18.

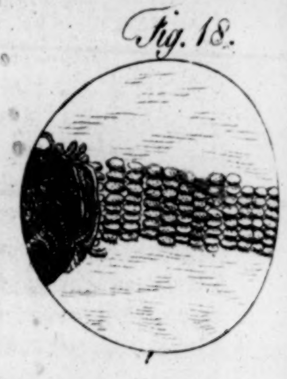
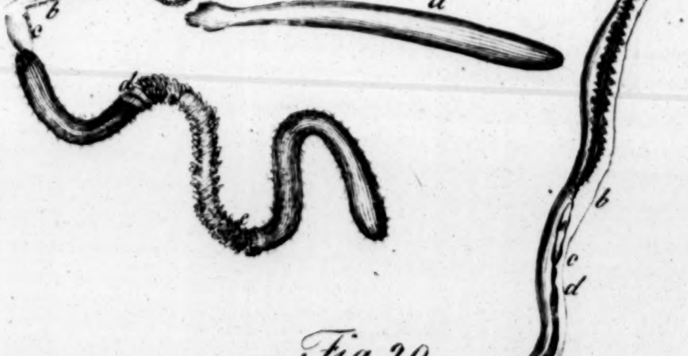


Fig. 21.

Spermatic Animalcula of the Dog | Spermatic Animalcula of the Rabbit

according to the first Edition of Lewenhoek

Fig. 19.



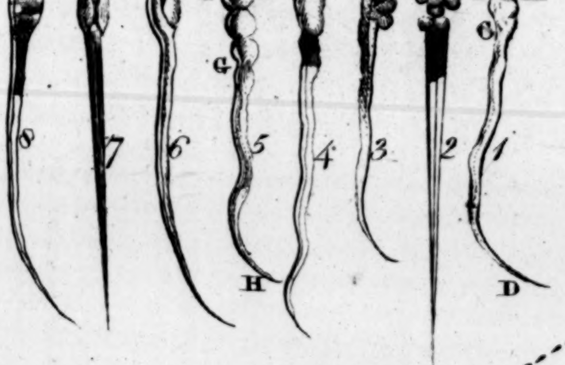

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Fig. 22.

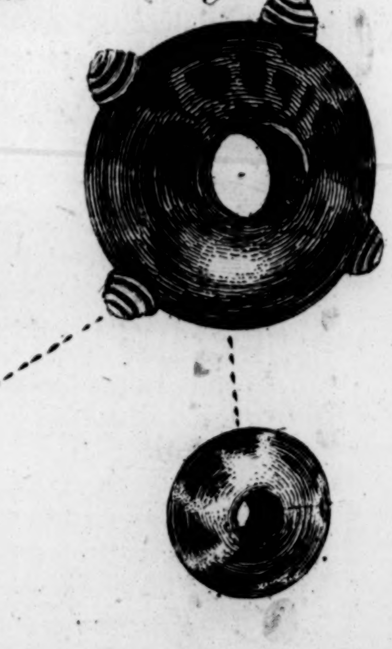
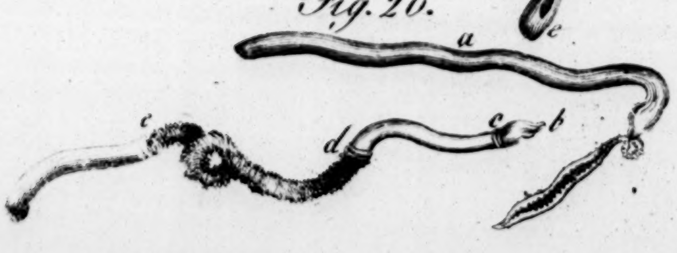


Fig. 20.



A. Bell Sculp.t

Plate XXIV (B) Fig. 20.

ſpongy ſubſtance *d e*. Thus the whole machine conſiſts of an outer tranſparent cartilaginous caſe *a*, the ſuperior extremity of which is terminated by a round head formed by the caſe itſelf, and performs the office of a valve. This external caſe contains a tranſparent tube; which includes the ſpring, a piſton or valve, a little barrel, and a ſpongy ſubſtance. The ſcrew occupies the ſuperior part of the tube and caſe, the piſton and barrel are ſituated in the middle, and the ſpongy ſubſtance occupies the inferior part. Theſe machines pump the liquor of the milt; the ſpongy ſubſtance is full of this liquor; and, before the animal ſpawns, the whole milt is only a congeries of theſe bodies which have ſucked up all the liquor of it. Whenever theſe ſmall machines are taken out of the body of the animal, and put in water, or expoſed to the air, they begin to act, as repreſented fig. 19. and 20; the ſpring mounts up, and is followed by the piſton, the barrel, and the ſpongy ſubſtance which contains the liquor: and, as ſoon as the ſpring and the tube in which it is contained begin to iſſue out of the caſe, the ſpring plaits, and the whole internal apparatus moves, till the ſpring, the piſton, and the barrel, have entirely eſcaped from the caſe. When this is effected, all the reſt inſtantly follow, and the milty liquor which had been pumped in, and confined in the ſpongy ſubſtance, runs out through the barrel.

52 Concluſion gainſt the xiſtence of nimalcules.

According to this account, the milt of the calmar contains no animalcules; and therefore we may from analogy conclude, that the ſmall moving bodies which are to be ſeen in the ſemen of other animals, are not really creatures endowed with life. Mr Buffon extends the analogy ſtill further; and concludes, that all the moving bodies which are to be found in the infuſions either of animal or vegetable ſubſtances are of a ſimilar nature. "To diſcover, ſays he, whether all the parts of animals, and all the ſeeds of plants, contained moving organic particles, I made infuſions of the fleſh of different animals, and of the ſeeds of more than 20 different ſpecies of vegetables; and after remaining ſome days in cloſe glaſſes, I had the pleaſure of ſeeing organic moving particles in all of them. In ſome they appeared ſooner, in others later; ſome preſerved their motions for months, and others ſoon loſt it. Some at firſt produced large moving globules reſembling animals, which changed their figure, ſplit, and became gradually ſmaller. Others produced only ſmall globules, whoſe motions were extremely rapid; and others produced filaments, which grew longer, ſeemed to vegetate, and then ſwelled and poured forth torrents of moving globules."

53 ron Munanſen's ory.

This laſt obſervation gave riſe to a new ſyſtem. Baron Munchanſen, perceiving that the laſt mentioned moving globules, after moving for ſome time, began again to vegetate, concluded that they were firſt animals and then plants.—This ſtrange hypotheſis Mr Ellis has overturned in the paper already quoted; in which he aſſerts, that they are no other than the ſeeds of that genus of fungi called *mucor* or *mouldineſs*, and that their motion is owing to numbers of minute animalcules attacking them for food. "Having (ſays he), at the requeſt of Dr Linnæus, made ſeveral experiments on the infuſion of muſhrooms in water, in order to prove the theory of Baron Munchanſen, that their ſeeds are firſt animals, and then plants, (which he takes notice of in his Syſtem of Nature, p. 1326, under the genus of chaos, by the name of *chaos fungorum ſeminum*) it appeared evidently, that the ſeeds were put into motion by very minute animalcules, which proceeded from the putrefaction of the muſhroom: for, by pecking at theſe ſeeds, which are reddiſh, light, round bodies, they moved them about with great agility in a variety of directions; while the little animals themſelves were ſcarce viſible, till the food they had eaten had diſcovered them. The ſatisfaction I received from clearing up this point, led me into many other curious and intereſting experiments.

54 iſproved Mr Ellis.

Plate XXIV (B)

"The ingenious Mr Needham ſuppoſes theſe little tranſparent ramified filaments, and jointed or coralloid bodies, which the microſcope diſcovers to us on the ſurface of moſt animal and vegetable infuſions when they become putrid, to be zoophytes, or branched animals: but to me they appear, after a careful ſcrutiny with the beſt glaſſes, to be of that genus of fungi called *mucor*, or *mouldineſs*; many of which Michelius has figured, and Linnæus has accurately deſcribed.

"Their vegetation is ſo amazingly quick, that they may be perceived in the microſcope even to grow and ſeed under the eye of the obſerver.

"Mr Needham has pointed out to us a ſpecies that is very remarkable for its parts of fructification. (See Philoſophical Tranſactions, vol. xlv. tab. 5. fig. 3. a, A.) This, he ſays, proceeded from an infuſion of bruiſed wheat.

"I have ſeen the ſame ſpecies ariſe from the body of a dead fly, which was become putrid by lying floating for ſome time in a glaſs of water, where ſome flowers had been in the month of Auguſt, 1768. This ſpecies of mucor ſends forth a maſs of tranſparent filamentous roots; from whence ariſe hollow ſtems, that ſupport little oblong oval ſeed-veſſels, with a hole on the top of each. From theſe I could plainly ſee minute globular ſeeds iſſue forth in great abundance with an elaſtic force, and turn about in the water as if they were animated.

"Continuing to view them with ſome attention, I could juſt diſcover, that the putrid water which ſurrounded them was full of the minuteſt animalcula; and that theſe little creatures began to attack the ſeeds of the mucor for food, as I have obſerved before in the experiment on the ſeeds of the larger kind of fungi or muſhrooms. This new motion continued the appearance of their being alive for ſome time longer: but, ſoon after, many of them aroſe to the ſurface of the water, remaining there without motion; and a ſucceſſion of them afterwards coming up, they united together in little thin maſſes, and floated to the edge of the water, remaining there quite inactive during the time of obſervation.

"As this diſcovery cleared up many doubts which I had received from reading Mr Needham's learned diſſertation, I put into the glaſs ſeveral other dead flies, by which means this ſpecies of mucor was propagated ſo plentifully, as to give me an opportunity of frequently trying the ſame experiment to my full ſatisfaction.

"Laſtly, Theſe jointed coralloid bodies, which Mr Needham calls *chaplets* and *pearl necklaces*, I have ſeen frequently very diſtinctly. Theſe appear not only on an infuſion of bruiſed wheat when it becomes putrid, but on moſt other bodies when they throw up a viſcid ſcum and are in a ſtate putrefaction. Theſe, then, are evidently no more than the moſt common mucor, the ſeeds

Plate XXIV (B)

ſeeds of which are every where floating in the air; and bodies in this ſtate afford them a natural proper ſoil to grow upon. Here they ſend downwards their fine tranſparent ramified roots into the moiſture which they float upon; and from the upper part of the ſcum, their jointed coralloid branches riſe full of ſeed into little grove-like figures. When a ſmall portion of theſe branches and ſeeds are put into a drop of the ſame putrid water upon which the ſcum floats, many of theſe millions of little animalcula with which it abounds, immediately ſeize them as food, and turn them about with a variety of motions, as in the experiments on the ſeeds of the common muſhrooms, either ſingly, or two or three ſeeds connected together; anſwering exactly to Mr Needham's deſcription, but evidently without any motion of their own, and conſequently not animated."

55 M. Buffon's opinion of different kinds of animalcules.

Mr Buffon, however, is not content with denying life only to thoſe beings where the ſigns of it are the moſt equivocal; but includes in the ſame rank of organic particles, almoſt every animal too ſmall to be diſcovered by the naked eye, and even ſome of thoſe whoſe motions are evidently perceptible to the eye. "Almoſt all microſcopic animals," ſays he, "are of the ſame nature with the moving bodies in the ſeminal fluids and infuſions of animal and vegetable ſubſtances. The eels in paſte, in vinegar, &c. are all of the ſame nature, and derived from the ſame origin. There are, perhaps, as many beings that either live or vegetate, produced by a fortuitous aſſemblage of organic particles, as by a conſtant and ſucceſſive generation. Some of them, as thoſe of the calmar, are only a kind of machines, which, though exceedingly ſimple, are very active. Others, as the ſpermatic animalcules, ſeem to imitate the movements of animals. Others reſemble vegetables in their manner of growth and extenſion. There are others, as thoſe of blighted wheat, which at pleaſure can be made alternately either to live or die, and it is difficult to know to what they ſhould be compared. There are ſtill others, and in great numbers, which are at firſt a kind of animals, then become a ſpecies of vegetables, and again return alternately to their vegetable ſtate. The eels in paſte have no other origin than the union of the organic particles of the moſt eſſential part of the grain. The firſt eels that appear are certainly not produced by other eels; but tho' they are not propagated themſelves, they fail not to engender other living eels. By cutting them with the point of a lancet, we diſcover ſmaller eels iſſuing in great numbers out of their bodies. The body of this animal ſeems to be only a ſheath or ſac, containing a multitude of ſmaller animals, which perhaps are other ſheaths of the ſame kind, in which the organic matter is aſſimilated into the form of eels."

56 His reaſoning inconcluſive.

Though we can by no means pretend to account for the appearance of theſe animalcules, yet we cannot help obſerving, that our ignorance of the cauſe of any phenomenon is no argument againſt its exiſtence. Though we are not able to account in a ſatisfactory manner for the origin of the native Americans, we ſuppoſe Mr Buffon himſelf would reckon it abſurd to maintain that the Spaniards on their arrival there found only *organic particles* moving about in diſorder. The caſe is the very ſame with the eels in paſte. They are exceedingly minute in compariſon with us; but, with the ſolar microſcope, Mr Baker has made them aſſume a more reſpectable appearance, ſo as to have a diameter of an inch and an half, or two inches, and a length proportionable. They ſwam up and down very briſkly; the motion of their inteſtines was plainly viſible; when the water dried up, they died with apparent agonies, and their mouths gaped very wide. Were we to find a creature of the ſize of this magnified eel, gaſping in a place where water had lately been, we certainly would never conclude it to be an *organic particle*, or a fortuitous aſſemblage of them; but a fiſh. Why then ſhould we conclude otherwiſe with regard to the eel while in its natural ſtate, than that it is a little fiſh? In reaſoning on this ſubject, we ought always to remember, that, however eſſential the diſtinction of bodies into great and ſmall may appear to us, they are not ſo to the Deity; with whom, as Mr Baker well expreſſes himſelf, "an atom is as a world, and a world but as an atom."—Were the Deity to exert his power for a little, and give a natural philoſopher a view of a quantity of paſte filled with eels, from each of whoſe bodies the light was reflected as when it paſſes through a ſolar microſcope; inſtead of imagining them organic particles, the paſte would appear like a little mountain, he would probably look upon the whole as a monſtrous aſſemblage of ſerpents, and be afraid to come near them. Wherever, therefore, we diſcover beings to appearance endowed with the principle of ſelf-preſervation, or whatever elſe we make the characteriſtic of animals, neither the ſmallneſs of their ſize, nor the impoſſibility of our knowing how they come there, ought to cauſe us doubt of their being really animated.—At the ſame time, it muſt alſo be remembered, that *motion* is not always a characteriſtic of animal life, even though the moving bodies ſhould avoid one another, or any ſeeming obſtacle placed in their way. We know, that inanimate bodies, when electrified, will avoid others endowed with an electricity of the ſame kind, and adhere to thoſe which have the oppoſite one. As we are by no means acquainted with the utmoſt powers of electricity, but on the contrary, from what we do know of it have all the reaſon in the world to conclude that it can produce effects utterly beyond our comprehenſion, it is impoſſible for us to know what ſhare it may have in producing the motions obſerved in vegetable-infuſions, or in the ſemen of animals.—We may alſo further obſerve, that though in Mr Ellis's experiment of the boiled potatoe he took it for granted that every ſeed of animal life would be deſtroyed by the boiling water, yet even this cannot be proved; nay, on the contrary, it hath been proved by undeniable experiments, that the human body itſelf hath endured a heat of 240 degrees of Fahrenheit (28 degrees above that of boiling water) without injury. The eggs of theſe animalcula might therefore be ſtrong enough to reſiſt the heat hitherto uſed in Mr Ellis's or any other experiment.

57 Animals ſometime found livi in ſolid b dies.

A conſiderable objection to the exiſtence of animalcules in the ſemen, or any other part of animal bodies, muſt ariſe from the total excluſion of air, which is found ſo neceſſary to the life of larger animals. Some inſtances, however, have been obſerved of large animals being found in ſuch ſituations as they could not poſſibly have enjoyed the leaſt benefit from the air for a great number of years; and in this ſtate they have not only lived, but lived much longer than they would otherwiſe have done.

Plate XXIV (B)

In Toulon harbour, and the road, are found ſolid hard ſtones, and perfectly entire; containing, in different cells, ſecluded from all communication with the air, ſeveral living ſhell-fiſh, of an exquiſite taſte, called *Dactyli*, i. e. Dates: to come at theſe fiſh, the ſtones are broken with mauls. Alſo, along the coaſt of Anconia, in the Adriatic, are ſtones uſually weighing about 50 pounds, and ſometimes even more; the outſide rugged, and eaſily broken, but the inſide ſo hard, as to require a ſtrong arm and an iron maul to break them: within them, and in ſeparate niches, are found ſmall ſhell-fiſh, quite alive, and very palatable, called *Solenes* or *Cappe lunghe*. Theſe facts are atteſted by Gaſſendi, Blondel, Mayol, the learned biſhop of Sulturara, and more particularly by Aldrovandi a phyſician of Bologna. The two latter ſpeak of it as a common fact, which they themſelves ſaw.

In the volume for 1719, of the Academy of Sciences at Paris, is the following paſſage.

"In the foot of an elm, of the bigneſs of a pretty corpulent man, three or four feet above the root, and exactly in the centre, has been found a live toad, middle-ſized, but lean, and filling up the whole vacant ſpace: no ſooner was a paſſage opened, by ſplitting the wood, than it ſcuttled away very haſtily: a more firm and ſound elm never grew; ſo that the toad cannot be ſuppoſed to have got into it. The egg whence it was formed, muſt, by ſome very ſingular accident, have been lodged in the tree at its firſt growth. There the creature had lived without air, feeding on the ſubſtance of the tree, and growing only as the tree grew. This is atteſted by Mr Hubert, profeſſor of philoſophy at Caen."

The volume for the year 1731 has a ſimilar obſervation, expreſſed in theſe words.

"In 1719 we gave an account of a fact, which, tho' improbable, was well atteſted; that a toad had been found, living and growing in the ſtem of a middling elm, without any way for the creature to come out or to have got in. M. Seigne, of Nantes, lays before the academy a fact juſt of the very ſame nature, except that, inſtead of an elm, it was an oak, and larger than the elm, which ſtill heightens the wonder. He judges, by the time requiſite for the growth of the oak, that the toad muſt have ſubſiſted in it, without air, or any adventitious aliment, during 80 or 100 years. M. Seigne ſeems to have known nothing of the fact in 1719."

With the two foregoing may be claſſed a narrative of Ambroſe Paré chief ſurgeon to Henry III. king of France, who, being a very ſenſible writer, relates the following fact, of which he was an eye-witneſs.

"Being (ſays he) at my ſeat, near the village of Meudon, and over-looking a quarry-man whom I had ſet to break ſome very large and hard ſtones; in the middle of one we found a huge toad, full of life, and without any viſible aperture by which it could get there. I began to wonder how it received birth, had grown and lived; but the labourer told me, it was not the firſt time he had met with a toad, and the like creatures, within huge blocks of ſtone, and no viſible opening or fiſſure."

Obſervations of living toads, found in very hard and entire ſtones, occur in ſeveral authors, particularly Baptiſt Fulgoſa doge of Genoa, the famous phyſicians Agricola and Horſtius, and lord Verulam: others give very ſpecious account of ſnakes, frogs, crabs, and lobſters, being found alive, incloſed within blocks of marble, rocks, and large ſtones.

Plate XXIV (B)

An inſtance ſimilar to theſe, of the truth of which we have no reaſon to doubt, was obſerved in this country in the year 1773, where a large toad was found in the middle of a piece of coal having not the leaſt viſible crack or fiſſure.

58 The ſubject ſtill obſcure.

Upon the whole, therefore, though philoſophers are not yet able to diſcover how theſe minute creatures are produced; yet, that there really are animals much ſmaller than what we can diſcern with our naked eye, ſeems to be indiſputable. The ſubject, however, is ſtill evidently obſcure, and will no doubt require the utmoſt attention of philoſophers, as well as further improvements in the conſtruction of microſcopes, fully to inveſtigate it.

ANIMATED, or ANIMATE, in a general ſenſe, denotes ſomething endowed with animal-life. It alſo imports a thing to be impregnated with vermin or animalcules.

ANIMATED *Horſe-hairs*. See HORSE-HAIRS.

ANIMATION ſignifies the informing an animal body with a ſoul: ſee the articles CREATION and SOUL. —The different hypotheſis of phyſicians and philoſophers, concerning the time of animation, have had their influence on the penal laws made againſt artificial abortions; it having been made capital to procure miſcarriage in the one ſtate, while in the other it was only deemed a venial crime. The emperor Charles V. by a conſtitution publiſhed in 1532, put the matter on another footing; inſtead of the diſtinction of an animated and unanimated fœtus, he introduced that of a vital and non-vital fœtus, as a thing of more obvious and eaſy deciſion, and not depending on any ſyſtem either of creation, traduction, or infuſion. Accordingly a fœtus is ſaid, in a legal ſenſe, to be animated, when it is perceived to ſtir in the womb; which uſually happens about the middle of the term of geſtation.

ANIME, in heraldry, a term uſed when the eyes of a rapacious creature are borne of a different tincture from the creature itſelf.

ANIME, a reſin exſuding from the trunk of a large American tree, called by Piſo *jetaiba*, by the Indians *courbaril*. This reſin is of a tranſparent amber colour, a light agreeable ſmell, and little or no taſte. It diſſolves entirely, but not very readily, in rectified ſpirit of wine; the impurities, which are often in large quantity, remaining behind. The Brazilians are ſaid to employ anime in fumigations for pains and aches proceeding from a cold cauſe: with us, it is rarely, if ever, made uſe of for any medicinal purpoſes.

ANIMETTA, among eccleſiaſtical writers, denotes the cloth wherewith the cup of the euchariſt is covered.

ANINGA, in commerce, a root which grows in the Antilles iſlands, and is pretty much like the China plant. It is uſed by ſugar-bakers, for refining the ſugar.

ANJOU, a province and duchy of France, bounded on the eaſt by Touraine, on the ſouth by Poictou, on the weſt by Bretagne, and on the north by Maine. It is 70 miles in length, and in breadth 60. Through this province run five navigable rivers: the Loire, which divides it in two parts; the Vienne, the Toue, the Maienne, and the Sarte.

The air is temperate, and the country agreeably diverſified with hills and meadows. There are 33 foreſts of oak-trees mixed with beech. The country produces white-wine, wheat, barley, rye, oats, peaſe, beans, flax, hemp, walnuts, and ſome cheſnuts. In Lower Anjou they make cyder. There are fruit-trees of all kinds, and paſture proper for horſes. The greateſt riches of the province conſiſt in cows, oxen, and ſheep. There are ſeveral coal and iron mines; and yet there are but two forges in the whole province. There are quarries of marble and of ſlate; as well as quarries of white ſtone, proper for building, on the ſide of the river Loire. Here are alſo ſeveral ſaltpetre-works and ſome glaſs-houſes. The remarkable towns, beſides Angers the capital, are Saumur, Briſac, Pons de Cea, La Fleche, and Beaufort.

ANIO, (Cicero, Horace, Priſcian); Anien, (Statius); now *il Teverone:* a river of Italy, which falls into the Tiber, three miles to the north of Rome, not far from Antemnæ. It riſes in a mountain near Treba, (Pliny); and, running through the country of the Æquiculi, or Æqui, it afterwards ſeparated the Latins from the Sabines; but nearer its mouth, or confluence, it had the Sabines on each ſide. It forms three beautiful lakes in its courſe, (Pliny). In the territories of Tibur it falls from a great height, and there forms a very rapid cataract; hence the epithet *præceps*, and hence the ſteam cauſed by its fall, (Horace). *Anienus* is the epithet formed from it, (Virgil, Propertius): *Anienus* is alſo the god of the river, (Propertius, Statius).

ANISUM, or Anise. See Pimpinella.

ANKER, a liquid meaſure at Amſterdam. It contains about 32 gallons Engliſh meaſure.

ANKLE, in anatomy, the joint which joins the foot to the leg.—We have an account of the menſes being regularly evacuated at an ulcer of the ankle, *Edin. Med. Obſ.* vol. iii. art. 29.

ANN, or Annat, in Scots law, is half a year's ſtipend, which the law gives to the executors of miniſters of the church of Scotland, over and above what was due to the miniſter himſelf, for his incumbency.

ANNA, a town of Turkey, in Aſia, ſeated on the weſtern bank of the river Euphrates. It is the pleaſanteſt place in all theſe parts; for there is plenty of olives, oranges, citrons, lemons, pomegranates, and dates. Of theſe laſt there are prodigious quantities, and there are two ſorts not common elſewhere. The fields are ſown with cotton, and the corn grows extremely high. The town is divided into two parts, the largeſt of which is ſurrounded with old walls; and the houſes are built with brick and ſtone, with gardens belonging to them. E. Long. 41. 35. N. Lat. 33. 30.

ANNALE, in the church of Rome, a term applied to the maſſes celebrated for the dead during a whole year.

ANNALS, in matters of literature, a ſpecies of hiſtory, which relates events in the chronological order wherein they happened. They differ from perfect hiſtory in this, that annals are but a bare relation of what paſſes every year, as a journal is of what paſſes every day; whereas hiſtory relates not only the tranſactions themſelves, but alſo the cauſes, motives, and ſprings of actions. Annals require nothing but brevity; hiſtory demands ornament.—Cicero informs us of the origin of annals. To preſerve the memory of events, the *Pontifex Maximus*, ſays he, wrote what paſſed each year, and expoſed it on tablets in his own houſe, where every one was at liberty to read: this they called *annales maximi;* and hence the writers who imitated this ſimple method of narrating facts were called *annaliſts*.

ANNAN, the capital of Annandale, a diviſion of Dumfriesſhire in Scotland; a ſmall town, containing 400 or 500 inhabitants, and ſituated on a river of the ſame name, in W. Long. 3°. N. Lat. 54. 40. This place has ſome trade in wine, and exports annually between 20 and 30,000 Wincheſter buſhels, (10 and 15,000 bolls) of corn. Veſſels of about 250 tons can come within half a mile of the town; and of 60, as high as the bridge; which conſiſts of five arches, defended by a gateway. Here was formerly a caſtle; but it was demoliſhed, by order of parliament, after the acceſſion of James VI. to the crown of England, and at preſent only the ditches remain. The Bruces were once lords of this place, as appears by a ſtone taken from the ruins of the caſtle, with this inſcription, "Robert de Brus Counte de Carrick et ſenteur du val de Annand. 1300." Annan was ruined in the time of Edward VI. at which time it was fortified againſt the Engliſh by a *Lyon* of the houſe of Glammis; but Lord Wharton, preſident of the marches, took the town, burnt it, and overthrew the church.

ANNANO, a ſtrong fort of Italy, in the duchy of Milan. It has been twice taken by the French; but was reſtored to the duke of Savoy in 1706. It is ſeated on the river Tanaro, in E. Long. 8. 30. N. Lat. 44. 40.

ANNAPOLIS, the chief town in Maryland, in North America, which as yet is but mean, becauſe the people in this province chuſe to live on their plantations, as in Virginia. St Mary's was once the capital of the province of Maryland, and the town of Annapolis was known by the name of *Severn.* It received its preſent name in 1694, when it was made a port-town, and the reſidence of a collector and naval officer. The county court was removed thither in 1699, and ever ſince it has been the chief ſeat of juſtice, and held to be the capital of the province. W. Long. 78. 10. N. Lat. 39. 25.

Annapolis Royal, the capital of Nova Scotia, is ſeated in the bay of Fundy, and has a fine harbour; but there is a difficulty in entering in and coming out, and it is ſubject to fogs. The town is but ſmall; and yet there are ſome handſome buildings, though the generality are but two ſtories high. It is defended by new and regular fortifications, and batteries of guns towards the ſea. At the bottom of the harbour is a point of land, which divides two rivers; and on each ſide there are pleaſant meadows, which in ſpring and autumn are covered with all ſorts of freſh-water fowl. There is a trade carried on by the Indians with furs, which they exchange for European goods. A governor reſides here, with a Britiſh garriſon. W. Long. 64. 5. N. Lat. 45. 10.

ANNATES, among eccleſiaſtical writers, a year's income of a ſpiritual living.

Theſe were, in ancient times, given to the Pope through all Chriſtendom, upon the deceaſe of any biſhop, abbot, or pariſh-clerk, and were paid by his ſucceſſor. At the Reformation they were taken from the Pope, and veſted in the king; and, finally, Queen Anne reſtored them to the church, by appropriating them to the augmentation of poor livings.

ANNEALING, or Nealing, the burning or baking glaſs, earthen ware, *&c.* in an oven or furnace.

Annealing is more particularly uſed for the art of burning or fixing metalline colours on glaſs. See Glass.

ANNE, Queen of Great Britain, daughter of James II. when duke of York, was born in 1664, and married to prince George of Denmark in 1683, by whom ſhe had ſeveral children, but ſurvived them all. Upon the death of William III. March 8, 1702, ſhe ſucceeded to the throne, and to a war with France, which was proſecuted under her reign by the great duke of Marlborough, with more glory than profit to this nation. She effected the long wiſhed-for union between England and Scotland, which took place May 1ſt, 1707; and dying Auguſt 1ſt, 1714, was ſucceeded by George Lewis Auguſtus elector of Hanover, as the direct deſcendant from James I. by his daughter Elizabeth queen of Bohemia.

St Anne's*-Day*, a feſtival of the Chriſtian church, celebrated by the Latins on the 26th of July, but by the Greeks on the 9th of December. It is kept in honour of Anne, or Anna, mother of the Virgin Mary.

ANNECY, a city of Savoy, ſeated between Chamberry and Geneva, on the banks of a lake of the ſame name, from whence run ſeveral brooks, which flow through the town, and uniting at length form a river. There are piazzas in moſt of the ſtreets of the town, which ſerve to ſhelter the inhabitants from rain. It has ſeveral collegiate and pariſh churches, as well as convents for men and women. The lake is about nine miles long, and four broad. E. Long. 6. 12. N. Lat. 45. 53.

ANNESLEY (Arthur), earl of Angleſey, and lord privy ſeal in the reign of king Charles II. was the ſon of Sir Francis Anneſley, Bart. lord Mount Norris, and viſcount Valentia, in Ireland; and was born at Dublin on the tenth of July, 1614. He was for ſome time at the univerſity of Oxford, and afterwards ſtudied the law at Lincoln's Inn. He had a conſiderable ſhare in the public tranſactions of the laſt century; for in the beginning of the civil war he ſat in the parliament held at Oxford, but afterwards became reconciled to the oppoſite party, and was ſent commiſſioner to Ulſter, to oppoſe the deſigns of the rebel Owen Roe O'Neal. He engaged in ſeveral other affairs with great ſucceſs. He was preſident of the council of ſtate after the death of Oliver, and was principally concerned in bringing about the Reſtoration: ſoon after which, king Charles II. raiſed him to the dignity of a baron, by the title of lord Anneſley, of Newport Pagnell, Bucks; and a ſhort time after, he was made earl of Angleſey. During that reign he was employed in ſome very important affairs, was made treaſurer of the navy, and afterwards lord privy-ſeal. In October 1680, his lordſhip was charged by one Dangerfield, in an information delivered upon oath, at the bar of the houſe of commons, with endeavouring to ſtifle evidence in relation to the Popiſh plot, and to promote the belief of a Preſbyterian one. The uneaſineſs he received from this attack did not prevent his ſpeaking his opinion freely of thoſe matters in the houſe of lords, particularly in regard to the Popiſh plot. About the ſame time he anſwered the lord Caſtlehaven's Memoirs, in which that nobleman endeavoured to paint the Iriſh rebellion in the lighteſt colours; and a ſharp diſpute was raiſed, which ended in the ſeals being taken from him. He was a perſon of great abilities, had uncommon learning, and was well acquainted with the conſtitution and laws of England. He wrote, beſides his Animadverſions on Caſtlehaven's Memoirs, 1. The privileges of the Houſe of Lords and Commons ſtated. 2. A diſcourſe on the Houſe of Lords. 3. Memoirs. 4. The hiſtory of the troubles in Ireland, from the rebellion in 1641, till the reſtoration. 5. Truth Unveiled, in behalf of the Church of England;—and ſome other works. He died in April 1686, in the 73d year of his age; and was ſucceeded by his ſon James.

ANNEXATION, in law, a term uſed to imply the the uniting of lands or rents to the crown.

ANNIHILATION, the act of reducing any created being into nothing.

Chriſtians, Heathens, Jews, Siameſe, Perſians, divines, philoſophers, &c. have their peculiar ſyſtems, ſentiments, conjectures, not to ſay dreams, concerning annihilation; and we find great diſputes among them about the reality, the poſſibility, the means, meaſures, prevention, ends, &c. of annihilation.

The firſt notions of the production of a thing from, or reduction of it to, nothing, Dr Burnet ſhews, aroſe from the Chriſtian theology; the words *creation* and *annihilation*, in the ſenſe now given to them, having been equally unknown to the Hebrews, the Greeks, and the Latins.

The ancient philoſophers in effect denied all annihilation as well as creation, reſolving all the changes in the world into new modifications, without ſuppoſing the production of any thing new, or deſtruction of the old. By daily experience, they ſaw compounds diſſolved; and that in their diſſolution nothing periſhed, but their union or connection of parts: when in death the body and ſoul were ſeparated, the man they held was gone, but that the ſpirit remained in its original the great ſoul of the world, and the body in its earth from whence it came; theſe were again wrought by nature into new compoſitions, and entered new ſtates of being which had no relation to the former.

The Perſian bramins hold, that, after a certain period of time, conſiſting of 71 joogs, God not only annihilates the whole univerſe, but every thing elſe, angels, ſouls, ſpirits, and all, by which he returns to the ſame ſtate he was in before the creation; but that, having breathed a while, he goes to work again, and a new creation ariſes, to ſubſiſt 71 joogs more, and then to be annihilated in its turn. Thus they hold there have been almoſt an infinite number of worlds: but how many joogs are elapſed ſince the laſt creation, they cannot certainly tell; only in an almanac written in the Sanſcript language in 1670, the world is ſaid to be then 3,892,771 years old from the laſt creation.

The Siameſe heaven is exactly the hell of ſome Socinians, and other Chriſtian writers; who, ſhocked with the horrible proſpect of eternal torments, have taken refuge in the ſyſtem of annihilation. This ſyſtem ſeems countenanced by ſcripture; for that the words *death*, *deſtruction*, and *periſhing*, whereby the puniſhment of the wicked is moſt frequently expreſſed in ſcripture, do moſt properly import annihilation and an utter end of being. To this Tillotſon anſwers, that theſe words, as well as thoſe correſponding to them in other languages, are often uſed, both in ſcripture and other writings, Annihilation.

to ſignify a ſtate of great miſery and ſuffering, without the utter extinction of the miſerable. Thus God is often ſaid in ſcripture to bring *deſtruction* on a nation, when he ſends judgments upon them, but without exterminating or making an end of them. So, in other languages, it is frequent, by *periſhing*, to expreſs a perſon's being made miſerable; as in that known paſſage in Tiberius's letter to the Roman ſenate: *Ita me dii, deæque omnes, pejus perdant, quam hodie perire me ſentio.* As to the word *death*, a ſtate of miſery which is as bad or worſe than death may properly enough be called by that name; and thus the puniſhment of wicked men after the day of judgment is in the book of Revelations frequently called the *ſecond death*.

Some Chriſtian writers allow a long time of the moſt terrible torments of ſinners; and after that ſuppoſe, that there ſhall be an utter end of their being. Of this opinion Irenæus appears to have been; who, according to M. du Pin, taught that the ſouls, at leaſt of the wicked, would not ſubſiſt eternally; but that, after having undergone their torments for a certain period, they would at laſt ceaſe to be at all. But Tillemont, Petit, Didier, and others, endeavour to defend Irenæus from this imputation, as being too favourable to the wicked.

It has been much diſputed among divines, whether, at the conſummation of all things, this *earth* is to be annihilated, or only purified, and fitted for the habitation of ſome new order of beings. Gerard in his common places, and Hakewil in his apology, contend earneſtly for a total abolition or annihilation. Ray, Calmet, and others, think the ſyſtem of renovation or reſtitution more probable, and more conſonant to ſcripture, reaſon, and antiquity. The fathers who have treated on the queſtion are divided; ſome holding that the univerſe ſhall not be annihilated, but only its external face changed; others aſſerting, that the ſubſtance of it ſhall be deſtroyed.

How widely have the ſentiments of mankind differed as to the poſſibility and impoſſibility of annihilation? According to ſome, nothing ſo difficult; it requires the infinite power of the Creator to effect it: ſome go further, and ſeem to put it out of the power of God himſelf. According to others, nothing ſo eaſy: Exiſtence is a ſtate of violence; all things are continually endeavouring to return to their primitive nothing; it requires no power at all; it will do itſelf; nay, what is more, it requires an infinite power to prevent it.

Many authors conſider preſervation as a continual reproduction of a thing, which, ſubſiſting no longer of itſelf, would every moment return into nothing. Gaſſendi on the contrary aſſerts, that the world may indeed be annihilated by the ſame power which firſt created it, but that to continue it there is no occaſion for any power of preſervation.

Some divines, of which number the learned biſhop King ſeems to be, hold annihilation for the greateſt of all evils, worſe than even the utmoſt torments of hell-flames: while others, with ſome of the eaſtern philoſophers, acknowledge annihilation for the ultimate pitch of happineſs human nature is capable of; that ſovereign good, that abſolute beatitude, ſo long vainly ſought for by the philoſophers, is found here. No wonder it had been ſo long concealed; for who would have thought of looking for the *ſummum bonum*, where others have placed the ſum of miſery?

Annihilation
‖
Annobon.

The ſaid prelate propoſes it as a queſtion, whether ſuffering eternal torments be a greater evil than not exiſting? He thinks it highly probable, that the damned will be ſuch fools, that, feeling their own miſery in the moſt exquiſite degree, they will rather applaud their own conduct, and chuſe to be, and to be what they are, rather than not to be at all; fond of their condition, however wretched, like people enraged, they will perſiſt in their former ſentiments without opening their eyes to their folly, and perſevere by way of indignation and revenge. Mr Bayle refutes him on this head; but might, one would think, have ſaved himſelf the trouble.

The Talapoins hold it the ſupreme degree of happineſs to have the ſoul totally annihilated, and freed from the burden and ſlavery of tranſmigrations. They ſpeak of three Talapoins, who, after a great number of tranſmigrations, became gods; and when arrived at this ſtate, procured this further reward of their merit to be annihilated. The ultimate reward of the higheſt perfection man can arrive at is *nieurepan*, or annihilation; which at length is granted to thoſe who are perfectly pure and good, after their ſouls have wandered many thouſand years through various bodies.

ANNI NUBILES, in law, denotes the marriageable age of a woman, viz. after ſhe has arrived at twelve.

ANNIVERSARY, the annual return of any remarkable day. Anniverſary days, in old times, more particularly denoted thoſe days in which an office was yearly performed for the ſouls of the deceaſed, or the martyrdom of the ſaints was yearly celebrated in the church.

ANNOBON, a ſmall iſland of Africa, on the coaſt of Loango, belonging to the Portugueſe. It lies in E. Long. 5. 10. S. Lat. 1. 50. and receives its name from being diſcovered on New-year's day. According to Pyrard, it is about five or ſix French leagues in compaſs; but Bandrand ſays, it is ten leagues round. Here are two high mountains, the tops of which being continually covered with clouds, occaſion frequent rains. On the ſouth-eaſt of the iſland are two rocks; one of which is low, and upon a level with the ſurface of the ſea; the other higher and larger, but both dangerous in the night to ſhipping; but between them the channel is deep and clear. Theſe rocks are inhabited by vaſt numbers of birds, ſo tame, that the ſailors frequently catch them with their hands. On the ſame ſide of the iſland, is a convenient watering-place at the foot of a rivulet, which tumbles from the mountains down to a valley covered with orange and citron trees, &c. and affording a pleaſant and refreſhing ſhade; but the road on the north-weſt ſide is difficult and dangerous, though moſt frequented by ſhips who have no intention of touching upon the continent. In either place it is difficult to take in a ſufficient quantity of water, on account of the violent breakings of the ſea, and a ſtone intrenchment erected by the negroes, from which they annoy all ſtrangers that attempt to land. The true road for ſhipping lies on the north-eaſt ſide, where they may anchor in ſeven, ten, thirteen, or ſixteen fathoms, on a fine ſand cloſe to the land, oppoſite to the village where the negroes have thrown up their intrenchments.

The climate is wholeſome, and the air clear and ſerene for the greateſt part of the year. Every part of the iſland is watered by pleaſant brooks, and freſh-water ſprings, which, however, at the new and full moons, or in all high tides, acquire a brackiſhneſs. The banks of every rivulet are covered with palms, whence the inhabitants extract their wine by inciſion. Here are a number of fertile valleys, which produce Turky-corn, rice, millet, yams, potatoes, &c. and afford paſture for abundance of oxen, ſheep, goats, &c. Poultry and fiſh alſo abound here; but the only mercantile production is cotton, which is eſteemed equal in quality to any produced in India, though the quantity is ſmall.

All the inhabitants are meanly clothed; the women have only a piece of linen cloth wrapped under their ſtomach, and falling down in the form of a petticoat to the knees. They carry their children on their backs, and ſuckle them over the ſhoulder. The governor is a Portugueſe, who has a few European ſervants about him: all the reſt are natives, who pay him an implicit obedience, and are bigotted in their attachment to the Catholic religion; and provided they can ſay their pater-noſter, ave-maria, and confeſs themſelves to the prieſt, they reckon themſelves good Chriſtians.

ANNO Domini, i. e. the year of our Lord; the computation of time from our Saviour's incarnation.

ANNOMINATION, in rethoric, the ſame with what is otherwiſe called *paronomaſia*. See Paronomasia.

ANNONA, in Roman antiquity, denotes proviſion for a year of all ſorts, as of fleſh, wine, &c. but eſpecially of corn. Annona is likewiſe the allowance of oil, ſalt, bread, fleſh, corn, wine, hay, and ſtraw, which was annually provided by the contractors for the maintenance of an army.

Annona, the *Cuſtard Apple*, a genus of the polygynia order, belonging to the polyandria claſs of plants. Of this genus there are eight

Species. 1. The reticulata, or cuſtard-apple, is a native of the Weſt-Indies, where it grows to the height of 25 feet, and is well furniſhed with branches on every ſide: the bark is ſmooth, and of an aſh colour; the leaves are of a light green, oblong, and have ſeveral deep tranſverſe ribs or veins, ending in acute points; the fruit is of a conical form, as large as a tennis-ball, of an orange colour when ripe, having a ſoft, ſweet, yellowiſh pulp, of the conſiſtence of a cuſtard, from whence it has its name. 2. The muricatis, or ſour-ſop, rarely riſes above 20 feet high, and is not ſo well furniſhed with branches as the other; the leaves are broader, have a ſmooth ſurface without any furrows, and are of a ſhining green colour: the fruit is large, of an oval ſhape, irregular, and pointed at the top, of a greeniſh yellow colour, and full of ſmall knobs on the outſide: the pulp is ſoft, white, and of a ſour and ſweet taſte intermixed, having many oblong, dark-coloured ſeeds. 3. The ſquamoſa, or ſweet ſop, ſeldom riſes higher than 15 feet, and well furniſhed with branches on every ſide. The leaves have an agreeable ſcent when rubbed; the fruit is roundiſh and ſcaly, and when ripe turns of a purple colour, and hath a ſweet pulp. 4. The paluſtris, or water-apple, grows to the height of 30 or 40 feet. The leaves are oblong, pointed, with ſome ſlender furrows, and have a ſtrong ſcent when rubbed; the fruit is ſeldom eaten but by negroes. The tree grows in moiſt places in all the Weſt India iſlands. 5. The cherimola, with oblong ſcaly fruit, is a native of Peru, where it is much cultivated for the fruit, and grows to be a very large tree well furniſhed with branches. The leaves are of a bright green colour, and much larger than thoſe of any of the other ſorts. The fruit is oblong, and ſcaly on the outſide, of a dark purple colour when ripe, and the fleſh is ſoft and ſweet, intermixed with many brown ſeeds which are ſmooth and ſhining. 6. The Africana, with ſmooth bluiſh fruit. 7. The Aſiatica, or purple apple. This grows in ſome of the French iſlands, as alſo in Cuba, in great plenty. The trees riſe to the height of 30 feet or more. The fruit is eſteemed by the inhabitants of thoſe iſlands, who frequently give them to ſick perſons. 8. The triloba, or North-American annona, called by the inhabitants *papaw*, is a native of the Bahama Iſlands, and likewiſe of Virginia and Carolina. The trunks of the trees are ſeldom bigger than the ſmall of a man's leg, and are about 10 or 12 feet high, having a ſmooth greeniſh-brown bark. In March, when the leaves begin to ſprout, the bloſſoms appear, conſiſting of ſix greeniſh-white petals. The fruit grows in cluſters of three, and ſometimes of four together: when ripe, they are yellow, covered with a thin ſmooth ſkin, which contains a yellow pulp of a ſweet luſcious taſte. In the middle of this pulp, lie in two rows twelve ſeeds, divided by as many thin membranes. All parts of the tree have a rank, if not a fetid, ſmell; nor is the fruit reliſhed by many except negroes. Theſe trees grow in low ſhady ſwamps, and in a very fat ſoil.

Culture. The laſt ſort will thrive in the open air in Britain, if it is placed in a warm and ſheltered ſituation; but the plants ſhould be trained up in pots, and ſheltered in winter for two or three years till they have acquired ſtrength. The ſeeds frequently remain a whole year in the ground; and therefore the earth in the pots ought not to be diſturbed, though the plants do not come up the firſt year. If the pots where thoſe plants are ſown, are plunged into a new hot-bed, they will come up much ſooner than thoſe that are expoſed to the open air. All the other ſorts require to be kept in a warm ſtove, or they will not live in this country.

ANNONÆ præfectus, in antiquity, an extraordinary magiſtrate, whoſe buſineſs it was to prevent a ſcarcity of proviſion, and to regulate the weight and fineneſs of bread.

ANNONAY, a ſmall town of France, in the Upper Vivarais, ſeated on the river Deunre. E. Long. 4. 52. N. Lat. 45. 15.

ANNOT, a ſmall city in the mountains of Provence in France. E. Long. 7. 0. N. Lat. 44. 4.

ANNOTATION, in matters of literature, a brief commentary, or remark, upon a book or writing, in order to clear up ſome paſſage, or draw ſome concluſion from it.

ANNOTTO, in dyeing, an elegant red colour, formed from the pellicles of the ſeeds of a tree common in South-America. It is alſo called *orlean* and *roucou*. The manner of making annotto is as follows: The red ſeeds cleared from the pods, are ſteeped in water for ſeven or eight days or longer, till the liquor begins to ferment; then ſtrongly ſtirred, ſtamped with wooden paddles and beaters, to promote the ſeparation of the red ſkins: this proceſs is repeated ſeveral times till the ſeeds are left white. The liquor, paſſed through cloſe cane-ſieves, is pretty thick, of a deep red colour, and a very ill ſmell; in boiling, it throws up its colouring matter to the ſurface in form of ſcum, which is afterwards boiled down by itſelf to a due conſiſtence, and made up while ſoft into balls. The annotto commonly met with among us, is moderately hard and dry, of a brown colour on the outſide, and a dull red within. It is difficultly acted upon by water, and tinges the liquor only of a pale browniſh-yellow colour. In rectified ſpirit of wine, it very readily diſſolves, and communicates a high orange or yellowiſh red. Hence it is uſed as an ingredient in varniſhes, for giving more or leſs of an orange-caſt to the ſimple yellows. Alkaline ſalts render it perfectly ſoluble in boiling water, without altering its colour. Wool or ſilk boiled in the ſolution, acquire a deep, but not a very durable, orange-dye. Its colour is not changed by alum or by acids, any more than by alcalies: but when imbibed in cloth, it is diſcharged by ſoap, and deſtroyed by expoſure to the air. It is ſaid to be an antidote to the poiſonous juice of manioc or caſſava.—Labat informs us, that the Indians prepare an annotto greatly ſuperior to that which is brought to us, of a bright ſhining red colour, almoſt equal to carmine: that, for this purpoſe, inſtead of ſteeping and fermenting the ſeeds in water, they rub them with the hands, previouſly dipt in oil, till the pellicles come off, and are reduced into a clear paſte; which is ſcraped off from the hands with a knife, and laid on a clean leaf in the ſhade to dry. De Laet, in his notes on Margrave's natural hiſtory of Brazil, mentions alſo two kinds of annotto; one of a permanent crimſon colour, uſed as a fucus or paint for the face; and another which gives a colour inclining more to that of ſaffron. This laſt, which is our annotto, he ſuppoſes to be a mixture of the firſt ſort with certain reſinous matters, and with the juice of the root of the tree.

ANNUAL, in a general ſenſe, an appellation given to whatever returns every year, or is always performed within that ſpace of time.

ANNUAL *Motion of the Earth*. See ASTRONOMY.

ANNUAL *Leaves*, are ſuch leaves as come up afreſh in the ſpring, and periſh in winter. Theſe ſtand oppoſed to *Ever-greens*.

ANNUAL *Plants*, called alſo ſimply *annuals*, are ſuch as only live their year, *i. e.* come up in the ſpring and die again in the autumn; and accordingly are to be recruited every year.

ANNUALRENT, in Scots law, an yearly profit due by a debtor in a ſum of money to a creditor for the uſe of it.

Right of **ANNUALRENT**, in Scots law, the original method of burdening lands with an yearly payment for the loan of money, before the taking of intereſt for money was allowed by ſtatute.

ANNUITIES.

AN Annuity is a ſum of money, payable yearly, half yearly, or quarterly, to continue a certain number of years, for ever, or for life.

An annuity is ſaid to be an arrear, when it continues unpaid after it falls due. And an annuity is ſaid to be in reverſion, when the purchaſer, upon paying the price, does not immediately enter upon poſſeſſion; the annuity not commencing till ſome time after.

Intereſt on annuities may be computed either in the way of ſimple or compound intereſt. But compound intereſt, being found moſt equitable, both for buyer and ſeller, the computation by ſimple intereſt is univerſally diſuſed.

I. *Annuities for a certain time.*

PROBLEM 1. Annuity, rate, and time, given, to find the amount, or ſum of yearly payments, and intereſt.

RULE. Make 1 the firſt term of a geometrical ſeries and the amount of 1 l. for a year the common ratio; continue this ſeries to as many terms as their are years in the queſtion; and the ſum of this ſeries is the amount of 1 l. annuity for the given years; which, multiplied by the given annuity, will produce the amount ſought.

EXAMPLE. An annuity of 40 l. payable yearly, is forborn and unpaid till the end of 5 years; What will then be due, reckoning compound intereſt at 5 *per cent.* on all the payments then in arrear?

1 2 5 4 5
1 : 1.05 : 1.1025 : 1.157625 : 1.21550625? whoſe ſum is 5.52563125 l.; and 5.25563125 × 40 = 221.02525=221. l. 0 s. 6 d. the amount ſought.

The amount may alſo be found thus: Multiply the given annuity by the amount of 1 l. for a year; to the product add the given annuity, and the ſum is the amount in 2 years; which multiply by the amount of 1 l. for a year; to the product add the given annuity and the ſum is the amount in 3 years, *&c.* The former queſtion wrought in this manner follows.

40 am. in 1 year.	126.1 am. in 3 years.
1.05	1.05
42.00	132.405
40	40
82 am. in 2 years,	172.405 am. in 4 years.
1.05	1.05
86.10	181.02525
40	40
126.1 am. in 3 years.	221.02525 am. in 5 years.

If the given time be years and quarters, find the amount for the whole years, as above; then find the amount of 1 l. for the given quarters; by which multiply the amount for the whole years; and to the product add ſuch a part of the annuity as the given quarters are of a year.

If the given annuity be payable half yearly, or quarterly, find the amount of 1 l. for half a year or a quarter; by which find the amount for the ſeveral half-years or quarters, in the ſame manner as the amount for the ſeveral years is found above.

Annuities for a certain time.

Prob. 2. Annuity, rate, and time given, to find the preſent worth, or ſum of money that will purchaſe the annuity.

Rule. Find the amount of the given annuity by the former problem; and then, by compound intereſt, find the preſent worth of this amount, as a ſum due at the end of the given time.

Examp. What is the preſent worth of an annuity of 40l. to continue 5 years, diſcounting at 5 *per cent.* compound intereſt?

By the former problem, the amount of the given annuity for 5 years, at 5 *per cent.* is 221.02525; and by compound intereſt, the amount of 1 l. for 5 years, at 5 l. *per cent.* is 1.2762815625

And, 1.2762815625)221.02525000(173.179= 173l. 3s. 7d. the preſent worth ſought.

The preſent worth may be alſo found thus: By compound intereſt, find the preſent worth of each year by itſelf, and the ſum of theſe is the preſent worth ſought. The former example done in this way follows.

1.2762815625)40.000000000(31.3410
1.21550625)40.0000000 (32.9080
1.157625)40.00000 (34.5535
1.1025)40.000 (36.2811
1.05)40.0 (38.0952

Preſent worth, 173.1788

If the annuity to be purchaſed be in reverſion, find firſt the preſent worth of the annuity, as commencing immediately, by any of the methods taught above; and then, by compound intereſt, find the preſent worth of that preſent worth, rebating for the time in reverſion; and this laſt preſent worth is the anſwer.

Examp. What is the preſent worth of a yearly penſion or rent of 75l. to continue 4 years, but not to commence till 3 years hence, diſcounting at 5 *per cent.*?

.05 : 1 :: 75 : 1500
1.05×1.05×1.05×1.05=1.21550625
1.21550625)1500.00000(1234.05371
1500
1234.05371

265.94629, preſent worth of the annuity, if it was to commence immediately.

1.05×1.05×1.05=1.157625 *L.* *s.* *d.*
1.157625)265.94629(229.7344=229 14 $8\frac{1}{4}$

Prob. 3. Preſent worth, rate and time given, to find the annuity.

Rule. By the preceding problem, find the preſent worth of 1 l. annuity for the rate and time given; and then ſay, As the preſent worth thus found to 1 l. annuity, ſo the preſent worth given to its annuity; that is, divide the given preſent worth by that of 1 l. annuity.

Examp. What annuity, to continue 5 years, will 173l. 3s. 7d. purchaſe, allowing compound intereſt at 5 *per cent.*?

.05 : 1 :: 1 : 20l.
1.05×1.05×1.05×1.05×1.05=1.2762815625
1.2762815625)20.00000000(15.6705.
20
15.6705.

4.3295 preſent worth of 1 l. annuity.
4.329)173.179(40 l. annuity. *Anſ.*

Annuities for ever.

II. *Annuities for ever, or freehold Eſtates.*

In freehold eſtates, commonly called *annuities in fee-ſimple*, the things chiefly to be conſidered are, 1. The annuity or yearly rent. 2. The price or preſent worth. 3. The rate of intereſt. The queſtions that uſually occur on this head will fall under one or other of the following problems.

Prob. 1. Annuity and rate of intereſt given, to find the price.

As the rate of 1 l. to 1 l. ſo the rent to the price.

Examp. The yearly rent of a ſmall eſtate is 40 l.: What is it worth in ready money, computing intereſt at $3\frac{1}{2}$ *per cent.*?

L. *s.* *d.*
As .035 : 1 :: 40 : 1142.857142= 1142 17 $1\frac{1}{2}$

Prob. 2. Price and rate of intereſt given, to find the rent or annuity.

As 1 l. to its rate, ſo the price to the rent.

Examp. A gentleman purchaſes an eſtate for 4000 l. and has $4\frac{1}{2}$ *per cent.* for his money: Required the rent.

As 1 : .045 :: 4000 : 180l. rent ſought.

Prob. 3. Price and rent given, to find the rate of intereſt.

As the price to the rent, ſo 1 to the rate.

Examp. An eſtate of 180 l. yearly rent is bought for 4000.: What rate of intereſt has the purchaſer for his money?

As 4000 : 180 :: 1 : .045 rate ſought.

Prob. 4. The rate of intereſt given, to find how many years purchaſe an eſtate is worth.

Divide 1 by the rate, and the quot is the number of years purchaſe the eſtate is worth.

Examp. A gentleman is willing to purchaſe an eſtate, provided he can have $2\frac{1}{2}$ *per cent.* for his money: How many years purchaſe may he offer?

.025)1.000(40 years purchaſe. *Anſ.*

Prob. 5. The number of years purchaſe, at which an eſtate is bought or ſold, given, to find the rate of intereſt.

Divide 1 by the number of years purchaſe, and the quot is the rate of intereſt.

Examp. A gentleman gives 40 years purchaſe for an eſtate: What intereſt has he for his money?

40)1.000(.025 rate ſought.

The computations hitherto are all performed by a ſingle diviſion or multiplication, and it will ſcarcely be perceived that the operations are conducted by the rules of compound intereſt; but when a reverſion occurs, recourſe muſt be had to tables of annuities on compound intereſt.

Prob. 6. The rate of intereſt, and the rent of a freehold eſtate in reverſion, given, to find the preſent worth or value of the reverſion.

By Prob. 1. find the price or preſent worth of the eſtate, as if poſſeſſion was to commence preſently; and then, by the Tables, find the preſent value of the given annuity, or rent, for the years prior to the commencement; ſubtract this value from the former value, and the remainder is the value of the reverſion.

Examp. A has the poſſeſſion of an eſtate of 130l. *per annum*, to continue 20 years; B has the reverſion of the ſame eſtate from that time for ever: What is the value of the eſtate, what the value of the 20 years poſſeſſion, and what the value of the reverſion, reckoning compound intereſt at 6 *per cent.*?

By Prob. 1. .06)130.00(2166.6666 value of the eſtate.
By Tables 1491.0896 val. of the poſſeſſion.

675.5770 val. of the reverſion.

Prob. 7. The price or value of a reverſion, the time prior to the commencement, and rate of intereſt, given, to find the annuity or rent.

By the Tables, find the amount of the price of the reverſion for the years prior to the commencement; and then by Prob. 3. find the annuity which that amount will purchaſe.

Examp. The reverſion of a freehold eſtate, to commence 20 years hence, is bought for 675.577l. compound intereſt being allowed at 6 *per cent.*: Required the annuity or rent.

By the Tables the amount of 675.577l. for 20 years, at 6 *per cent.* is } *L.* 2166.6
By Prob. 2. 2166.6×.06=130.0 rent ſought.

III. *Life Annuities.*

The value of annuities for life is determined from obſervations made on the bills of mortality. Dr Halley, Mr Simpſon, and Monſ. de Moivre, are gentlemen of diſtinguiſhed merit in calculations of this kind.

Dr Halley had recourſe to the bills of mortality at Breſlaw, the capital of Sileſia, as a proper ſtandard for the other parts of Europe, being a place pretty central, at a diſtance from the ſea, and not much crowded with traffickers or foreigners. He pitches upon 1000 perſons all born in one year, and obſerves how many of theſe were alive every year, from their birth to the extinction of the laſt, and conſequently how many died each year, as in the firſt of the following tables; which is well adapted to Europe in general. But in the city of London, there is obſerved to be a greater diſparity in the births and burials than in any other place, owing probably to the vaſt reſort of people thither, in the way of commerce, from all parts of the known world. Mr Simpſon, therefore, in order to have a table particularly ſuited to this populous city, pitches upon 1280 perſons all born in the ſame year, and records the number remaining alive each year, till none were in life.

It may not be improper, however, to obſerve, that however perfect tables of this ſort may be in themſelves, and however well adapted to any particular climate, yet the concluſions deduced from them muſt always be uncertain, being nothing more than probabilities, or conjectures drawn from the uſual period of human life. And the practice of buying and ſelling annuities on lives, by rules founded on ſuch principles, may be juſtly conſidered as a ſort of lottery or chance-work, in which the parties concerned muſt often be deceived. But as eſtimates and computations of this kind are now become faſhionable, we ſhall ſubjoin ſome brief account of ſuch as appear moſt material.

Dr Halley's table on the bills of mortality at Breſlaw.

Age.	*Perſ. liv.*	*A.*	*Perſ. liv.*	*A.*	*Perſ. liv.*	*A.*	*Perſ. liv.*
1	1000	24	573	47	377	70	142
2	855	25	567	48	367	71	131
3	798	26	560	49	357	72	120
4	760	27	553	50	346	73	109
5	732	28	546	51	335	74	98
6	710	29	439	52	324	75	88
7	692	30	531	53	313	76	78
8	680	31	523	54	302	77	68
9	670	32	515	55	292	78	58
10	661	33	507	56	282	79	49
11	653	34	499	57	272	80	41
12	646	35	490	58	262	81	34
13	640	36	481	59	252	82	28
14	634	37	472	60	242	83	23
15	628	38	463	61	232	84	20
16	622	39	454	62	222	85	15
17	616	40	445	63	212	86	11
18	610	41	436	64	202	87	8
19	604	42	427	65	192	88	5
20	598	43	417	66	182	89	3
21	592	44	407	67	172	90	1
22	586	45	397	68	162	91	0
23	579	46	387	69	152		

Mr Simpſon's table on the bills of mortality at London.

Age.	*Perſ. liv.*	*A.*	*Perſ. liv.*	*A.*	*Perſ. liv.*	*A.*	*Perſ. liv.*
0	1280	24	434	48	220	72	59
1	870	25	426	49	212	73	54
2	700	26	418	50	204	74	49
3	635	27	410	51	196	75	45
4	600	28	402	52	188	76	41
5	580	29	394	53	180	77	38
6	564	30	385	54	172	78	35
7	551	31	376	55	165	79	32
8	541	32	367	56	158	80	29
9	532	33	358	57	151	81	26
10	524	34	349	58	144	82	23
11	517	35	340	59	137	83	20
12	510	36	331	60	130	84	17
13	504	37	322	61	123	85	14
14	498	38	313	62	117	86	12
15	492	39	304	63	111	87	10
16	486	40	294	64	105	88	8
17	480	41	284	65	99	89	6
18	474	42	274	66	93	90	5
19	468	43	264	67	87	91	4
20	462	44	255	68	81	92	3
21	455	45	246	69	75	93	2
22	448	46	237	70	69	94	1
23	441	47	228	71	64	95	0

From the preceding tables the probability of the continuance or extinction of human life is eſtimated as follows.

1. The probability that a perſon of a given age ſhall live a certain number of years, is meaſured by the proportion which the number of perſons living at the propoſed age has to the difference between the ſaid num-

Life Annuities.

ber and the number of perſons living at the given age.

Thus, if it be demanded, what chance a perſon of 40 years has to live ſeven years longer? from 445, the number of perſons living at 40 years of age in Dr Halley's table, ſubtract 377, the number of perſons living at 47 years of age, and the remainder 68, is the number of perſons that died during theſe 7 years; and the probability or chance that the perſon in the queſtion ſhall live theſe 7 years is as 377 to 68, or nearly as $5\frac{1}{2}$ to 1. But, by Mr Simpſon's table, the chance is ſomething leſs than that of 4 to 1.

2. If the year to which a perſon of a given age has an equal chance of arriving before he dies, be required, it may be found thus: Find half the number of perſons living at the given age in the tables, and in the column of age you have the year required.

Thus, if the queſtion be put with reſpect to a perſon of 30 years of age, the number of that age in Dr Halley's table is 531, the half whereof is 265, which is found in the table between 57 and 58 years; ſo that a perſon of 30 years has an equal chance of living between 27 and 28 years longer.

3. By the tables, the premium of inſurance upon lives may in ſome meaſure be regulated.

Thus, the chance that a perſon of 25 years has to live another year, is, by Dr Halley's table, as 80 to 1; but the chance that a perſon of 50 years has to live a year longer is only 30 to 1. And, conſequently, the premium for inſuring the former ought to be to the premium for inſuring the latter for one year, as 30 to 80, or as 3 to 8.

Prob. I. To find the value of an annuity of 1 l. for the life of a ſingle perſon of any given age.

Monſ. de Moivre, by obſerving the decreaſe of the probabilities of life, as exhibited in the table, compoſed an algebraic theorem or canon, for computing the value of an annuity for life; which canon we here lay down by way of

Rule. Find the complement of life; and, by the tables, find the value of 1 l. annuity for the years denoted by the ſaid complement; multiply this value by the amount of 1 l. for a year, and divide the product by the complement of life; then ſubtract the quot from 1; divide the remainder by the intereſt of 1 l. for a year; and this laſt quot will be the value of the annuity ſought, or, in other words, the number of years purchaſe the annuity is worth.

Examp. What is the value of an annuity of 1 l. for an age of 50 years, intereſt at 5 *per cent.*?

86
50 age given.
—
36 complement of life.

By the tables, the value is, 16.5468
Amount of 1 l. for a year, 1.05
827340
165468

Complement of life, 36)17.374140).482615
From unity, *viz.* 1.000000
Subtract .482615

Intereſt of 1 l. .05).517385(10.3477 value ſought.

By the preceding problem is conſtructed the following table.

Life Annuities.

The value of 1 l. annuity for a ſingle life.

Age.	3 *per c.*	$3\frac{1}{2}$ *per c.*	4 *per c.*	$4\frac{1}{2}$ *per c.*	5 *per c.*	6 *per c.*
9=10	19.87	18.27	16.88	15.67	14.60	12.80
8=11	19.74	18.16	16.79	15.59	14.53	12.75
7=12	19.60	18.05	16.64	15.51	14.47	12.70
13	19.47	17.94	16.60	15.43	14.41	12.65
6=14	19.33	17.82	16.50	15.35	14.34	12.60
15	19.19	17.71	16.41	15.27	14.27	12.55
16	19.05	17.59	16.31	15.19	14.20	12.50
5=17	18.90	17.46	16.21	15.10	14.12	12.45
18	18.76	17.33	16.10	15.01	14.05	12.40
19	18.61	17.21	15.99	14.92	13.97	12.35
4=20	18.46	17.09	15.89	14.83	13.89	12.30
21	18.30	16.96	15.78	14.73	13.81	12.20
22	18.15	16.83	15.67	14.64	13.72	12.15
23	17.99	16.69	15.55	14.54	13.64	12.10
3=24	17.83	16.56	15.43	14.44	13.55	12.00
25	17.66	16.42	15.31	14.34	13.46	11.95
26	17.50	16.28	15.19	14.23	13.37	11.90
27	17.33	16.13	15.04	14.12	13.28	11.80
28	17.16	15.98	14.94	14.02	13.18	11.75
29	16.98	15.83	14.81	13.90	13.09	11.65
30	16.80	15.68	14.68	13.79	12.99	11.60
2=31	16.62	15.53	14.54	13.67	12.88	11.50
32	16.44	15.37	14.41	13.55	12.78	11.40
33	16.25	15.21	14.27	13.43	12.67	11.35
34	16.06	15.05	14.12	13.30	12.56	11.25
35	15.86	14.89	13.98	13.17	12.45	11.15
36	15.67	14.71	13.82	13.04	12.33	11.05
37	15.46	14.52	13.67	12.90	12.21	11.00
38	15.29	14.34	13.52	12.77	12.09	10.90
1=39	15.05	14.16	13.36	12.63	11.96	10.80
40	14.84	13.98	13.20	12.48	11.83	10.70
41	14.63	13.79	13.02	12.33	11.70	10.55
42	14.41	13.59	12.85	12.18	11.57	10.45
43	14.19	13.40	12.68	12.02	11.43	10.35
44	13.96	13.20	12.50	11.87	11.29	10.25
45	13.73	12.99	12.32	11.70	11.14	10.10
46	13.49	12.78	12.13	11.54	10.99	10.00
47	13.25	12.56	11.94	11.37	10.84	9.85
48	13.01	12.36	11.74	11.19	10.68	9.75
49	12.76	12.14	11.54	11.00	10.51	9.60
50	12.51	11.92	11.34	10.82	10.35	9.45
51	12.26	11.69	11.13	10.64	10.17	9.30
52	12.00	11.45	10.92	10.44	9.99	9.20
53	11.73	11.20	10.70	10.24	9.82	9.00
54	11.46	10.95	10.47	10.04	9.63	8.85
55	11.18	10.69	10.24	9.82	9.44	8.70
56	10.90	10.44	10.01	9.61	9.24	8.55
57	10.61	10.18	9.77	9.39	9.04	8.35
58	10.32	9.91	9.52	9.16	8.83	8.20
59	10.03	9.64	9.27	8.93	8.61	8.00
60	9.73	9.36	9.01	8.60	8.20	

The

Life Annuities.

The value of 1 l. annuity for a ſingle life.

A.	3 *per c.*	3½ *per c.*	4 *per c.*	4½ *per c.*	5 *per c.*	6 *per c.*
61	9.42	9.08	8.75	8.44	8.16	7.60
62	9.11	8.79	8.48	8.19	7.93	7.40
63	8.79	8.49	8.20	7.94	7.68	7.20
64	8.46	8.19	7.92	7.67	7.43	6.95
65	8.13	7.88	7.63	7.39	7.18	6.75
66	7.79	7.56	7.33	7.12	6.91	6.50
67	7.45	7.24	7.02	6.83	6.64	6.25
68	7.10	6.91	6.75	6.54	6.36	6.00
69	6.75	6.57	6.39	6.23	6.07	5.75
70	6.38	6.22	6.06	5.92	5.77	5.50
71	6.01	5.87	5.72	5.59	5.47	5.20
72	5.63	5.51	5.38	5.26	5.15	4.90
73	5.25	5.14	5.02	4.92	4.82	4.60
74	4.85	4.77	4.66	4.57	4.49	4.30
75	4.45	4.38	4.29	4.22	4.14	4.00
76	4.05	3.98	3.91	3.84	3.78	3.65
77	3.63	3.57	3.52	3.47	3.41	3.30
78	3.21	3.16	3.11	3.07	3.03	2.95
79	2.78	2.74	2.70	2.67	2.64	2.55
80	2.34	2.31	2.28	2.26	2.23	2.15

The above table ſhews the value of an annuity of one pound for a ſingle life, at all the current rates of intereſt; and is eſteemed the beſt table of this kind extant, and preferable to any other of a different conſtruction. But yet thoſe who ſell annuities have generally one and a half or two years more value, than ſpecified in the table, from purchaſers whoſe age is 20 years or upwards.

Annuities of this ſort are commonly bought or ſold at ſo many years purchaſe; and the value aſſigned in the table may be ſo reckoned. Thus the value of an annuity of one pound for an age of 50 years, at 3 *per cent.* intereſt, is 12.51; that is, 12 l. 10 s. or twelve and a half years purchaſe. The marginal figures on the left of the column of age ſerve to ſhorten the table, and ſignify, that the value of an annuity for the age denoted by them, is the ſame with the value of an annuity for the age denoted by the numbers before which they ſtand. Thus the value of an annuity for the age of 9 and 10 years is the ſame; and the value of an annuity for the age of 6 and 14, for the age of 3 and 24, *&c.* is the ſame. The further uſe of the table will appear in the queſtions and problems following.

Quest. 1. A perſon of 50 years would purchaſe an annuity for life of 200 l.: What ready money ought he to pay, reckoning intereſt at 4½ *per cent.?*

L.
By the table the value of 1 l. is 10.8
Multiply by 200

Value to be paid in ready money 2164.00 *Anſ.*

Quest. 2. A young merchant marries a widow lady of 40 years of age, with a jointure of 300 l. a-year, and wants to diſpoſe of the jointure for ready money: What ſum ought he to receive, reckoning intereſt at 3½ *per cent.?*

L.
By the table the value of 1 l. is 13.98
300

Value to be received in ready money 4194.00 *Anſ.*

Prob. 2. To find the value of an annuity for the joint continuance of two lives, one life failing, the annuity to ceaſe.

Here there are two caſes, according as the ages of the two perſons are equal or unequal.

1. If the two perſons be of the ſame age, work by the following

Rule. Take the value of any one of the lives from the table; multiply this value by the intereſt of 1 l. for a year; ſubtract the product from 2; divide the foreſaid value by the remainder; and the quot will be the value of 1 l. annuity, or the number of years purchaſe ſought.

Examp. What is the value of 100 l. annuity for the joint lives of two perſons, of the age of 30 years each, reckoning intereſt at 4 *per cent.?*

By the table, one life of 30 years is - 14.68
Multiply by - - .04
Subtract the product 5872
From - - 2.0000

Remains - - 1.4128

And 1.4128)14.68(10.39 value of 1 l. annuity.

And 10.39×100=1039 the value ſought.

2. If the two perſons are of different ages, work as directed in the following

Rule. Take the values of the two lives from the table; multiply them into one another, calling the reſult the firſt product; then multiply the ſaid firſt product by the intereſt of 1 l. for a year, calling the reſult the ſecond product; add the values of the two lives, and from their ſum ſubtract the ſecond product; divide the firſt product by the remainder, and the quot will be the value of 1 l. annuity, or the number of years purchaſe ſought.

Examp. What is the value of 70 l. annuity for the joint lives of two perſons, whereof one is 40 and the other 50 years of age, reckoning intereſt at 5 *per cent.?*

By the table the value of 40 years is - 11.83
And the value of 50 years is - - 10.35

First product, 122.4405
Multiply by - .05

Second product, 6.122025

Sum of the two lives, - - 22.180000
Second product deduct, - - 6.122025

Remainder, - 16.057975

And 16.057975)122.4405(7.62 value of 1 l. annuity.
70

533.40 value ſought.

Prob. 3. To find the value of an annuity upon the longeſt of two lives; that is, to continue ſo long as either of the perſons is in life.

Rule. From the ſum of the values of the ſingle lives ſubtract the value of the joint lives, and the remainder will be the value ſought.

Examp. What is the value of an annuity of 1 l. upon

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on the longeſt of two lives, the one perſon being 30, and the other 40 years of age, intereſt at 4 *per cent.?*

By the table, 30 years is - -	14.68
40 years is - -	13.20
Value of their joint lives, by Prob. 2.	27.88
Caſe 2. is,	9.62
Value ſought,	18.26

If the annuity be any other than 1 l. multiply the anſwer found as above by the given annuity.

If the two perſons be of equal age, find the value of their joint lives by Caſe 1. of Prob. 2.

Prob. 4. To find the value of the next preſentation to a living.

Rule. From the value of the ſucceſſor's life ſubtract the joint value of his and the incumbent's life, and the remainder will be the value of 1 l. annuity; which multiplied by the yearly income, will give the ſum to be paid for the next preſentation.

Examp. A enjoys a living of 100 l. *per annum*, and B would purchaſe the ſaid living for his life after A's death: The queſtion is, What he ought to pay for it, reckoning intereſt at 5 *per cent.* A being 60, and B 25 years of age?

	L.
By the table, B's life is - -	13.46
Joint value of both lives, by Prob. 2. is	6.97
The value of 1 l. annuity, - -	6.49
Multiply by - -	100
Value of next preſentation, - -	649.00

The value of a direct preſentation is the ſame as that of any other annuity for life, and is found for 1 l. by the table: which being multiplied by the yearly income, gives the value ſought.

Prob. 5. To find the value of a reverſion for ever, after two ſucceſſive lives; or to find the value of a living after the death of the preſent incumbent and his ſucceſſor.

Rule. By Prob. 3. find the value of the longeſt of the two lives, and ſubtract that value from the value of the perpetuity, and the remainder will be the value ſought.

Examp. A, aged 50, enjoys an eſtate or living of 100 l. *per annum*; B, aged 30, is intitled to his lifetime of the ſame eſtate after A's death; and it is propoſed to ſell the eſtate juſt now with the burden of A and B's lives on it: What is the reverſion worth, reckoning intereſt at 4 *per cent.?*

	L.
By the table, A's life of 50 is, -	11.34
B's life of 30 is, - -	14.68
Sum,	26.02
Value of their joint lives, found by Prob. 2. Caſe 2. is, -	8.60
Value of the longeſt life, - -	17.42 ſub.
From the value of the perpetuity,	25.00
Remains the value of 1 l. reverſion, -	7.58
Multiply by	100
Value of the reverſion, - - - -	758.00

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Prob. 6. To find the value of the joint continuance of three lives, one life failing, the annuity to ceaſe.

Rule. Find the ſingle values of the three lives from the table; multiply theſe ſingle values continually, calling the reſult the product of the three lives; multiply that product by the intereſt of 1 l. and that product again by 2, calling the reſult the double product; then, from the ſum of the ſeveral products of the lives, taken two and two, ſubtract the double product; divide the product of the three lives by the remainder, and the quot will be the value of the three joint lives.

Examp. A is 18 years of age, B 34, and C 56: What is the value of their joint lives, reckoning intereſt at 4 *per cent.?*

By the table, the value of A's life is 16.1, of B's 14.12, and of C's 10.01.

$16.1 \times 14.12 \times 10.01 = 2275.6$, product of the three lives,

$$\begin{array}{r} .04 \\ \hline 91.024 \\ 2 \\ \hline 182.048 \end{array}$$

182.048, double product.

Product of A and B,	$16.1 \times 14.12 \times 227.33$
A and C,	$16.1 \times 10.01 = 161.16$
B and C,	$14.12 \times 10.00 = 141.34$
Sum of all, two and two, -	529.83
Double product ſubtract - -	182.048
Remainder -	347.782

And 347.782)2275.600(6.54 value ſought.

Prob. 7. To find the value of an annuity upon the longeſt of three lives.

Rule. From the ſum of the values of the three ſingle lives, taken from the table, ſubtract the ſum of all the joint lives, taken two and two, as found by Prob. 2. and to the remainder add the value of the three joint lives, as found by Prob. 6. and that ſum will be the value of the longeſt life ſought.

Examp. A is 18 years of age, B 34, and C 56: What is the value of the longeſt of theſe three lives, intereſt at 4 *per cent.?*

By the table, the ſingle value of A's life is	16.1
ſingle value of B's life is	14.12
ſingle value of C's life is	10.01
Sum of the ſingle values,	40.23
By Prob. 2. the joint value of A and B is	10.76
joint value of A and C is	8.19
joint value of B and C is	7.65
Sum of the joint lives,	26.60
Remainder, -	13.63
By Prob. 6. the value of the 3 joint lives is	6.54
Value of the longeſt of the 3 lives,	20.17

Other problems might be added, but theſe adduced are ſufficient for moſt purpoſes. The reader probably may wiſh that the reaſon of the rules, which, it muſt be owned, are intricate, had been aſſigned; but this could not be done without entering deeper into the ſubject than was practicable in this place. See Chances.

ANNUITY of Tiends, in Scots law, a certain proportion of the tiends of erected benefices formerly payable to the crown, but now gone into diſuſe.

ANNULAR, in a general ſenſe, ſomething in the form of, or reſembling, a ring. It is alſo a peculiar denomination of the fourth finger, commonly called the *ring-finger.*

ANNULET, in architecture, a ſmall ſquare member in the Doric capital, under the quarter-round.

Annulet is alſo a narrow flat moulding, which is common to divers places of the columns, as in the baſes, capitals, &c. It is the ſame member which Vitruvius calls a *fillet;* Palladio, a *liſtel* or *cincture;* Scamozzi, and Mr Brown, a *ſupercilium, liſt, tinea, eye-brow, ſquare, rabbit.* See Architecture.

Annulet, a little circle, borne as a charge in coats-of-arms, as alſo added to them as a *difference.* Among the Romans it repreſented liberty and nobility. It alſo denotes ſtrength and eternity, by reaſon of its circular form.

When this figure is added as a difference, ſome authors aſſert, that it ſerves to remind the bearer to atchieve great actions.

ANNULLING, a term ſometimes uſed for cancelling or making void a deed, ſentence, or the like.

ANNUNCIADA, Annuntiada, or Annuntiata, an order of knighthood in Savoy, firſt inſtituted by Amadeus I. in the year 1409: their collar was of 15 links, interwoven one with another, in form of a true-lover's-knot; and the motto, F. E. R. T. ſignifying, *Fortitudo ejus Rhodum tenuit.* Amadeus VIII. gave the name *Annunciada* to this order, which was formerly known by that of *the knot of love;* changing at the ſame time the image of St Maurice patron of Savoy, which hung at the collar, for that of the Virgin Mary; and, inſtead of the motto above mentioned, ſubſtituting the words of the angel's ſalutation.

Annunciada is alſo the title of ſeveral religious orders, inſtituted at different times, and at different places, in honour of the annunciation. See the next article.

ANNUNCIATION, the tidings brought by the angel Gabriel to the Virgin Mary of the incarnation of Chriſt.

Annunciation is alſo a feſtival, kept by the church on the 25th of March, in commemoration of theſe tidings. This feſtival appears to be of very great antiquity. There is mention made of it in a ſermon which goes under the name of *Athanaſius.* Others carry it up to the time of Gregory Thaumaturgus, becauſe there is a ſermon likewiſe attributed to him upon the ſame ſubject. But the beſt critics reject both theſe writings as ſpurious. However, it is certain, this feſtival was obſerved before the time of the council of Trullo, in which there is a canon forbidding the celebration of all feſtivals in Lent, excepting the Lord's day, and the feaſt of the annunciation: ſo that we may date its original from the ſeventh century.

In the Romiſh church, on this feaſt, the pope performs the ceremony of marrying or cloyſtering a certain number of maidens, who are preſented to him in the church, clothed in white ſerge, and muffled up from head to foot: An officer ſtands by, with purſes containing notes of fifty crowns for thoſe who make choice of marriage, and notes of a hundred for thoſe who chuſe to veil.

Annunciation is likewiſe a title given by the Jews to part of the ceremony of the paſſover.

ANNUNCIATOR, the name of an officer in the church of Conſtantinople. It was his buſineſs to inform the people of the feſtivals that were to be celebrated.

ANODYNE (from *a* privative, and οδονω, doleo; or *a* neg. and ωδυνη, pain;) a term applied to medicines which eaſe pain, and procure ſleep. They are divided in to threeſorts, *viz.* 1. Paregorics, or ſuch as aſſwage pain. 2. Hypnotics, or ſuch as relieve by procuring ſleep. 3. Narcotics, or ſuch as eaſe the patient by ſtupifying him.

Opiates and narcotics deſtroy ſenſation. Some hypnotics and paregorics, as nitre, camphor, &c. procure eaſe and ſleep by removing the offending cauſe. Camphor is the beſt anodyne in nervous caſes, and at the decline of fevers. The doſes of theſe medicines are generally regulated by the pulſe.

ANOLYMPIADES, in antiquity, a name given by the Eleans to thoſe Olympic games which had been celebrated under the direction of the Piſæans and Arcadians. The Eleans claimed the ſole right of managing the Olympic games, in which they ſometimes met with competitors. The hundred and fourth Olympiad was celebrated by order of the Arcadians, by whom the Eleans were at that time reduced very low: this, as well as thoſe managed by the inhabitants of Piſa, they called ανολυμπιαδας, that is, "unlawful Olympiads;" and left them out of their annals, wherein the names of their victors and other occurences were regiſtred.

ANOMALISTICAL Year, in aſtronomy, the time that the earth takes to paſs through her orbit: it is alſo called the *Periodical Year.* The ſpace of time belonging to this year is greater than the tropical year, on account of the proceſſion of the equinoxes *.

ANOMALOUS, a term applied to whatever is irregular, or deviates from the rule obſerved by other things of the like nature.

Anomalous *Verbs,* in grammar, ſuch as are not conjugated conformably to the paradigm of their conjugation. They are found in all languages. In Latin, the verb *lego* is the paradigm of the third conjugation; and runs thus, *lego, legis, legit:* By the ſame rule it ſhould be *fero, feris, ferit;* but we ſay *fero, fers, fert; fero,* then, is an anomalous verb. In Engliſh, the irregularity relates often to the preter tenſe and paſſive participle: for example, *give,* were it formed according to rule, would make *gived* in the preter tenſe and paſſive participle; whereas, in the former, it makes *gave,* and in the latter *given.*

ANOMALY, in aſtronomy, an irregularity in the motion of the planets, whereby they deviate from the aphelion or apogee.

ANOMIA, in zoology, a genus of inſects belonging to the order of vermes teſtacea. The ſhell is bivalve, and the valves are unequal. One valve is perforated near the hinge; affixed by that perforation to ſome other body. There are 25 ſpecies of the anomia; of which, only two are natives of the Britiſh ſeas, *viz.* 1. The ephippium, with the habit of an oyſter; the one ſide convex, the other flat; perforated; adherent to other bodies, often to oyſter-ſhells, by a ſtrong tendinous ligature; colour of the inſide, perlaceous. Size, near two inches diameter. 2. The ſquammula, with ſhells reſembling the ſcales of fiſh; very delicate,

* See Aſtronomy.

delicate, and ſilvery; much flatted; perforated; very ſmall. Adheres to oyſters, crabs, lobſters, and ſhells. The ſpecies of this genus are commonly called *Beaked cockles*. No name has been given to the fiſh that inhabit it; for the recent ſhells of this kind are ſo very rare, that there is ſcarcely one to be found perfect. They are perhaps, as well as that which has given its form to the *cornu ammonis*, inhabitants of the deepeſt parts of the ocean; conſequently it muſt be ſome extraordinary agitation of that great body of water that can bring them at all to our knowledge in their recent ſtate.

The foſſile ſpecies of the *Anomia* genus are uncommonly numerous in this iſland, in our chalk-pits and limeſtone-quarries; and, in Glouceſterſhire, they are as common on the ploughed lands as pebbles in other places.

ANOMOEANS, in eccleſiaſtical hiſtory, the name by which the pure Arians were called in the fourth century, in contradiſtinction to the Semi-Arians. The word is formed from the Greek, ανομοιος, *different, diſſimilar:* For the pure Arians aſſerted, that the Son was of a nature different from, and in nothing like, that of the Father: whereas the Semi-Arians acknowledged a likeneſs of nature in the Son; at the ſame time that they denied, with the pure Arians, the conſubſtantiality of the Word.—The Semi-Arians condemned the Anomœans in the council of Seleucia; and the Anomœans in their turn condemned the Semi-Arians in the councils of Conſtantinople and Antioch, eraſing the word ομοιος, *like*, out of the Formula of Rimini and that of Conſtantinople.

ANOMORHOMBOIDIA, in natural hiſtory, the name of a genus of ſpars; the word is derived from the Greek, ανωμαλης, *irregular*, and ρομβοιδης a *rhomboidal* figure. The bodies of this genus are pellucid cryſtaline ſpars of no determinate or regular external form, but always breaking into regularly rhomboidal maſſes; eaſily fiſſile, and compoſed of plates running both horizontally and perpendicularly thro' the maſſes, but cleaving more readily and evenly in an horizontal, than in a perpendicular direction; the plates being ever compoſed of irregular arrangements of rhomboidal concretions. Of this genus there are five known ſpecies. 1. A white, bright, and ſhattery one; found in great quantities in the lead-mines of Derbyſhire, Yorkſhire, and Wales. 2. A milk-white, opaque, and ſhattery one, found in ſome parts of France, and very plentifully in Germany, and ſometimes in Wales and Scotland, and in the hills of Yorkſhire. 3. A hard, dull, and ſnow-white one, found in ſome of the mines in Derbyſhire, and in many of our northern countries. 4. A hard grey and pellucid one, found in the lead-mines of Yorkſhire, and very common in Germany. And, 5. A pellucid and colourleſs one; this is found in the lead-mines of Derbyſhire and Yorkſhire. All theſe in ſome degree have the double refraction of the iſland cryſtal. See Iſland-cryſtal.

ANONIS in botany. See Ononis.

ANONYMOUS, ſomething that is nameleſs, or of which the name is concealed. It is a term uſually applied to books which do not expreſs the author's name, or to authors whoſe names are unknown.

ANOREXIA, anorexy, (from α neg. and ορεξις, *appetite*); a want of appetite, or a loathing of food. The diſorder is either original or ſymptomatic. When it is original, its cauſes are, bad diet, too free drinking, voraciouſneſs, &c.: In which caſes, a vomit or two of ipecacuanha may be taken; and temperance, a light but cordial nouriſhing diet, and daily exerciſe, perſiſted in, will generally effect a recovery. But it is more frequently a ſymptom of ſome other diſorder; and then the cure depends on the removal of the original one.

ANOSSI, a province of the iſland of Madagaſcar, lying between Lat. 23° 18′ and 26° S. It is watered by many rivers, moſt of which run into the *Franchere*, *Ramevatte*, or *Immour*, the ſpring of which is in a mountain called *Manghage*, and diſcharges itſelf into the ſea in Lat. 25. 18. S. The mouth of this river is often ſtopped, and the courſe to the ſea interrupted, unleſs kept open by the overflowings of great rains and high tides. The water runs ſalt one league above the mouth, particularly in a free communication with the ſea. A lake, called *Ambou*, is formed at the mouth, half a league wide, with depth ſufficient for any ſhip if the mouth of the river was kept open. Next in bigneſs to the Franchere is the Manghafia, which ſprings from a mountain called *Siliva*, and empties itſelf into the ſea, where large ſhips may ride at anchor. Crocodiles breed in theſe and all the other rivers of the iſland.

Between the two rivers above-mentioned lies Cape St Romain, half a mile diſtant from the mouth of the Franchere, and which runs from the north-weſt ſix or ſeven leagues into the ſea. When the Cape is paſſed, the coaſt forms a great bay, in the ſhape of a croſs, which extends to the mouth of a river called *Dian Panouge*, or *Pitorah*. In the middle of this bay the land runs out, and almoſt forms a peninſula called *Tholangare*. Fort Dauphin lies to the north of this peninſula, and Port Dauphin over againſt it. This province has ſeveral other peninſulas and ſmall iſlands belonging to it. The country is beautiful; abounds in fruit-trees; is fertile in paſtures for cattle; and, if carefully cultivated, would produce all the neceſſaries of life. It is ſurrounded by high mountains, which are covered with woods and ſhrubs; but, about four miles diſtant from Fort Dauphin, the adjacent hills are quite deſtitute of verdure. The French often dug in this neighbourhood, expecting to meet with mines of gold and ſilver, particularly in one mountain where ſeveral ſprings flow near each other and empty themſelves into a neighbouring river. In this river they found ſeveral ſtones and heaps intermixed with yellow clay, with a great quantity of black and white ſpangles ſhining like ſilver, which they carefully pounded and waſhed, but without effect. About 60 yards above theſe ſprings the graſs, and every ſort of vegetable, appears half dried and yellow, from a metalline ſulphur, which gives that aſpect; but the top of the mountain is covered with a freſh and beautiful verdure. It is ſaid that the Portugueſe found gold at the foot of this mountain on the north-ſide, but that the place they had dug was filled up by the chiefs of the country after the Portugueſe had been driven out.

The province of Anoſſi is inhabited by three different ſorts of whites, and four ſorts of negroes. The whites are diſtinguiſhed by the names of *Rohandrians*, *Anacandrians*, and *Ondzatſi*. The whites are diſtinguiſhed from the negroes by the general name of *Za-*

ſeramini, or *Rahimini;* and the Rohandrians are diſtinguiſhed above the other whites. When they proceed to an election of a ſovereign, whom they call *Ompiandrian*, or *Dian Bahouache;* he is choſen from the Rohandrian race. Next to him the others hold the rank of princes, and are honoured as ſuch by all the reſt of the ſubjects. The Anacandrians are deſcendants of the chiefs, but who have degenerated, and are accounted the baſtards of princes, or thoſe who are deſcended from a Rohandrian and any inferior white or black woman. Theſe are likewiſe called by the name of *Ontempaſſemaca*, or people from the ſandy parts of Mecca, from whence, they ſay, came the Rohandrians. Both the Rohandrians and Anacandrians wear long hair, which hangs down in curls; and enjoy the privilege of killing beaſts. The Ondzatſi, or loweſt claſs of whites, are deſcended from the baſtards of the Anacandrians. Theſe are all fiſhermen, and are allowed to kill no land-animal except a chicken.

The four claſſes of negroes are named *Voadziri*, *Lohavohits*, *Ontſoa*, and *Ondeves*. The Voadziri, the moſt powerful and the richeſt, are maſters of ſeveral villages, and deſcended from the original lords of the country. They enjoy the privilege of killing beaſts, when at a diſtance from the whites, and no Rohandrian or Anacandrian in the village. The Lohavohits are deſcendents from the Voadziri, and alſo lords; but with this difference, that the one commands a whole diſtrict, and the juriſdiction of the others extends only to their own village and family. They are alſo permitted to kill thoſe beaſts they intend to eat, when at a diſtance from the whites. The Ontſoa are next to the Lohavohits, and are their near relations. The Ondeves are the loweſt of all, being originally ſlaves by father and mother. The Voadziri, Lohavohits, and Ontſoa, enjoy the privilege of ſubmitting themſelves, on the death of their lord or king, to any chief they pleaſe. In return for ſuch homage the new lord makes them a preſent, in conſequence of which he becomes heir to all their poſſeſſions. Hence the lower claſſes both of whites and blacks, when death approaches, are under the greateſt concern and anguiſh of mind, well knowing that their lords will not fail to deprive their children of every thing they poſſeſs. The Ondeves have not the ſame liberty with the others: but, in times of famine, the chiefs are obliged to ſupply them with neceſſaries; which if they fail to do, they have the liberty of ſubmitting themſelves to new maſters. The inhabitants of this province have no temples, and very little appearance of religion; only they keep up a cuſtom of immolating beaſts upon particular occaſions, as in ſickneſs, planting yams or rice, on aſſemblies, &c. They offer the firſt-born beaſt to the devil and to God, naming the devil firſt, in this manner, *Dianbilis Aminhanhabare*, or, "Lord Devil and God."—There are ſeveral towns on the river Franchere; and near this river the Portugueſe had a fort built upon a ſteep rock, and ſeveral buildings below, with incloſures, which furniſhed all ſorts of neceſſaries for their ſubſiſtence; but they were all maſſacred by the natives.

This province ſeems originally to have been inhabited by negroes. The whites or Zaferamini ſettled in it about 200 years ago, and conquered the negroes. But they themſelves were conquered by the French, though under the government of a king whom they honoured as a god. In 1642, captain Rivault obtained a permiſſion to eſtabliſh a colony in this part of the iſland; and accordingly he took poſſeſſion of it in the name of the king of France, in the month of September, that ſame year. The French landed 200 men well armed and provided with ſtore of ammunition and other neceſſaries for building a fort, which they immediately ſet about; but no ſooner did the natives obſerve their intention, than they uſed their utmoſt art to prevent their deſign from taking effect. This created a war, in which the French were victors; and, the natives becoming in time much better reconciled to them, they intermarried, and lived up and down in ſeveral towns at ſome diſtance from one another, not above five or ſix in a place. This tranquillity laſted for ſome years; but at laſt the natives, growing jealous, reſolved to free themſelves from a foreign yoke, and accordingly formed a conſpiracy to cut off all the French in one day; which they ſoon after effected, not leaving a ſingle perſon alive. In 1644 the above-mentioned Fort Dauphin was erected in Lat. 25. 6. S. Many buildings were erected, behind the Fort, adjoining to the governor's houſe, with great incloſures that produced every ſort of fruit and kitchen herb. In 1656 this fort was accidentally deſtroyed by fire; but was ſoon after repaired, and ſtill continues notwithſtanding the cataſtrophe above-mentioned, and its garriſon carries on frequent wars with the natives.

ANOUT, a ſmall iſland in the Schagerrack, or that part of the ſea of Denmark which has Norway on the north, Jutland on the weſt, and the iſle of Zealand on the ſouth; it lies in 13° E. Long. and 56° 36′ N. Lat.

ANSÆ, in aſtronomy, implies the parts of Saturns ring projecting beyond the diſk of the planet.—The word is Latin, and properly ſignifies *handles*; theſe parts of the ring appearing like handles to the body of the planet.

ANSE, an ancient town of France, in the Lyonois, ten miles north of Lyons, Long. 6. 55. N. Lat. 45. 55.

ANSELM, archbiſhop of Canterbury, in the reigns of William Rufus and Henry I. He was born in the year 1033, at Aoſt, a town in Savoy at the foot of the Alps. He became a monk in the abbey of Bec in Normandy; of which he was afterwards choſen prior, and then abbot. In the year 1092, he was invited over to England by Hugh earl of Cheſter; and in the year following was prevailed on, as we are told, with great difficulty, to accept the archbiſhoprick of Canterbury. He enjoined celibacy on the clergy; for which he was baniſhed by king Rufus, but recalled by Henry at his coming to the crown. He refuſed to conſecrate ſuch biſhops as were inveſted by the king, according to pope Urban's decree; flatly denying it to be the king's prerogative: for this he was outed again; till, the pope and king agreeing, he was recalled in 1107. In ſhort, from the day of his conſecration to that of his death, he was continually employed in fighting the prerogative of the church againſt that of the crown; and for that purpoſe ſpent much of his time in travelling backwards and forwards between England and Rome, for the advice and direction of his holineſs. At the council of Bari, in the kingdom of Naples, the pope being puzzled by the arguments of the Greeks againſt the Holy Ghoſt's proceeding from the Father, he called upon Anſelm, who was preſent, and he diſcuſſed their objections with great applauſe. Prieſts call him a reſolute ſaint; to other people he appears to have been an obſtinate and inſolent prieſt. He wrought many miracles, if we believe the author of his life, both before and after his death, which happened at Canterbury, in the 76th year of his age, *anno* 1109. He was canoniſed in the reign of Henry VII. Anſelm, tho' we may diſregard him as a ſaint, deſerves to be remembered as one of the principal revivers of literature, after three centuries of profound ignorance.

His works have been printed in different years, and at different places, *viz.* Nuremb. 1491. Paris, 1544 and 1549. Venice, 1549. Cologn, 1573 and 1612. Lyons, 1630. But the beſt is that of father Gerberon, printed at Paris, 1675. It is divided into three parts; the firſt contains dogmatical tracts, and is intitled *Monologia*; the ſecond contains practical and devotional tracts; the third part conſiſts of letters, in four books.

ANSER, in ornithology, the trivial name of a ſpecies of anas. See ANAS.

ANSER, in aſtronomy, a ſmall ſtar, of the fifth or ſixth magnitude, in the milky way, between the ſwan and eagle, firſt brought into order by Hevelius.

ANSERES, the name which Linnæus gives to his third order of birds. See ZOOLOGY, n° 8.

ANSIBARII, or ANSIVARII, an ancient people of Germany, ſituated ſomewhere in the neighbourhood of the Chauci. All we know of their hiſtory is, that, in the reign of the Emperor Nero, they were driven from their own poſſeſſions by the Chauci. Being then in a forlorn condition, they took poſſeſſion of ſome uninhabited lands, which had been uſed as paſture for the horſes of the Roman ſoldiers. They were led by one Boiocalus, a man of great valour, and of known fidelity to the Romans. He remonſtrated to the Romans, who objected to their taking poſſeſſion of theſe lands, That the territory in diſpute was large; and requeſted, that it might be allowed to an unhappy people, driven from their own habitations: that, at the ſame time, wide tracts might be retained for the horſes and cattle of the ſoldiers to graze in: that it was inconſiſtent with humanity to famiſh men in order to feed beaſts, &c. and at laſt, lifting up his eyes to heaven, he aſked the celeſtial luminaries how they could behold a deſolate ſoil, and if they would not more juſtly let looſe the ſea to ſwallow up uſurpers, who had engroſſed the whole earth? To this the Roman commander, Avitus, replied, that the weakeſt muſt ſubmit to the ſtrongeſt; and that, ſince the gods, to whom they had appealed, had left the ſovereign judgment to the Romans, they were reſolved to ſuffer no other judges than themſelves. To Boiocalus himſelf, however, he privately offered lands as a reward for his long attachment to the Romans: but this offer the brave German rejected, as a price for betraying his people; adding, "A place to live in we may want, but a place to die in we cannot." The Anſibarii now invited the neighbouring nations to join them againſt the Romans; but they, dreading the power of that nation, refuſed to give them any aſſiſtance: upon which they applied to the neighbouring nations, begging leave to ſettle in their territories; but being every where driven out as enemies and intruders, theſe unhappy people were reduced to wander up and down till every one of them periſhed.

ANSIKO, a kingdom of Africa, bounded on the weſt by the river Umbre which runs into the Zaire, the kingdom of Wangua, and the Amboes who border on Loango; on the north, by ſome deſerts of Nubia; and on the ſouth, by Songo and Sonda, provinces of Congo. Here are great numbers of wild beaſts, as lions, rhinoceroſes, &c. and many copper mines. The king of Anſiko, or the great Macoco, commands 13 kingdoms, and is eſteemed the moſt powerful monarch in Africa. The inhabitants of Angola have a tradition, that this is the proper country of the Giagas, who came originally from Sierra Leona, and over-ran like a torrent the whole coaſt as far as Benguela; that, being weakened by numerous battles, and unable to force the deſiles in order to return to Sierra Leona, they arrived on the borders of Monomotapa, where being defeated, they were forced to remain in the provinces of Anſiko. Be this as it will, the Anſikans yield not in the leaſt to the Giagas in fierceneſs and barbarity. They are ſo accuſtomed to the eating of human fleſh, that it is aſſerted they have markets where it is publicly ſold, and that there are no other graves for the dead than the bellies of the living. They try the courage of their priſoners of war by ſhooting at them as at marks, directing their arrows above or around their heads; and whoever diſcovers the leaſt ſigns of fear, is immediately devoured without remedy. Thoſe who appear intrepid and reſolute, have their noſes and ears bored, and two fore-teeth of the upper jaw drawn. They are then improved in barbarity, by accuſtoming them to the moſt horrid cruelties.

The Anſikans are neat, well-proportioned, and ſtrong; wandering about from place to place, without either ſowing or reaping. They are dreaded for their extreme brutality, and never traded with by the Europeans. Their language is barbarous, and difficult to be learned, even by the inhabitants of Congo. The moſt diſtinguiſhed among them wear red and black caps of Portugueſe velvet; the lower ranks go naked from the waiſt upwards; and, to preſerve their health, anoint their bodies with a compoſition of pounded white ſandal-wood, and palm-oil. Their arms are battle-axes, and ſmall but very ſtrong bows adorned with ſerpents ſkins. Their ſtrings are made of ſupple and tender ſhoots of trees, that will not break, and their arrows of hard and light wood. Theſe people, who kill birds flying, ſhoot with ſuch ſurpriſing ſwiftneſs, that they can diſcharge 28 arrows from the bow before the firſt falls to the ground. With equal dexterity they manage their battle-axes; one end of which is ſharpened and cuts like a wedge, and the other flattened like a mallet, with an handle ſet between, about half the length of the iron, rounded at the end like an apple, and covered with the ſkin of a ſerpent.—The current money in this country is the zimbis or ſhell, which is fiſhed for, and paſſes among ſeveral African nations.—They worſhip the ſun as their chief deity; whom they repreſent by the figure of a man, and the moon by that of a woman. They have alſo an infinite number of inferior deities, each individual having a particular idol whom he addreſſes on certain occaſions.

ANSLO, a ſea-port town of Norway, in the province of Aggerhuys, with a biſhop's ſee. The ſupreme court of juſtice is held here for Norway. It is ſeated on a bay of the ſame name. E. Long. 10. 14. N. Lat. 50. 24.

ANSON (George), a gentleman whoſe merit and good fortune, as a naval commander, exalted him to the rank of nobility. He was the ſon of William Anſon, Eſq; of Huckborough, in Staffordſhire; and, ſhewing an early inclination for the ſea, received a ſuitable education. The firſt command he enjoyed was that of the Weazle ſloop, in 1722; but the moſt memorable action of his life, and the foundation of his future good fortune, took place on his receiving the command of five ſhips, a ſloop, and two victuallers, equipped to annoy the Spaniards in the South ſeas, and to co-operate with admiral Vernon acroſs the Iſthmus of Darien: an expedition the principal object of which failed by the unaccountable delay in fitting him out. He ſailed, however, in Sept. 1740; doubled Cape Horn in a dangerous ſeaſon; loſt moſt of his men by the ſcurvy; and with only one remaining ſhip, the Centurion, croſſed the great Pacific Ocean. If no conſiderable national advantage reſulted from this voyage, Commodore Anſon made his own fortune, and enriched his ſurviving companions, by the capture of a rich galleon on her paſſage from Acapulco to Manilla; with which he returned home round the Cape of Good Hope. If he was lucky in meeting this galleon, he was no leſs fortunate in eſcaping a French fleet then cruiſing in the channel, by ſailing through it during a fog. He arrived at Spithead in June 1744. In a ſhort time after his return, he was appointed rear-admiral of the blue, and one of the lords of the admiralty. In April 1745, he was made rear-admiral of the white, and the following year vice-admiral of the blue; at which time he was choſen to repreſent the borough of Heydon in parliament. In 1747, being on board the Prince George of 90 guns, in company with Admiral Warren, and twelve other ſhips, he intercepted, off Cape Finiſterre, a powerful fleet, bound from France to the Eaſt and Weſt Indies; when, by his valour and conduct, he again enriched himſelf and his officers, and at the ſame time ſtrengthened the Britiſh navy, by taking ſix men of war and four Eaſt-Indiamen, not one of them eſcaping. The French admiral, M. Jonquiere, on preſenting his ſword to the conqueror, ſaid, *Monſieur, vous avez vaincu l'Invincible, et la Gloire vous ſuit:* "Sir, you have conquered the Invincible, and Glory follows you;" pointing to the ſhips, named the *Invincible* and the *Glory*, he had taken. For his ſignal ſervices, his late majeſty created him Baron of Soberton, in Hants. The ſame year he was appointed vice-admiral of the red; and, on the death of Sir John Norris, was made vice-admiral of England. In 1748 he was made admiral of the blue: he was afterwards appointed firſt lord of the admiralty, and was at length made admiral and commander in chief of his majeſty's forces; in which rank he continued, with a very ſhort interval, until his death; and the laſt ſervice he performed was to convoy queen Charlotte to England. He died in June 1762. No performance ever met with a more favourable reception, than the account of Anſon's voyage round the world. Tho' it is printed under the name of his chaplain, it was compoſed under his lordſhip's own inſpection, and from the materials he himſelf furniſhed, by the ingenious Mr Benjamin Robins.

ANSPACH (the marquiſate of) is a ſmall territory of Franconia, in Germany, bounded on the north by the biſhopricks of Wartſburg and Bamberg, which laſt likewiſe lies to the weſt; the earldoms of Holach and Oeting, with the biſhoprick of Aichſtet, lie on the ſouth; and the palatinate of Bavaria and the territory of Nuremberg on the eaſt. The country is fruitful, and interſperſed with woods, which render it agreeable for hunting. Beſides the city Anſpach, which is the capital, the chief towns are Kreglin, Swaſbach, Kreilſheim, Rot, and Waſſer-Truding.

Anſpach is a ſmall but pretty town, very well built, and has ſeveral churches. It is walled round, but has no other fortifications. In the palace there is a remarkable cabinet of curioſities. It is ſeated on a river of the ſame name, and belongs to the houſe of Brandenburg. E. Long. 10. 42. N. Lat. 49. 14.

ANSPESSADES, in the French armies, a kind of inferior officer in the foot, below the corporals, but above the common centinels. There are uſually four or five of them in a company.

ANSTRUTHER *Eaſter*, and *Weſter*, two royal burghs of Scotland, ſituated on the ſouth-eaſt coaſt of the county of Fife, in W. Long. 2. 25. N. Lat. 56. 20.

ANT, in zoology. See Formica.

Ant-*Bear*, or *Ant-eater*, in zoology. See Myrmecophaga.

Ant-*Lion*, in zoology. See Formica-*Leo*.

Ant-*Eggs*, a name popularly given to a kind of little white balls found in the banks or neſts of ants, ordinarily ſuppoſed to be the ova of this inſect.

Late naturaliſts have obſerved, that theſe are not properly the ants eggs, but the young brood themſelves in their firſt ſtate; they are ſo many little vermiculi wrapped up in a film, or ſkin, compoſed of a ſort of ſilk, which they ſpin out of themſelves as ſilk-worms and caterpillars do. At firſt they are hardly obſerved to ſtir: but, after a few days continuance, they exhibit a feeble motion of flexion and extenſion; and begin to look yellowiſh and hairy, ſhaped like ſmall maggots, in which ſhape they grow up till they are almoſt as large as ants. When they paſs their metamorphoſis, and appear in their proper ſhape, they have a ſmall black ſpeck on them cloſe to the anus of the included ant, which M. Lewenhoeck probably enough imagines to be the fæces voided by it. Dr Ed. King opened ſeveral of theſe vulgarly reputed eggs; in ſome of which he found only a maggot in the circumſtances as above deſcribed; while in another the maggot had begun to put on the ſhape of an ant about the head, having two little yellow ſpecks, where the eyes were to be. In others, a further progreſs was obſerved, the included maggots being furniſhed with every thing to complete the ſhape of an ant, but wholly tranſparent, the eyes only excepted, which were as black as bugles. Laſtly, in others, he took out every way perfect and complete ants, which immediately crept about among the reſt. Theſe ſuppoſed ants eggs are brought up every morning in ſummer, near the top of the bank, where they are lodged all the warm part of the day, within reach of the ſun's influence. At night, or if it be cool, or like to rain, they carry them down to a greater depth; ſo that you may dig a foot depth e'er you come at them. The true ants eggs are the white ſubſtance which, upon opening their banks, appears to the eye like the ſcatterings of fine white ſugar, or ſalt, but very ſoft and tender. Examined by a microſcope, it is found to conſiſt of ſeveral pure, white appearances, in diſtinct membranes, all figured like the leſſer ſort of birds eggs, and as clear as a fiſhes bladder. The ſame ſubſtance is found in the bodies of the ants themſelves. On this ſpawn, when emitted, they lie in multitudes, to brood, till in ſome time it is turned into little vermicles as ſmall as mites, commonly called *ants-eggs*.

Ant-*Hills*, are little hillocks of earth, which the ants throw up for their habitation and the breeding of their young. They are a very great miſchief to dry paſtures, not only by waſting ſo much land as they cover, but by hindering the ſcythe in mowing the graſs, and yielding a poor hungry food pernicious to cattle. The manner of deſtroying them is to cut them into four parts from the top, and then dig into them ſo deep as to take out the core below, ſo that, when the turf is laid down again, it may lie ſomewhat lower than the level of the reſt of the land: by this means it will be wetter than the reſt of the land; and this will prevent the ants from returning to the ſame place, which otherwiſe they would certainly do. The earth that is taken out muſt be ſcattered to as great a diſtance every way as may be, otherwiſe they will collect it together and make another hill juſt by. The proper time for doing this is winter; and if the places be left open, the froſt and rains of that time of the year will deſtroy the reſt: but in this caſe care muſt be taken that they are covered up early enough in the ſpring, otherwiſe they will be leſs fertile in graſs than the other places. In Hertfordſhire they uſe a particular kind of ſpade for this purpoſe. It is very ſharp, and formed at the top into the ſhape of a creſcent, ſo that the whole edge makes up more than three fourths of a circle; this cuts in every part, and does the buſineſs very quickly and effectually. Others uſe the ſame inſtruments that they do for mole-hills. Human dung is a better remedy than all theſe, as is proved by experiment; for it will kill great numbers of them, and drive all the reſt away, if only a ſmall quantity of it be put into their hills.

ANTA, in the ancient architecture, a ſquare pilaſter, placed at the corners of buildings.

Anta, or *Ante*, a ſmall kingdom on the gold coaſt of Africa, extending about ten leagues in length.—The country is covered with large trees, among which ſtand a number of fine villages. The ſoil is exceedingly rich, and the face of the country beautiful. The air is alſo much more ſalubrious than in other places of the gold coaſt; it being obſerved by all writers, that the number of deaths here bears no proportion to that on any other part on the coaſts of Guinea. This country contains the following villages, which deſerve a particular deſcription on account of the commerce they drive; viz. *Bourtrey*, *Tokorari*, *Sukoada*, and *Sama*; for which, ſee thoſe articles.—Formerly Anta was potent and populous, inhabited by a bold and rapacious people, who greatly annoyed the Europeans by their frequent incurſions; but by continual wars with their neighbours they are now greatly enfeebled, and the country in a manner depopulated. The ſpirit of the few remaining inhabitants is fled: they are deſponding, diſpirited, and abject, ſeeking protection from the Dutch and other Europeans who have forts on this coaſt, and looking upon them as their beſt friends.

ANTACIDS, in pharmacy, an appellation given to all medicines proper to correct acid or ſour humours.

Under the claſs of antacids come, 1. Abſorbents; as chalk, coral, ſea-ſhells, hæmatites, and ſteel filings. 2. Obtundents; as oils, and fats. 3. Immutants; as lixivious ſalts, and ſoaps.

ANTÆUS, in fabulous hiſtory, a giant of Libya, ſon of Neptune and Terra. Deſigning to build a temple to his father, of mens ſculls, he ſlew all he met; but Hercules fighting him, and perceiving the aſſiſtance he received from his mother (for by a touch of the earth he refreſhed himſelf when weary), lifted him up from the earth, and ſqueezed him to death.

ANTAGONIST, denotes an adverſary, eſpecially in ſpeaking of combats and games.

Antagonist *muſcles*, in anatomy, thoſe which have oppoſite functions; as flexors and extenſors, abductors and adductors, &c.

ANTANACLASIS, in rhetoric, a figure which repeats the ſame word, but in a different ſenſe; as, *dum vivimus, vivamus*.

ANTAGOGE, in rhetoric, a figure by which, when the accuſation of the adverſary is unanſwerable, we load him with the ſame or other crimes.

ANTAPHRODISIACS, in pharmacy, medicines proper to diminiſh the ſemen, and conſequently extinguiſh or leſſen all deſires of venery.

ANTARCTIC, in a general ſenſe, denotes ſomething oppoſite to the arctic or northern pole. Hence antarctic circle is one of the leſſer circles of the ſpheres, and diſtant only 23° 30′ from the ſouth pole, which is likewiſe called antarctic for the ſame reaſon.

ANTARES, in aſtronomy, the name of a ſtar of the firſt magnitude, called alſo the ſcorpion's heart. Its longitude is 60° 13′ 14″ of Sagittarius; and its latitude 4° 31′ 26″ S.

ANTAVARE, a province of the Iſland of Madagaſcar, lying about 21° 30′ S. Lat; and bounded by the province and cape of Manouſi. The greateſt part of it is watered by the river Mananzari, whoſe ſource is in the red mountains of Ambohitſmene.

ANTE´, in heraldry, denotes that the pieces are let into one another in ſuch form as there is expreſſed; for inſtance, by dove-tails, rounds, ſwallow-tails, or the like.

ANTEAMBULONES, in Roman antiquity, ſervants who went before perſons of diſtinction to clear the way before them. They uſed this formula, *Date locum domino meo*, i. e. Make room or way for my maſter.

ANTECEDENT, in general, ſomething that goes before another, either in order of time or place.

Antecedent, in grammar, the words to which a relative refers.

Antecedent, in logic, is the firſt of the two propoſitions in an enthymeme.

Antecedent, in mathematics, is the firſt of two terms of a ratio, or that which is compared with the other.

ANTECEDENCE, in aſtronomy, an apparent motion of a planet towards the weſt, or contrary to the order of the ſigns.

ANTECESSOR, one that goes before. It was an appellation given to thoſe who excelled in any ſcience. Juſtinian applied it particularly to profeſſors of civil law; and, in the univerſities of France, the teachers of law take the title *anteceſſores* in all their theſes.

ANTECURSORES, in the Roman armies, a party of horſe detached before, partly to get intelligence, proviſions, &c. and partly to chuſe a proper place to encamp in. Theſe were otherwiſe called *anteceſſores*, and by the Greeks *prodromi*.

ANTEDATE, among lawyers, a ſpurious or falſe date prior to the true date of a bond, bill, or the like.

ANTEDILUVIAN, in a general ſenſe, implies ſomething that exiſted before the flood.

ANTEDILUVIAN *World*; the earth as it exiſted before the flood. See EARTH.

ANTEDILUVIANS, a general name for all mankind who lived before the flood, and ſo includes the whole of the human race from Adam to Noah and his family.——Concerning them all the authentic particulars we have are contained in the book of Geneſis; and from the ſhort hints given there, we can only form a few conjectures.

The only thing we know as to their religious rites is, that they offered ſacrifices, and that very early, both of the fruits of the earth, and of animals; but whether the blood and fleſh of the animals, or only their milk and wool, were offered, is a diſputed point.—Some have endeavoured to prove, that all the patriarchs from Adam had ſtated places, and annual and weekly times, ſet apart for divine worſhip, and alſo a ſeparate maintenance for the prieſts: all which particulars may be true, though they cannot be made out from ſcripture. But what is more extraordinary, they pretend to tell us the very day of the week on which the antediluvian ſabbath was kept; and that it was the ſame with the Chriſtian ſabbath, or Sunday.

Of the arts and ſciences of theſe people we have not much more to ſay. They ſeem rather to have ſpent their time in luxury and wantonneſs, to which the abundant fertility of the firſt earth invited them, than in diſcoveries or improvements, which probably they ſtood much leſs in need of than their ſucceſſors. The art of working metals was found out by the laſt generation of Cain's line; and muſic, which they might be ſuppoſed to practiſe for their pleaſure, was not brought to any perfection, if invented, before the ſame generation. Some authors have ſuppoſed aſtronomy to have been cultivated by the antediluvians, though this is probably owing to a miſtake of Joſephus: but it is to be preſumed, the progreſs they made therein, or in any other ſcience, was not extraordinary; it being even very doubtful whether letters were ſo much as known before the flood; whatever is pretended by ſome men, who have conceived ſo high an opinion of Adam's knowledge, that they ſuppoſe it to have been almoſt univerſal: nor can any thing be inferred from the books attributed to that patriarch, or to Seth, and Enoch, which are forgeries too groſs to deſerve any conſideration.

As to their politics and civil conſtitutions, we have not ſo much as any circumſtances whereon to build conjectures. It is probable, the patriarchal form of government, which certainly was the firſt, was ſet aſide when tyranny and oppreſſion began to take place, and much ſooner among the race of Cain than that of Seth. It ſeems alſo, that their communities were but few, and conſiſted of vaſtly larger numbers of people than any formed ſince the flood: or rather, it is a queſtion, whether, after the union of the two great families of Seth and Cain, there were any diſtinction of civil ſocieties, or diverſity of regular governments, at all. It is more likely, that all mankind then made but one great nation, though living in a kind of anarchy, divided into ſeveral diſorderly aſſociations; which, as it was almoſt the natural conſequence of their having, in all probability, but one common language, ſo it was a circumſtance which greatly contributed to that general corruption, which otherwiſe perhaps could not have ſo univerſally overſpread the antediluvian world. And for this reaſon chiefly, as it ſeems, ſo ſoon as the poſterity of Noah were ſufficiently increaſed, a plurality of tongues was miraculouſly introduced, in order to divide them into diſtinct ſocieties, and thereby prevent any ſuch total depravation for the future. See CONFUSION *of Tongues*.

The antediluvian world was, in all probability, ſtocked with a much greater number of inhabitants than the preſent earth either actually does, or perhaps is capable of containing or ſupplying. This ſeems naturally to follow from the great length of their lives, which exceeding the preſent ſtandard of life in the proportion, at leaſt, of ten to one, the antediluvians muſt accordingly in any long ſpace of time double themſelves, at leaſt, in about the tenth part of the time in which mankind do now double themſelves: for they began to beget children as early, and left off as late, in proportion, as men do now, and the ſeveral children of the ſame father ſeem to have ſucceeded as quickly one after another as they uſually do at this day; and as many generations, which are but ſucceſſive with us, were contemporary before the flood; the number of people living on the earth at once would be by that means ſufficiently increaſed to anſwer any defect which might ariſe from other circumſtances not conſidered. So that, if we make a computation on theſe principles, we ſhall find, that there were a conſiderable number of people in the world at the death of Abel, though their father Adam was not then 130 years old; and that the number of mankind before the deluge would eaſily amount to above one hundred thouſand millions (even according to the Samaritan chronology), that is, to twenty times as many as our preſent earth has, in all probability, now upon it, or can well be ſuppoſed capable of maintaining in its preſent conſtitution.

The following table, made upon the abovementioned principles by Mr Whiſton, ſhews at leaſt what number of people might have been in the antediluvian world.

Number of mankind.	*Year of the world.*	*Year of doubling.*	*Series.*
4	2	2	1
8	6	4	2
16	12	6	3
32	20	8	4
64	30	10	5
128	42	12	6
256	56	14	7
512	72	16	8
1024	90	18	9
2048	110	20	10
4096	132	22	11
8192	156	24	12
16,384	182	26	13
32,768	210	28	14
65,536	240	30	15
131,072	272	32	16
262,144	306	34	17

Antediluvians.

Number of mankind.	Year of the world.	Year of doubling.	Series.
524,288	342	36	18
1,048,576	380	38	19
2,097,152	420	40	20
4,194,304	462	42	21
8,388,608	506	44	22
16,777,216	552	46	23
33,554,432	600	48	24
67,108,864	650	50	25
134,217,728	702	52	26
268,435,456	756	54	27
536,870,912	812	56	28
1,073,741,824	870	58	29
2,147,483,648	930	60	30
4,294,967,296	992	62	31
8,589,934,592	1056	64	32
17,179,869,184	1122	66	33
34,359,738,368	1190	68	34
68,719,476,736	1260	70	35
137,438,953,472	1332	72	36
274,877,906,944	1406	74	37
549,755,813,888	1482	76	38

As to any hiſtory of tranſactions before the flood, beſides the general account already given, we are left entirely in the dark by the ſacred hiſtorian. The Jews and eaſtern nations, however, have made ample amends for the ſilence of Moſes, by the abundance of fables they have invented. The only part of their traditions which can be connected in any thing like hiſtory is what follows.——After the death of Adam, Seth with his family ſeparated themſelves from the profligate race of Cain, and choſe for their habitation the mountain where Adam was buried, the Cainites remaining below in the plain where Abel was killed; and, according to our hiſtorians, this mountain was ſo high, that the inhabitants could hear the angels ſinging the praiſes of God, and even join them in that ſervice. Here they lived in great purity and ſanctity of manners. Their conſtant employment was praiſing God, from which they had few or no avocations; for their only food was the fruits of the trees which grew on the mountain, ſo that they had no occaſion to undergo any ſervile labours, nor the trouble of ſowing and gathering in their harveſt. They were utter ſtrangers to envy, injuſtice, or deceit. Their only oath was, "By the blood of Abel;" and they every day went up to the top of the mountain to worſhip God, and to viſit the body of Adam, as a mean of procuring the Divine bleſſing. Here, by contemplation of the heavenly bodies, they laid the foundations of the ſcience of aſtronomy; and, leſt their inventions ſhould be forgotten, or loſt before they were publicly known, underſtanding, from a prediction of Adam's, that there would be a general deſtruction of all things, once by fire, and once by water, they built two pillars, one of brick, and the other of ſtone, that if the brick one happened to be overthrown by the flood, or otherwiſe deſtroyed, that of ſtone might remain. This laſt, Joſephus ſays, was to be ſeen in his time in the land of Siriad, (thought to be in Upper Egypt).

Antediluvians.

The deſcendents of Seth continued in the practice of virtue till the 40th year of Jared, when an hundred of them hearing the noiſe of the muſic, and the riotous mirth of the Cainites, agreed to go down to them from the holy mountain. On their arrival in the plain, they were immediately captivated by the beauty of the women, who were naked, and defiled themſelves with them; and this is what they mean by the intermarriage of the ſons of God with the daughters of men, mentioned by Moſes. The example of theſe apoſtate ſons of Seth was ſoon followed by others; and from time to time, great numbers continued to deſcend from the mountain, who, in like manner, took wives from the abandoned race of Cain. From theſe marriages ſprung the giants, (who, however, according to Moſes, exiſted before); and, theſe being as remarkable for their impiety as for their ſtrength of body, tyrannized in a cruel manner, and polluted the earth with wickedneſs of every kind. This defection became at laſt ſo univerſal, that none were left in the holy mountain, except Noah, his wife, his three ſons and their wives.

Beroſus, a Chaldæan hiſtorian, who flouriſhed in the time of Alexander the Great, enumerates ten kings who reigned in Chaldea before the flood; of whom the firſt, called *Alorus*, is ſuppoſed to be Adam, and Xiſuthrus, the laſt, to be Noah.—This Alorus declared that he held his kingdom by divine right, and that God himſelf had appointed him to be the paſtor of the people. According to our hiſtorian, in the firſt year of the world, there appeared out of the Red Sea, at a place near the confines of Babylonia, a certain *irrational* animal called *Oannes*. He had his whole body like that of a fiſh; but beneath his fiſhes head grew another of a different ſort, (probably a human one). He had alſo feet like a man, which proceeded from his fiſhes tail, and a human voice, the picture of him being preſerved ever after. This animal converſed with mankind in the day-time, without eating any thing: he delivered to them the knowledge of letters, ſciences, and various arts: he taught them to dwell together in cities, to erect temples, to introduce laws, and inſtructed them in geometry: he likewiſe ſhewed them how to gather ſeeds and fruits, and imparted to them whatever was neceſſary and convenient for a civilized life; but after this time there was nothing excellent invented. When the ſun ſet, Oannes retired into the ſea, and continued there all night. He not only delivered his inſtructions by word of mouth, but, as our author aſſures us, wrote of the origin of things, and of political œconomy. This, or a ſimilar animal, is alſo mentioned by other authors.

Of Alaſporus, the ſecond king, nothing remarkable is related. His ſucceſſor, Amelon, or Amillarus, was of a city called *Pantabibla*. In his time another animal reſembling the former appeared, 260 years after the beginning of this monarchy. Amelon was ſucceeded by Metalarus, and he by Daonus, all of whom were of the ſame city. In his time, four animals, of a double form, half man and half fiſh, made their appearance. Their names were *Euedocus*, *Eneugamus*, *Encubulus*, and *Anementus*. Under the next prince, who was likewiſe of Pantabibla, appeared another animal of the ſame kind, whoſe name was *Odacon*. All theſe explained more particularly what had been conciſely delivered by Oannes.

In the reign of the tenth king, Xiſuthrus, happened the great deluge, of which our author gives the following account: Cronus, or Saturn, appeared to Xiſuthrus in a dream, and warned him, that on the fifteenth of the month Dæſius mankind would be deſtroyed by a flood; and therefore commanded him to write down the original, intermediate ſtate, and end of all things, and bury the writings under ground in Sippara, the city of the ſun; that he ſhould alſo build a ſhip, and go into it with his relations and deareſt friends, having firſt furniſhed it with proviſions, and taken into it fowls and four-footed beaſts; and that, when he had provided every thing, and was aſked whither he was ſailing, he ſhould anſwer, *To the gods, to pray for happineſs to mankind.* Xiſuthrus did not diſobey, but built a veſſel, whoſe length was five furlongs, and breadth two furlongs. He put on board all he was directed, and went into it with his wife, children, and friends. The flood being come, and ſoon ceaſing, Xiſuthrus let out certain birds, which finding no food, nor place to reſt upon, returned again to the ſhip. Xiſuthrus, after ſome days, let out the birds again; but they came back again to the ſhip, having their feet daubed with mud: but when they were let go the third time, they came no more to the ſhip, whereby Xiſuthrus underſtood, that the earth appeared again; and thereupon he made an opening between the planks of the ſhip, and ſeeing that it reſted on a certain mountain, he came out with his wife, and his daughter, and his pilot; and having worſhipped the earth, and raiſed an altar, and ſacrificed to the gods, he and thoſe who went out with him diſappeared. They who were left behind in the ſhip, finding Xiſuthrus, and the perſons that accompanied him, did not return, went out themſelves to ſeek for him, calling him aloud by his name: but Xiſuthrus was no more ſeen by them; only a voice came out of the air, which enjoined them, as their duty was, to be religious; and informed them, that, on account of his own piety, he was gone to dwell with the gods; and that his wife, and daughter, and pilot, were partakers of the ſame honour. It alſo directed them to return to Babylon, and that, as the fates had ordained, they ſhould take the writings from Sippara, and communicate them to mankind; and told them, that the place where they were was the country of Armenia. When they had heard this, they offered ſacrifice to the gods, and unanimouſly went to Babylon; and when they came thither, they dug up the writings at Sippara, built many cities, raiſed temples, and rebuilt Babylon again.

The Egyptians, who would give place to no nation in point of antiquity, have alſo a ſeries of kings, who, as is pretended, reigned in Egypt before the flood; and, to be even with the Chaldeans, began their account the very ſame year that theirs does according to Beroſus.

There was an antient chronicle extant among the Egyptians, not many centuries ago, which contained 30 dynaſties of princes who ruled in that country, by a ſeries of 113 generations, through an immenſe ſpace of 36,525 years, during which Egypt was ſucceſſively governed by three different races; of whom the firſt were the Auritæ, the ſecond the Meſtræi, and the third the Egyptians.

But this extravagant number of years Manetho (to whoſe remains we muſt chiefly have recourſe for the ancient Egyptian hiſtory) has not adopted, however in other reſpects he is ſuppoſed to have been led into errors in chronology by this old chronicle, which yet ſeems to have been a compoſition ſince Manetho's time.

The account given by Beroſus is manifeſtly taken from the writings of Moſes; but we have another account of the firſt ages of mankind, in which no mention is made of the flood at all. This is contained in ſome fragments of a Phœnician author called *Sanchoniatho*, who is by ſome ſaid to have been cotemporary with Gideon, by others to have lived in the days of king David; while ſome boldly aſſert there never was ſuch a perſon, and that the whole is a fiction of Philo-Biblius, in oppoſition to the books of Joſephus wrote againſt Apion. To gratify the readers curioſity, however, we have ſubjoined an account of the firſt ten generations mentioned by him, which are ſuppoſed by the compilers of the univerſal hiſtory to correſpond to the generations mentioned by Moſes before the flood.

Sanchoniatho having delivered his coſmogony, or generation of the other parts of the world, begins his hiſtory of mankind with the production of the firſt pair of mortals, whom Philo, his tranſlator, calls *Protogonus* and *Æon*, the latter of whom found out the food which was gathered from trees.

Their iſſue were called *Genus* and *Genea*, and dwelt in Phœnicia; but when the great droughts came, they ſtretched forth their hands to heaven towards the ſun; for him they thought the only God and Lord of heaven, calling him *Beelſamen*, which in Phœnician is, *Lord of heaven*, and in Greek, *Zeus*.

Afterwards from Genus, the ſon of Protogonus and Æon, other mortal iſſue was begotten, whoſe names were *Phos*, *Pur*, and *Phlox;* that is, *Light*, *Fire*, and *Flame*. Theſe found out the way of generating fire, by the rubbing of pieces of wood againſt each other, and taught men the uſe thereof. Theſe begat ſons of vaſt bulk, and height, whoſe names were given to the mountains on which they ſiezed: ſo from them were named mount *Caſſius*, and *Libanus*, *Antilibanus*, and *Brathys*.

Of theſe laſt were begotten Memrumus, and Hypſuranius, but they were ſo named by their mothers, the women of thoſe times, who without ſhame lay with any man they could light upon. Hypſuranius inhabited Tyre, and he invented the making of huts of reeds and ruſhes, and the papyrus. He alſo fell into enmity with his brother Uſous, who firſt invented a covering for his body out of the ſkins of the wild beaſts which he could catch. And when violent tempeſts of winds and rains came, the boughs in Tyre, being rubbed againſt each other, took fire, and burnt the wood there. And Uſous, having taken a tree, and broke off its boughs, firſt was ſo bold as to venture upon it into the ſea. He alſo conſecrated two rude ſtones, or pillars, to fire and wind, and he worſhipped them, and poured out to them the blood of ſuch wild beaſts as had been caught in hunting. But when theſe were dead, thoſe that remained, conſecrated to them ſtumps of wood and pillars, worſhipping them, and kept anniverſary feaſts unto them.

Many years after this generation, came Agreus and Halicus, the inventors of the arts of hunting and fiſhing, from whom huntſmen and fiſhermen are named.

Of theſe were begotten two brothers, the inventors of iron and of the forging thereof: one of theſe, called *Chryſor*, the ſame with Hepheſtus, or Vulcan, exerciſed himſelf in words and charms and divinations; found out the hook, bait, and fiſhing line, and boats ſlightly built, and was the firſt of all men that ſailed. Wherefore he alſo was worſhipped after his death for a god; and they called him *Zeus Michius*, or Jupiter the engineer; and ſome ſay, his brothers invented the way of making walls of brick.

Afterwards from this generation came two brothers; one of whom was called *Technites*, or the Artiſt; the other, *Geinus Autochthon*, [the home-born man of the earth.] Theſe found out to mingle ſtubble, or ſmall twigs, with the brick earth, and to dry them in the ſun, and ſo made tyling.

By theſe were begotten others; of which one was called *Agrus* [Field]; and the other *Agrouerus*, or *Agrotes*, [Huſbandman], who had a ſtatue much worſhipped, and a temple carried about by one or more yoke of oxen, in Phœnicia, and among thoſe of Byblus he is eminently called the *greateſt of the gods*. Theſe found out how to make courts about mens houſes, and fences, and caves, or cellars. Huſbandmen, and ſuch as uſe dogs in hunting, derive from theſe; and they are alſo called *Aletæ* and *Titans*.

Of theſe were begotten Amynus, and Magus, who ſhewed men to conſtitute villages and flocks.

In theſe mens age there was one Eliun, which imports in Greek *Hypſiſtus* [the moſt high], and his wife was named *Beruth*, who dwelt about Byblus: and by him was begotten one Epigeus, or Autochthon, whom they afterwards called *Uranus* [heaven]; ſo that from him that element which is over us, by reaſon of its excellent beauty, is called *heaven:* and he had a ſiſter of the ſame parents, called *Ge*, [the earth]; and by reaſon of her beauty, the earth had her name given to it.

Hypſiſtus, the father of theſe, dying in fight with wild beaſts, was conſecrated, and his children offered ſacrifices and libations to him.—But Uranus taking the kingdom of his father, married his ſiſter Ge, and had by her four ſons; Ilus, who is called *Cronus* [or Saturn]; Betylus; Dagon, who is Siton or the god of corn; and Atlas: but by other wives Uranus had much iſſue.

ANTEGO. See Antigua.

ANTEJURAMENTUM, by our anceſtors called *juramentum calumniæ*, an oath which anciently both accuſer and accuſed were to take before any trial or purgation.—The accuſer was to ſwear that he would proſecute the criminal; and the accuſed to make oath, on the day he was to undergo the ordeal, that he was innocent of the crime charged againſt him.

ANTELOPE, in zoology. See Capra.

ANTELUCAN, in eccleſiaſtical writers, is applied to things done in the night or before day. We find frequent mention of the antelucan aſſemblies (*Cœtus antelucani*) of the ancient Chriſtians in times of perſecution for religious worſhip.

ANTEMURALE, in the ancient military art, denotes much the ſame with what the moderns call an *outwork*.

ANTENCLEMA, in oratory, is where the whole defence of the perſon accuſed turns on criminating the accuſer. Such is the defence of Oreſtes, or the oration for Milo: *Occiſus eſt, ſed latro. Exſectus, ſed raptor.*

ANTENNÆ, in the hiſtory of inſects, ſlender bodies with which nature has furniſhed the heads of theſe creatures, being the ſame with what in Engliſh are called *horns* or *feelers*.

ANTENOR, a Trojan prince, came into Italy, expelled the Enganians on the river Po, and built the city of Padua, where his tomb is ſaid to be ſtill extant.

ANTEPAGMENTA, in the ancient architecture, the jambs of a door. They are alſo ornaments, or garniſhings, in carved work, of men, animals, *&c.* made either of wood or ſtone, and ſet on the architrave.

ANTEPENULTIMA, in grammar, the third ſyllable of a word from the end, or the laſt ſyllable but two.

ANTEPILANI, in the Roman armies, a name given to the haſtati and principes, becauſe they marched next before the triarii, who were called *pilani*.

ANTEPILEPTICS, among phyſicians, medicines eſteemed good in the epilepſy.

ANTEPOSITION, a grammatical figure, whereby a word, which by the ordinary rules of ſyntax ought to follow another, comes before it. As when, in the Latin, the adjective is put before the ſubſtantive, the verb before the nominative caſe, &c.

ANTEPREDICAMENTS, among logicians, certain preliminary queſtions which illuſtrate the doctrine of predicaments and categories.

ANTEQUIERA, a handſome town of Spain, in the kingdom of Granada, divided into two parts, the upper and lower. The upper is ſeated on a hill, and has a caſtle: the lower ſtands in a fertile plain, and is watered with a great number of brooks. There is a large quantity of ſalt in the mountain; and five miles from the town, a ſpring famous for the cure of the gravel. W. Long. 4. 40. N. Lat. 36. 51.

ANTERIOR, denotes ſomething placed before another, either with reſpect to time or place.

ANTESIGNANI, in the Roman armies, ſoldiers placed before the ſtandards, in order to defend them, according to Limpſius; but Cæſar and Livy mention the anteſignani as the firſt line, or firſt body, of heavy-armed troops. The velites, who uſed to ſkirmiſh before the army, were likewiſe called *anteſignani*.

ANTESTATURE, in fortification, a ſmall retrenchment made of paliſadoes, or ſacks of earth, with a view to diſpute with an enemy the remainder of a piece of ground.

ANTEVIRGILIAN husbandry, an appellation given to Mr Tull's new method of horſe-hoeing huſbandry. See Agriculture, n° 171, &c.

ANTHELIX, in anatomy, the inward protuberance of the external ear, being a ſemicircle within, and almoſt parallel to the helix. See Anatomy, n° 405.

ANTHELMINTICS, among phyſicians, medicines proper to deſtroy worms.

ANTHEM, a church-ſong performed in cathedral-ſervice by choriſters, who ſing alternately. It was uſed to denote both pſalms and hymns, when performed in this manner. But, at preſent, anthem is uſed in a more confined ſenſe, being applied to certain paſſages taken out of the ſcriptures, and adapted to a particular ſolemnity.

ANTHEMIS, camomile, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. Of this genus Linnæus enumerates 17 *Species*. But the moſt remarkable are the following.

1. The nobilis, or common camomile, grows in plenty upon commons, and other waſte land. It is a trailing perennial plant, which puts out roots from the branches, by which it ſpreads and multiplies greatly. Of this kind there is a variety with double leaves.—Formerly this plant was uſed for planting of walks, which, when mowed and rolled, looked well for ſome time; but as it was ſubject to decay in large patches, the walks became unſightly, and this was therefore diſuſed. 2. The pyrethrum, or pellitory of Spain, is a perennial plant, which grows naturally in Spain and Portugal, from whence the roots are brought to Britain. The branches trail upon the ground, and ſpread a foot or more each way; theſe are garniſhed with fine winged leaves like thoſe of the common camomile. At the extremity of each branch is produced one large ſingle flower, like camomile, but much larger; the rays of which are of a pure white within, but purple on the outſide. After the flowers are paſt, the receptacle ſwells to a large ſcaly cone, having the ſeeds lodged between its ſcales; but unleſs the ſeaſon is dry, the ſeeds will not come to perfection in this country. 3. The tinctoria, with ſawed winged leaves, is a perennial plant, which flowers from June to November, and makes a very pretty appearance, ſome of the flowers being of a white, others of a ſulphur, and ſome of a bright yellow colour. 4. The Arabica, with a branching empalement. The ſeeds of this ſpecies were brought from Africa by the late Dr Shaw, and diſtributed to many curious botaniſts in this and other countries of Europe. It grows near two feet high, with an upright ſtem, having a ſingle flower at the top, from whoſe empalement there are two or three foot-ſtalks put out horizontally, about two inches long, each having a ſingle flower ſmaller than the firſt, like the childing marigold, or hen-and-chicken daiſy.

Culture. The firſt ſort may be very eaſily propagated by procuring a few ſlips in the ſpring, and planting them about a foot diſtant from one another, where they will ſoon cover the ground. The other ſorts may be propagated from ſeeds ſown in the ſpring, and will require no other care than to be kept free from weeds: only the third ſort muſt be tranſplanted when come up from the ſeeds into borders near ſhrubs, where they may have room to grow; for they ſpread very wide, and therefore require to be placed three feet diſtant from other plants.

Medicinal Uſes. The firſt and ſecond ſorts are uſed in medicine. The firſt have a ſtrong, not ungrateful, aromatic ſmell, and a very bitter nauſeous taſte. They are accounted carminative, aperient, emollient, and in ſome meaſure anodyne; and ſtand recommended in flatulent colics, for promoting the uterine purgations, in ſpaſmodic pains, and the pains of childbed-women: ſometimes they have been employed in intermittent fevers, and the nephritis. Theſe flowers are frequently alſo uſed externally in diſcutient and antiſeptic fomentations, and in emollient glyſters:—The root of the pyrethrum is the only part endowed with medical virtue. It has no ſenſible ſmell; its taſte is very hot and acrid, but leſs ſo than that of arum or dracunculus: the juice expreſſed from it has ſcarce any acrimony, nor is the root itſelf ſo pungent when freſh as after it has been dried. Water, aſſiſted by heat, extracts ſome ſhare of its taſte, rectified ſpirit the whole; neither of them elevate any thing in diſtillation. The principal uſe of pyrethrum in the preſent practice is as a maſticatory, for promoting the ſalival flux, and evacuating viſcid humours from the head and neighbouring parts; by this means it often relieves the tooth-ach, ſome kinds of pains of the head, and lethargic complaints.

ANTHERA, among botaniſts, that part of the ſtamen which is fixed on the top of the filamentum, within the corolla: it contains the pollen or fine duſt, which, when mature, it emits for the impregnation of the plant according to Linnæus. The APEX of Ray, Tournef. & Rivin.; *Capſula ſtaminis*, of Malpighi.

ANTHERICUM, SPIDER-WORT; a genus of the monogynia order, belonging to the hexandria claſs of plants. Of this genus Linnæus reckons up nine

Species. But only the three following ſeem to deſerve notice. 1. The ramoſum, with a branching ſtalk. 2. The liliago. Theſe are perennial plants, which are natives of Spain, Portugal, and other warm countries. They were formerly pretty common in the Engliſh gardens; but the ſevere winter of 1740 killed moſt of their roots. They flower in June and July, and the ſeeds are ripe in September. 3. The fruteſcens, with a ſhrubby ſtalk, was formerly known among the gardeners near London by the name of *onion-leaved aloe*. It produces many ligneous branches from the root, each ſupporting a plant with long taper leaves, in ſhape like thoſe of an onion, and full of a yellow pulp very juicy. Theſe plants ſend out roots, which run down and faſten themſelves into the earth, by which they multiply greatly. The flowers are produced on long looſe ſpikes, are yellow, and appear at different times, ſo that the plants are never long deſtitute of flowers. This ſpecies is a native of the Cape of Good Hope.

Culture. The two firſt are propagated by ſeeds, which ſhould be ſown in the autumn, in a warm ſituation, on a bed of light ſandy earth. When the plants come up they muſt be kept clear of weeds during the ſummer; and in autumn, when the leaves decay, they ſhould be carefully taken up and tranſplanted into a bed of light earth, at a foot diſtance from one another. If the winter prove ſevere, they ſhould be covered with ſtraw, peaſe-haulm, or old tan. The third likewiſe requires ſhelter in winter; though ſome of them will live in the open air, if planted cloſe to the warm wall.

ANTHESPHORIA, in antiquity, a Sicilian feſtival inſtituted in honour of Proſerpine. The word is derived from the Greek ανθος, *flower*, and φερω, *I carry;* becauſe that goddeſs was forced away by Pluto when ſhe was gathering flowers in the fields. Yet Feſtus does not aſcribe the feaſt to Proſerpine; but ſays it was thus called by reaſon ears of corn were carried on this day to the temples.—Antheſphoria ſeems to be the ſame thing with the *floriſertum* of the Latins, and anſwers to the harveſt-home among us.

ANTHESTERIA, in antiquity, was a feaſt celebrated by the Athenians in honour of Bacchus. The moſt natural derivation of the word is from the Greek ανθος (*flos*), a flower, it being the cuſtom at this feaſt to offer garlands of flowers to Bacchus.

The antheſteria laſted three days, the 11th, 12th and 13th of the month; each of which had a name ſuited to the proper office of the day. The firſt day of the feaſt was called πιθοιγια, *i. e.* opening of the veſſels;

becauſe on this day they tapped the veſſels, and taſted the wine. The ſecond day they called χοος, *congii*, the name of a meaſure containing the weight of ten pounds; on this they drank the wine prepared the day before. The third day they called χυτροι, *kettles*: on this day they boiled all ſorts of pulſe in kettles; which however they were not allowed to taſte, as being offered to Mercury.

ANTHESTERION, in ancient chronology, the ſixth month of the Athenian year. It contained 29 days; and anſwered to the latter part of our November, and beginning of December. The Macedonians called it *dæſion* or *deſion*. It had its name from the feſtival antheresteria kept in it.

ANTHOCEROS, or HORN-FLOWER, a genus of the order of algæ, belonging to the cryptogamia claſs of plants. The calix of the male is ſeſſile, cylindrical, and entire; the antheræ are very long, ſubulated, and two-valved; the calix of the female is divided into ſix pieces; the ſeeds are three. There are only three ſpecies of the anthoceros, viz. the punctatus or ſpotted anthoceros, a native of Britain; the lævis, a native of Europe and America; and the multifidus, a native of Germany. It is found in moiſt ſhady places, and on heaths.

ANTHOLOGION, the title of the ſervice-book uſed in the Greek church. It is divided into 12 months, containing the offices ſung throughout the year, on the feſtivals of our Saviour, the Virgin, and other remarkable ſaints.

ANTHOLOGY, a diſcourſe of flowers, or of beautiful paſſages from any authors.—It is alſo the name given to a collection of epigrams taken from ſeveral Greek poets.

ANTHOLYZA, a genus of the monogynia order, belonging to the triandria claſs of plants, for which there is no Engliſh name.

Species. 1. The ringens, whoſe flower-ſlips ſpread aſunder. This hath red, round, bulbous roots, from which ariſe ſeveral rough furrowed leaves, near a foot long, and half an inch broad: between theſe comes out the flower-ſtalk immediately from the root, which riſes two feet high, is hairy, and hath ſeveral red flowers coming out on each ſide. Theſe appear in June, and the ſeeds ripen in September. 2. The ſpicata, with narrow furrowed leaves, is in ſhape and ſize like the vernal crocus, but the outer ſkin is thin and white; from this ariſe five or ſix long narrow leaves, which are deeply furrowed. Between theſe ariſe the flower-ſtem, which is a foot and an half high, bending on one ſide towards the top, where the flowers come out on one ſide, ſtanding erect. They are of a white colour, appear in May, and the ſeeds ripen in Auguſt. Both theſe ſpecies are natives of Africa, from whence their ſeeds were firſt obtained, and raiſed in the Dutch gardens.

Culture. The antholyza may be propagated by offſets, which it ſends off in pretty great plenty; or by ſeeds, which are ſometimes perfected in Europe. Theſe ſhould be ſown ſoon after they are ripe, in pots of light earth; which, if plunged in an old bed of tan which has loſt its heat, and ſhaded in the middle of the day in hot weather, they will come up the following winter: therefore they muſt be kept covered with glaſſes to ſcreen them from cold, otherwiſe the young plants will be deſtroyed. They may remain in the pots two years, if the plants are not too cloſe, when they will have acquired ſtrength enough to bear tranſplanting; the proper time for which is in July and Auguſt, when their leaves are decayed. In ſummer the pots may be placed in the open air, but in winter they muſt be placed under a hot-bed frame.

ANTHONY (St), was born in Egypt in 251, and inherited a large fortune, which he diſtributed among his neighbours and the poor, retired into ſolitude, founded a religious order, built many monaſteries, and died anno 356. Many ridiculous ſtories are told, of his conflicts with the devil, and of his miracles: there are ſeven epiſtles extant, attributed to him.

ANTHONY, or *Knights of St* ANTHONY, a military order, inſtituted by Albert duke of Bavaria, Holland, and Zealand, when he deſigned to make war againſt the Turks in 1382. The knights wore a collar of gold made in form of a hermit's girdle, from which hung a ſtick cut like a crutch, with a little bell, as they are repreſented in St Anthony's pictures.

St ANTHONY alſo gives the denomination to an order of religious founded in France about the year 1095, to take care of thoſe afflicted with *St Anthony's fire*: (ſee the next article.)—It is ſaid, that, in ſome places, theſe monks aſſume to themſelves a power of giving, as well as removing, the *ignis ſacer*, or eryſipelas; a power which ſtands them in great ſtead for keeping the poor people in ſubjection, and extorting alms. To avoid the menaces of theſe monks, the country people preſent them every year with a fat hog a-piece. Some prelates endeavoured to perſuade pope Paul III. to aboliſh the order; *quæſtuarios iſtos ſancti Anthonii, qui decipiunt ruſticos & ſimplices, eoſque innumeris ſuperſtitionibus implicent, de medio tollendos eſſe.* But they ſubſiſt, notwithſtanding, to this day in ſeveral places.

St ANTHONY's FIRE, a name popularly given to the eryſipelas.—Apparently it took this denomination, as thoſe afflicted with it made their peculiar application to St Anthony of Padua for cure. It is known, that anciently particular diſeaſes had their peculiar ſaints: thus, in the opthalmia, perſons had recourſe to St Lucia; in the tooth-ach, to St Apollonia; in the hydrophobia, to St Hubert, &c. In effect, the Romaniſts in ſome parts are ſtill ſaid to repreſent St Anthony with a fire kindled at his ſide, to ſignify that he delivers people from the *ſacer ignis* or eryſipelas. They alſo paint a hog near him, as a token that he cures beaſts of all diſeaſes. To do him the greater honour in ſeveral places, they keep at common charges a hog denominated *St Anthony*'s *hog*, for which they have great veneration. Some will have St Anthony's picture on the walls of their houſes, hoping by that to be preſerved from the plague; and the Italians, who do not know the true ſignification of the fire painted at the ſide of their ſaint, concluding that he preſerves houſes from being burnt, invoke him on ſuch occaſions.

ANTHORA, in botany, the trivial name of a ſpecies of aconitum. See ACONITUM.

ANTHORISMUS, in rhetoric, denotes a contrary deſcription or definition of a thing from that given by the adverſe party.—Thus, if the plaintiff urge, that to take any thing away from another without his knowledge or conſent, is a theft; this is called ορος, or definition. If the defendant reply, that to take a thing away from another without his knowledge or conſent, provided it be done with deſign to return it to him again, is not theft; this is an Ανθοϱισμος.

ANTHOSPERMUM, the AMBER-TREE; a genus of the diœcia order, belonging to the polygamia claſs of plants.

Species. Of this genus Dr Linnæus mentions two, the Æthiopicum and ciliare; but the firſt is moſt generally known in the gardens of the curious. Its beauty conſiſts in its ſmall evergreen leaves, which grow as cloſe as heath. Theſe being bruiſed between the fingers emit a very fragrant odour.

Culture. This plant is eaſily propagated, by cuttings, during any of the ſummer months, in a border of light earth; where they will take root in ſix weeks time, provided they are watered or ſhaded as the ſeaſon may require; or if they are planted in pots plunged in a moderate hot-bed, they will take root the ſooner, and there will be a greater certainty of their growing. They muſt be frequently renewed by cuttings, as the old plants are very ſubject to decay, and ſeldom laſt above three or four years.

ANTHOXANTHUM, or VERNAL-GRASS; a genus of the digynia order, belonging to the diandria claſs of plants, is one of the earlieſt ſpring graſſes, and is extremely common in our fertile paſtures. The delightful ſmell of new-mown hay is chiefly from this plant. Cows, horſes, ſheep, and goats eat it.

ANTHRACIS, ANTHRACIAS, or ANTHRACITIS, names promiſcuouſly uſed by ancient naturaliſts for very different foſſils, *viz.* the carbuncle, hæmatites, and a kind of aſteria. See CARBUNCLE, *&c.*

ANTHRACOSIS, in medicine, a corroſive ſcaly ulcer, either in the bulb of the eye or the eye-lids.

ANTHRAX, a Greek term, literally ſignifying a burning coal, uſed by the ancients to denote a gem, as well as a diſeaſe, more generally known by the name of *carbuncle.*

ANTHRAX is ſometimes alſo uſed for lithanthrax, or pit-coal. See LITHANTHRAX.

ANTHROPOGLOTTUS, among zoologiſts, an appellation given to ſuch animals as have tongues reſembling that of mankind, particularly to the parrot kind.

ANTHROPOGRAPHY, denotes the deſcription of the human body, its parts, ſtructure, &c*.

ANTHROPOLATRÆ, in church-hiſtory, an appellation given to the Neſtorians, on account of their worſhipping Chriſt, notwithſtanding that they believed him to be a mere man.

ANTHROPOLATRIA, the paying divine honours to a man; ſuppoſed to be the moſt ancient kind of idolatry.

ANTHROPOLOGY, a diſcourſe upon human nature.

ANTHROPOLOGY, among divines, denotes that manner of expreſſion by which the inſpired writers attribute human parts and paſſions to God.

ANTHROPOMANCY, a ſpecies of divination, performed by inſpecting the intrails of a human creature.

ANTHROPOMORPHA, a term formerly given to the primates of that claſs of animals which have the greateſt reſemblance to the human kind*.

ANTHROPOMORHISM, among eccleſiaſtical writers, denotes the hereſy or error of the Anthropomorphites. See the next article.

ANTHROPOMORPHITES, in church-hiſtory, a ſect of ancient heretics, who taking every thing ſpoken of God in ſcripture in a literal ſenſe, particularly that paſſage of Geneſis in which it is ſaid *God made man after his own image,* maintained, That God had a human ſhape. They are likewiſe called *Audens,* from Audeus their leader.

ANTHROPOMORPHOUS, an appellation given to whatever reſembles the human form.

ANTHROPOPATHY, a figure or expreſſion by which ſome paſſion is aſcribed to God, which properly belongs only to man.

ANTHROPOSCOPY, that part of phyſiognomy which judges of a man's character, &c. from the lineaments of his body.—Otto publiſhed an *Anthropoſcopia, ſive judicium hominis de homine ex lineamentis externis.* Regiom. 1647, 4to.

ANTHROPOPHAGI, (of ανθϱωπος a *man,* and φαγω to *eat*), MEN-EATERS. That there have been, in almoſt all ages of the world, nations who have followed this barbarous practice, we have abundance of teſtimonies. According to Herodotus, among the Eſſedonian Scythians, when a man's father died, the neighbours brought ſeveral beaſts, which they killed, mixed up their fleſh with that of the deceaſed, and made a feaſt. Among the Maſſagetæ, when any perſon grew old, they killed him and eat his fleſh; but if he died of ſickneſs, they buried him, eſteeming him unhappy. The ſame author alſo aſſures us, that ſeveral nations in the Indies killed all their old people and their ſick, to feed on their fleſh: he adds, that perſons in health were ſometimes accuſed of being ſick, to afford a pretence for devouring them. According to Sextus Empiricus, the firſt laws that were made, were for the prevention of this barbarous practice, which the Greek writers repreſent as univerſal before the time of Orpheus.

Of the practice of anthropophagy in latter times, we have the teſtimonies of all the Romiſh miſſionaries who have viſited the internal parts of Africa, and even ſome parts of Aſia. Herrera ſpeaks of great markets in China, furniſhed wholly with human fleſh, for the better ſort of people. Marcus Paulus ſpeaks of the like in his time, in the kingdom of Concha towards Quinſay, and the iſland of Zapengit; others, of the great Java; Barboſa, of the kingdom of Siam and iſland of Sumatra; others, of the iſlands in the Gulf of Bengal, of the country of the Samogitians, &c.

When America was diſcovered, this practice was found to be almoſt univerſal, inſomuch that ſeveral authors have ſuppoſed it to be occaſioned through a want of other food, or through the indolence of the people to ſeek for it: but this Dr Robertſon denies; and aſcribes the origin of ſuch a barbarous cuſtom to its moſt probable cauſe, *viz.* an implacable ſpirit of revenge.

Notwithſtanding all theſe teſtimonies, however, the exiſtence of anthropophagy has been denied by many, and much argumentation *pro* and *con* has been carried on; but Mr Forſter, in his account of Captain Cook's voyage, hath given us ſuch a teſtimony, as we imagine will convince the moſt ſceptical. This gentleman hath aſſured us, that not only he, but the whole ſhip's crew, who were called upon deck for that purpoſe, ſaw ſome New Zealanders eat a piece of human fleſh roaſted, ed, with a ravenous appetite; and that they affirmed its taſte to be exceedingly delicious. See *New* ZEALAND.

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* See *Anatomy.*

* See *Zoology.*

The philoſophers Diogenes, Chryſippus, and Zeno, followed by the whole ſect of Stoics, affirmed that there was nothing unnatural in the eating of human fleſh; and that it was very reaſonable to uſe dead bodies for food, rather than give them a prey to worms and putrefaction. In order to make the trial, however, whether there was any real repugnancy in nature to the feeding of an animal with the fleſh of its own ſpecies, Leonardus Floroventius fed a hog with hog's fleſh, and a dog with dog's fleſh; upon which he found the briſtles of the hog to fall off, and the dog to become full of ulcers.—To the cuſtom of eating human fleſh the origin of the venereal diſeaſe hath been aſcribed; and not without great probability, as it is found to exiſt in all thoſe places where ſuch barbarity is practiſed.

ANTHROPOTHYSIA, the inhuman practiſe of offering human ſacrifices. See SACRIFICE.

ANTHUS, in ornithology, a ſynonime of the loſeia. See LOSEIA.

ANTHYLLIS, KIDNEY-VETCH, a genus of the decandria order, belonging to the diadelphia claſs of plants.

Species. Dr Linnæus enumerates nine ſpecies of anthyllis; of which, the following ſeem to be moſt worthy of attention. 1. The vulneraria, with unequal winged leaves, is a native of Spain and Portugal, as likewiſe of Wales. It is a biennial plant, having ſingle leaves at bottom, which are oval and hairy; but thoſe which grow out of the ſtalks are winged, each being compoſed of two or three pair of lobes terminated by an odd one. The flowers grow collected into heads at the top of the ſtalks, are of a bright ſcarlet colour, and make a pretty appearance. It flowers in June and July, and the ſeeds ripen in October. 2. The montana or herbaceous woundwort, with winged leaves, grows naturally in the mountains in the ſouth of France, and in Italy. It is garniſhed with winged leaves, which have an equal number of hairy lobes at the extremity of the branches. The flowers are produced in heads, and are of a purple colour and globular form. They apear in June and July, and the ſeeds ripen in October. 3. The barba jovis, or ſilver-buſh, has its name from the whiteneſs of its leaves. This is a ſhrub which often grows to the height of ten or twelve feet, dividing into many lateral branches, garniſhed with winged leaves compoſed of an equal number of narrow lobes, which are very white and hairy: the flowers are produced at the extremities of the branches, collected into ſmall heads; theſe are of a bright yellow colour, and appear in June; ſometimes they are ſucceeded by ſhort woolly pods, containing two orthree kidney-ſhaped ſeeds: but unleſs the ſeaſon proves warm, they do not ripen in this country. 4. The cytiſoides, or ſhrubby woundwort, has long been known in the Engliſh gardens. It is a low ſhrub, ſeldom riſing above two feet high, but ſends out many ſlender branches, garniſhed with hoary leaves, which are ſometimes ſingle, but generally have three oval lobes, the middle being longer than the other two: the flowers are yellow, and come out from the ſides of the branches, three or four joined together, having woolly impalements; but theſe are rarely ſucceeded by ſeeds in England.

Culture. The firſt and ſecond ſorts require no particular management further than being kept free from weeds. The third and fourth may be propagated by cuttings planted during any of the ſummer months; obſerving to ſhade and water them till they have taken good root; when they are to be tranſplanted into pots, and muſt always be houſed in winter.

ANTHYPOPHORA, in rhetoric, a figure of ſpeech; being the counter-part of an hypophora. See HYPOPHORA.

ANTI, a Greek prepoſition, which enters into the compoſition of ſeveral words, both Latin, French, and Engliſh, in different ſenſes. Sometimes it ſignifies *before*, as in anti-chamber; and ſometimes *oppoſite* or *contrary*, as in the names of theſe medicines, anti-ſcorbutic, anti-venereal.

ANTIBACCHIUS, in ancient poetry, a foot conſiſting of three ſyllables, the two firſt long, and the laſt one ſhort: ſuch is the word āmbīrĕ.

ANTIBES, a ſea-port town of Provence in France, with a ſtrong caſtle. Its territory produces excellent fruit; and the town ſtands oppoſite to Nice, in the Mediterranean. E. Long. 7. 5. N. Lat. 43. 35.

ANTICHAMBER, an outer chamber for ſtrangers to wait in, till the perſon to be ſpoken with is at leiſure.

ANTICHRIST, among eccleſiaſtical writers, denotes a great adverſary of Chriſtianity, who is to appear upon the earth towards the end of the world. He is called in ſcripture, *The man of ſin, the man of perdition*, &c.

We have demonſtrations, diſputations, and proofs, in great order and number, both that the pope is, and that he is not, Antichriſt.

F. Calmet is very large in deſcribing the father and mother of Antichriſt, his tribe and pedigree, his wars and conqueſts, his atchievements againſt Gog, Magog, *&c.*

Some place his capital at Conſtantinople, others at Jeruſalem, others at Moſcow, and ſome few at London; but the generality at Rome, though theſe laſt are divided. Grotius and ſome others ſuppoſe Rome Pagan to have been the ſeat of Antichriſt: moſt of the Lutheran and reformed doctors contend earneſtly for Rome Chriſtian under the papal hierarchy.

M. Le Clerc holds, that the rebel Jews and their leader Simon, whoſe hiſtory is given by Joſephus, are to be reputed as the true Antichriſt. Lightfoot and Vanderhart rather apply this character to the Jewiſh Sanhedrim. Hippolitus and others held that the devil himſelf was the true Antichriſt; that he was to be incarnate, and make his appearance in human ſhape before the conſummation of all things. Others among the ancients held that Antichriſt was to be born of a virgin, by ſome prolific power imparted to her by the devil. A modern writer * of the female ſex, whom many hold for a ſaint, has improved on this ſentiment; maintaining that Antichriſt is to be begotten by the devil on the body of a witch by means of the ſemen of a man caught in the commiſſion of a certain crime, and conveyed, &c.

How endleſs are conjectures? Some of the Jews, we are told, actually took Cromwell for the Chriſt; while ſome others have laboured to prove him Antichriſt himſelf. Pfaffius aſſures us he ſaw a folio book in the Bodleian library, written on purpoſe to demonſtrate

* Bayle's Dictionary voce *Bourignon*.

this latter poſition.

Hunnius and ſome others, to ſecure Antichriſt to the pope, (notwithſtanding that this latter ſeemed excluded by not being of the tribe of Dan), have broke in upon the unity of Antichriſt, and aſſert that there is to be both an eaſtern and a weſtern Antichriſt.

Father Malvenda, a Jeſuit, hath publiſhed a large work intitled *Antichriſto*, in which this ſubject is amply diſcuſſed. It conſiſts of thirteen books. In the firſt, he relates all the opinions of the fathers with regard to Antichriſt. In the ſecond, he ſpeaks of the times when he ſhall appear; and ſhews, that all the fathers who ſuppoſed Antichriſt to be near at hand, judged the world was near its period. In the third, he diſcourſes of his origin and nation; and ſhews that he is to be a Jew, of the tribe of Dan: this he founds on the authority of the fathers; on the paſſage in Geneſis xlix. 17. *Dan ſhall be a ſerpent by the way*, &c.; on that of Jeremy viii. 16. where it is ſaid, *The armies of Dan ſhall devour the earth*; and on Rev. vii. where St John, enumerating all the tribes of Iſrael, makes no mention of that of Dan. In the fourth and fifth books, he treats of the ſigns of Antichriſt. In the ſixth, of his reign and wars. In the ſeventh, of his vices. In the eighth, of his doctrine and miracles. In the ninth, of his perſecutions: and in the reſt, of the coming of Enoch and Elias, the converſion of the Jews, the reign of Jeſus Chriſt, and the death of Antichriſt, after he has reigned three years and an half. See alſo *Lowman on the Revelation*.

ANTICHRISTIANISM, a ſtate or quality in perſons or principles, which denominates them antichriſtian, or oppoſite to the kingdom of Chriſt.

M. Jurieu takes the idea of the unity of the church to have been the ſource of *Antichriſtianiſm*. Had not mankind been infatuated with this, they would never have ſtood in ſuch awe of the anathema's of Rome. It is on this the popes erected their monarchial power.

ANTICHRISTIANS properly denote the followers or worſhippers of Antichriſt.

ANTICHRISTIANS are more particularly underſtood of thoſe who ſet up or believe a falſe Chriſt, or Meſſiah.

ANTICHTHONES, in ancient geography, an appellation given to the inhabitants of oppoſite hemiſpheres.

ANTICIRRHA, (Strabo); ANTICYRA, (Pauſanias, Stephanus, Livy); a town in Phocis, on the Corinthian bay, oppoſite to Cirrha, lying to the weſt on the ſame bay. Another *Anticirrha*, or *Anticyra*, on the Sinus Maliacus, and near mount Oeta, where grew the beſt hellebore, (Strabo, Stephanus;) but which Pauſanias aſcribes to the *Anticyra* of Phocis: Hence the adage, *Naviget Anticyram*, (Horace,) uſed of a perſon of an unſound mind. The gentilitious name is *Anticyreus*, (Pauſanias.)

ANTICOR, or ANTICOEUR, among farriers, an inflammation in a horſe's throat, being the ſame with the quinzy in mankind. See FARRIERY, xxxvii. 2.

ANTICOSTE, a barren iſland lying in the mouth of the river St Laurence, in North America. W. Long. 64. 16. N. Lat. from 49. to 53.

ANTICUS, a term uſed by anatomiſts, importing, that the part with which it is joined ſtands before ſome others: Thus, we meet with *ſerratus anticus, peronæus anticus.*

ANTIDESMA, in botany, a genus of the diœcia order, belonging to the pentandria claſs of plants. The calix of the male conſiſts of five leaves; it has no corolla: The calix of the female is entire, gaping a little on one ſide; it has no corolla, but two ſtyli, and a double-valved capſule incloſed in the calix. There is but one ſpecies of the antideſma, *viz.* the alexteria, a native of India.

ANTIDICOMARIANITES, ancient heretics, who pretended that the holy virgin did not preſerve a perpetual virginity, but that ſhe had ſeveral children by Joſeph after our Saviour's birth.—Their opinion was grounded on ſome expreſſions of our Saviour, wherein he mentions his brothers and his ſiſters; and of St Matthew, where he ſays, that Joſeph knew not Mary till ſhe had brought forth her firſt-born ſon. The Antidicomarianites were the diſciples of Helvidius and Jovinian, who appeared in Rome toward the cloſe of the fourth century.

ANTIDOSIS, in antiquity, denotes an exchange of eſtates, practiſed by the Greeks on certain occaſions with peculiar ceremonies, and firſt inſtituted by Solon.

When a perſon was nominated to an office, the expence of which he was not able to ſupport, he had recourſe to the antidoſis; that is, he was to ſeek ſome other citizen of better ſubſtance than himſelf, who was free from this, and other offices; in which caſe the former was excuſed. In caſe the perſon thus ſubſtituted denied himſelf to be the richeſt, they were to exchange eſtates, after this manner: the doors of their houſes were cloſe ſhut up and ſealed, that nothing might be conveyed away; then both took an oath to make a faithful diſcovery of all their effects, except what lay in the ſilver-mines, which by the laws was excuſed from all impoſts; accordingly, within three days, a full diſcovery and exchange of eſtates was made.

ANTIDOTE, among phyſicians, a remedy taken to prevent, or to cure the effects of poiſon, *&c.*

ANTIENT. See ANCIENT.

ANTIGONUS, one of Alexander's commanders, to whom Aſia fell. He conquered Eumenes, and expelled Seleucus out of Syria; who flying to Ptolemy Lagus in Egypt, a bloody war commenced betwixt him, Caſſander, and Antigonus, wherein, by the help of his ſon Demetrius, Antigonus prevailed, and built the city Antigonia, anno Romæ 448. Afterward Caſſander, Seleucus, and Lyſimachus, uniting againſt him, routed him, in league with king Pyrrhus, and ſlew him near Epirus, 301 years before Chriſt.

ANTIGONUS, king of the Jews, was the ſon of Ariſtobulus. He entered into an alliance with the king of the Parthians, and beſieged Jeruſalem. He cut off his uncle Hircanus's ears, to incapacitate him for the high-prieſthood; and put Joſephus, Herod's brother, to death. At length, Herod took him and ſent him to M. Anthony; who, to gratify Herod, cut off his head, and thereby extinguiſhed the Aſmoneans, who had reigned 126 years. This happened 36 years before Chriſt.

ANTIGUA, one of the Antilles or Caribbee iſlands, belonging to the Engliſh, and ſituated in about W. Long. 62. N. Lat. 17. 30. It is above 50 miles in circumference, and is reckoned the largeſt of all the Britiſh Leeward iſlands. This iſland was long thought to be uninhabitable, becauſe of its being deſtitute of freſh water; but this loſs was ſupplied by the induſtry of the inhabitants, who have diſcovered ſome ſprings, and made reſervoirs for preſerving the rain water. It is the beſt provided with harbours of all the Leeward iſlands; but the approach to it is dangerous to any but ſkilful pilots, on account of the vaſt number of rocks with which it is ſurrounded. One of thoſe is called *Five-iſle-harbour*; and, though difficult of acceſs, is often of great ſervice to ſhips in diſtreſs. St John's harbour, which lies due north, would be the beſt in the whole iſland, were it not for a ſandy bar that runs acroſs it. At the mouth of St John's river, is a fort, which is mounted with 14 cannon; and ſeveral batteries, mounting in the whole 26 guns, are raiſed for the defence of as many landing-places. None-ſuch harbour lies on the weſt ſide of the iſland, in a ſpacious bay. Willoughby bay is almoſt a league over at the mouth; but is above two thirds blocked up with a ſhoal ſtretching from the north to the ſouth point; from whence lies Sandy-point, with an iſland in it; but between the north and ſouth point there is an open channel where ſhips may enter, and, when entered, may have good riding. But the moſt convenient harbour in Antigua, or perhaps in the Weſt Indies, is Engliſh-harbour; which is proper for careening ſhips of war, and might be improved in ſuch a manner as to admit thoſe of the greateſt burthen. At the bottom of Falmouth harbour, lies Falmouth town, which is defended by Fort-Charles, and Monkſhill Fort. The latter contains a magazine of 410 muſkets and 800 bayonets, and is mounted with 30 pieces of cannon.

The climate of Antigua is very hot, and ſo liable to hurricanes, that were it not for the great conveniency of its ſituation and harbours, it muſt have lain a mere deſert. Wild cinnamon grows in the low lands; and this iſland is generally ſaid to have greater plenty of veniſon upon it than any other of the Carribbees; beſides its producing abundance of fowl, and black cattle. Its chief commodities are ſugar and tobacco; but the inhabitants formerly cultivated indigo and pepper. The annual export of ſugar from this iſland is computed to be 16,000 hogſheads; but the inhabitants do not make rum in proportion.

Antigua was very early planted by ſome Engliſh adventurers, whoſe hiſtory is now uncertain. According to ſome French writers, the Engliſh, ſo far back as the year 1640, were very numerous, inſomuch that they gave offence to the native Carribbees, who had probably received them kindly at firſt. The event of the quarrel was, that the natives killed fifty of the Engliſh, and carried off the governor's lady. Long after this the iſland was inhabited both by French and Engliſh, who lived together with great cordiality; but the former were at laſt treated with ſuch ſeverity, becauſe they heſitated at ſwearing allegiance to the Engliſh government, that they were forced to retire to Guadaloupe. Thoſe exiles immediately diſcloſed to their countrymen the weak ſtate of the Engliſh colony, and how eaſily it might be reduced; upon which an expedition was immediately undertaken. The Engliſh were beſieged in form, their forts taken, their governor made priſoner, and they themſelves obliged to accept of a capitulation for ſurrendering the whole iſland. Before this capitulation, however, could be put in execution, a reinforcement arrived, which prevented its taking place. The governors of the French Carribbees underſtanding this, muſtered a greater force, and landing upon Antigua in 1667, the Engliſh governor, Fiſh, was obliged to ratify the treaty; the iſland was, however, reſtored to the Engliſh the following year, by an article of the treaty of Breda.

From this time, the colony of Antigua began to flouriſh, chiefly through the prudent management of colonel Chriſtopher Codrington; who, having been appointed captain-general, and general-governor of all the Leeward iſlands, removed from Barbadoes to Antigua, which he made the ſeat of his government; and here, by his great knowledge and experience in Weſt-India plantations, he introduced a new and better ſyſtem of colonizing and improving. It was not in his power, however, to prevent the effects of thoſe dreadful hurricanes to which the iſland is ſubject, and which more than once in his time rendered it a ſcene of deſolation, particularly in 1681; and nine years after, it was almoſt entirely ruined by an earthquake.

The Indians, inſtigated by the French, never failed to avail themſelves of thoſe natural calamities by making deſcents upon the iſland: but after having plundered the plantations neareſt the ſea, they were generally driven off with loſs. Sometimes, however, they made their deſcents with a force ſufficient to carry off negroes and other prey. On theſe occaſions the French privateers were partly manned with Iriſh Roman-catholics, whom the inhabitants found to be their moſt cruel enemies. To make themſelves ſome amends for theſe depredations, the Antiguans made a deſcent upon the French iſland of Marigalante, where they took and burnt the chief town, demoliſhed the fort and ſpiked up its guns, drove the inhabitants into the woods, and returned to Antigua laden with plunder.

Notwithſtanding theſe ſkirmiſhes, the trade of Antigua continued to flouriſh, ſo that in 1696, eleven loaded ſhips were ſent from the iſland at one time. This year died Colonel Codrington, and was ſucceeded by his ſon, of the ſame name and rank; and who had diſtinguiſhed himſelf equally in arms, and in the polite arts. This gentleman very early formed a deſign of attacking the French Weſt-India iſlands; and, having uſed his utmoſt endeavours to procure a ſufficient armament for this purpoſe, as well as encouraged the merchants and planters to fit out privateers, to which he himſelf contributed largely, he made a deſcent upon Guadaloupe. Here he firſt diſlodged the enemy from a poſt called *Le petits Habitans*, and having landed about 800 more men, they boldly marched up to a town called the *Bayliſſe*, where the French had manned a breaſt-work, which they vigorouſly defended, and killed three Engliſh captains at the head of their grenadiers. But the Engliſh ſoldiers having briſkly kept up their fire, at laſt laid the muzzles of their pieces acroſs the top of the breaſt-work, and ſoon became maſters of it. This was followed by the conqueſt of all the other breaſtworks, of the town of Bayliſſe itſelf, and of the Jacobine church and plantation, both of which were ſtrongly fortified. At laſt the main town of Baſſe Terre was taken, and the French retired to the fort, leaving all the open country to be plundered and deſtroyed by the Engliſh. When now nothing remained to complete the conqueſt of the iſland, but the reduction of Baſſe Terre fort and caſtle, a diſagreement aroſe between the ſea and land officers, the particulars of which were ſo little to the credit of either, that they were never made public: the expedition, however, was abandoned, on pretence that the reduction of the iſland was a matter of much greater difficulty than had been foreſeen; and that, conſidering the vigorous defence made by the French, the Engliſh army, which was now both weak and ſickly, was unable to do duty any longer.

Colonel Codrington was ſucceeded, in 1704, by Sir William Matthews, and he by colonel Park, who received the government from the hands of John Yeomans, Eſq; the preſident of the iſland, and of the council. All this time, notwithſtanding the repeated attacks of the French upon the other Weſt-India iſlands, Antigua remained unmoleſted; and the inhabitants grew rich by their privateering, in which they became ſo expert, that a French ſloop with 50 men was taken, and 40 of her men killed by an Engliſh veſſel having no more than nine men and ſix boys on board. The new governor began his adminiſtration in the moſt unpopular manner that can be conceived. He appointed a common foot-ſoldier to act as provoſt-marſhal of the iſland; and that too without obliging him to give any ſecurity, which was highly neceſſary. When talked to upon this head, he refuſed to give any other anſwer than, that a foot-ſoldier was a gentleman. In other reſpects he behaved in a manner ſo unbecoming his ſtation, that an impeachment of his conduct was tranſmitted to England by the principal inhabitants of the iſland, and he was in the end ordered home. With this command, however, he did not comply, but ſuffered a ſhip to ſail without him, in which he ought to have returned to England. Upon this, the iſlanders began to look upon him as an uſurper, and formed a deſign of taking him priſoner and ſending him home by force. Park prepared for his defence againſt the iſlanders, who appeared in arms againſt him to the number of 400. He had garriſoned his houſe with all the regulars he found upon the iſland, and was attended by ſome of his worthleſs creatures whom he had raiſed to places of power and truſt. He now ſent his provoſt-marſhal to the inhabitants, with a proclamation, requiring them to diſperſe; but this they deſpiſed, declaring that the governor's troops ſhould not prevent him from being ſent priſoner to England. The more moderate among them were for compromiſing matters, and Park himſelf now offered them very reaſonable terms; but the greater part thinking that they had gone too far to retract, attacked the houſe, and having wounded the governor and then got him into their hands, murdered him in a ſhocking manner.

From this time, no very remarkable tranſactions have happened with regard to the iſland of Antigua. It hath continued unmoleſted in all the late wars with France. The number of white inhabitants is reckoned about 10,000. It is divided into five pariſhes; that of St John's-town, which is reckoned the capital of the north-weſt part, and conſiſts of above 200 houſes; thoſe of Falmouth, Porham, and Bridge-town, on the ſouth-ſide; and St Peter's, which is no town, but lies almoſt in the middle of the iſland.

ANTIHECTICS, in pharmacy, medicines good in hectical diſorders.

ANTIHECTICUM POTERII, the name of a medicine formerly much celebrated, but now laid aſide in common practice.

ANTILLES, the French name for the Caribbee ſlands.

ANTILOGARITHM, the complement of the logarithm of a ſine, tangent, or ſecant; or the difference of that logarithm from the logarithm of 90 degrees.

ANTILOGY, in matters of literature, an inconſiſtency between two or more paſſages of the ſame book.

ANTILYSSUS PULVIS. See PHARMACY, n° 807.

ANTIMERIA, in grammar, a figure whereby one part of ſpeech is uſed for another: e. gr. *velle ſuum cuique eſt*, for, *voluntas ſua cuique eſt;* alſo, *populus late rex*, for *populus late regnans*.

ANTIMERIA, in a more reſtrained ſenſe, is a figure where the noun is repeated inſtead of the pronoun. The antimeria is frequent in the Hebrew, and is ſometimes retained in our verſion of the Old Teſtament accordingly: e. gr. *Hear my voice, ye wives of Lamech*, for *my wives*, Gen. iv. 23.

ANTIMETABOLE, in rhetoric, a figure which ſets two things in oppoſition to each other. The word is Greek, compounded of αντι, *againſt*, and μεταϐολη from μεταϐαλλω, I *ſhiſt* or *transfer; i. e.* a ſhifting, or ſetting two things over-againſt each other. This figure is twice exemplified in an apophthegm of Muſonius; which, on account of its excellence, is called *aureum monitum*, the golden maxim or precept.

ANTIMONARCHICAL, an appellation given to whatever oppoſes monarchical government.

ANTIMONIALS, in medicine, preparations of antimony. See the references at MAT. MED. n° 110.

ANTIMONY, a blackiſh mineral ſubſtance, ſtaining the hands, full of long, ſhining, needle-like ſtriæ, hard, brittle, and conſiderably heavy. It is found in different parts of Europe, as Bohemia, Saxony, Tranſylvania, Hungary, France and England; commonly in mines by itſelf, intermixed with earth and ſtony matters. Sometimes it is blended with the richer ores of ſilver, and renders the extraction of that metal difficult by volatilizing a part of the ſilver, or, in the language of the miners, *robbing the ore*.

This mineral is ſeparated from its natural impurities by fuſion in an earthen pot whoſe bottom is full of holes; the fluid antimony paſſing through, while the unfuſible matters remain behind. The melting veſſel is ſet into another pot ſunk in the ground. This laſt, which is of a conical figure, and ſerves for a receiver, gives the ſhape to the loaves of antimony uſually met with. The juncture of the two veſſels is cloſely luted, the uppermoſt one covered, and a fire made round it. In ſome places, inſtead of a pot with a perforated bottom, one is made uſe of which has no bottom, and a perforated iron plate is interpoſed betwixt it and the receiver. But the former method is preferable, as the antimony, while in fuſion, is apt to diſſolve ſome of the iron. Very little heat is neceſſary in this operation, for the antimony melts before it is red hot.

Medicinal Uſes, &c. For a long time this mineral was eſteemed poiſonous. In 1566, its uſe was prohibited in France by an edict of parliament; and in 1609, one Beſnier was expelled the faculty for having given it. The edict was repealed in 1650; antimony having a few years before been received into the number of purgatives. In 1668, a new edict came forth, forbidding its uſe by any but doctors of the faculty.—It is now univerſally allowed, that pure antimony in its crude ſtate has no noxious quality; and that tho' many of its preparations are moſt virulently emetic and cathartic, yet, by a ſlight alteration or addition, they loſe their virulence, and become mild in their operation. Antimony was uſed by the ancients in collyria againſt inflammations of the eyes, and for ſtaining the eyebrows black. Its moſt efficacious preparations, are the regulus, glaſs, and liver *. Antimony is alſo made uſe of for purifying and heightening the colour of gold. See that article.

* See *Chemiſtry*, nº 158, 211, 258, 449, 454, 459. Alſo the references at *Materia Medica*, nº 110.

ANTINOEIA, in antiquity, annual ſacrifices, and quinquennial games, in memory of Antinous the Bithynian. They were inſtituted at the command of Adrian the Roman emperor, at Mantinea in Arcadia, where Antinous was honoured with a temple and divine worſhip.

ANTINOMIANS, in eccleſiaſtical hiſtory, certain heretics who firſt appeared in the year 1535. The word is formed from the Greek, αντι *againſt*, and νομος *a law*. They were ſo called, becauſe they rejected the law as of no uſe under the goſpel-diſpenſation. They held, that good works do not further, nor evil hinder, ſalvation; that the child of God cannot ſin; that God never chaſtiſes any land for their ſins; that murder, adultery, drunkenneſs, and the like, are no ſins in the children of God; that an hypocrite may have all the graces that were in Adam before his fall; and the like ſtrange opinions.

ANTINOUS, the favourite of Adrian, was born at Bithynus in Bithynia. His beauty engaged the heart of Adrian in ſuch a manner, that there never was a more boundleſs and extravagant paſſion than that of this emperor toward this youth. After his death, the emperor ordered divine honours to be paid him.

ANTIOCH, a city of Syria in Aſia, ſituated on the river Orontes, in E. Long. 37. 5. N. Lat. 36. 20. It was built by Seleucus Nicator, founder of the Syro-Macedonian empire, who made it his capital. It ſtood on the above mentioned river, about 20 miles from the place where it empties itſelf into the Mediterranean; being equally diſtant from Conſtantinople and Alexandria in Egypt, that is, about 700 miles from each. Seleucus called it *Antioch*, from his father's name, according to ſome; or from that of his ſon, according to others. He built 16 other cities bearing the ſame name; of which one, ſituated in Piſidia, is probably that where the name of *Chriſtians* was firſt given to the followers of Jeſus Chriſt. But that ſituated on the Orontes, by far eclipſed, not only all the others of this name, but all the cities built by Seleucus. Antigonus, not long before, had founded a city in that neighbourhood, which from his own name he had called *Antigonia*, and deſigned it for the capital of his empire; but it was raſed to the ground by Seleucus, who employed the materials in building his metropolis, and alſo tranſplanted the inhabitants thither.

The city of Antioch was afterwards known by the name of *Tetrapolis*, being divided as it were into four cities, each of them being ſurrounded with its proper wall, beſides a common one which incloſed them all. The firſt of theſe cities was built by Seleucus Nicator, as already mentioned; the ſecond by thoſe who flocked thither on its being made the capital of the Syro-Macedonian empire; the third by Seleucus Callinicus; and the fourth by Antiochus Epiphanes.—About four or five miles diſtant, ſtood a place called *Daphne*, which was nevertheleſs reckoned a ſuburbs of Antioch. Here Seleucus planted a grove, and in the middle of it built a temple which he conſecrated to Apollo and Diana, making the whole an aſylum. To this place the inhabitants of Antioch reſorted for their pleaſures and diverſions; whereby it became at laſt ſo infamous, that, "to live after the manner of Daphne," was uſed as a proverb to expreſs the moſt voluptuous and diſſolute way of living. Here Lucius Verus, the colleague of M. Aurelius, choſe to take up his reſidence, inſtead of marching againſt the Parthians; while his general Caſſius forbad by proclamation any of his ſoldiers to enter or even go near the place. In ſhort, ſo remarkable was Daphne of old, that the metropolis itſelf was diſtinguiſhed by it, and called *Antioch near Daphne*.

Though Antioch continued to be, as Pliny calls it, the queen of the eaſt, for near 1600 years; yet ſcarce any city mentioned in hiſtory hath undergone ſuch calamities, both from the attacks of its enemies, and its being naturally ſubjected to earthquakes—The firſt diſaſter, mentioned in hiſtory, which befel the Antiochians, happened about 145 years before Chriſt. Being at that time very much diſaffected to the perſon and government of Demetrius their king, they were continually raiſing tumults and ſeditions; inſomuch that he found himſelf at laſt obliged to ſolicit aſſiſtance from the Jews; and was furniſhed by Jonathan, one of the Maccabees, with 3000 men: by which reinforcement believing himſelf ſufficiently ſtrong to reduce the mutineers by force, he ordered them immediately to deliver up their arms. This unexpected order cauſed a great uproar in the city. The inhabitants ran to arms, and inveſted the king's palace, to the number of 120,000, with a deſign to put him to death. All the Jews haſtened to his relief, fell upon the rebels, killed 100,000 of them, and ſet fire to the city. On the deſtruction of the Syrian empire by the Romans, Antioch ſubmitted to them as well as the other cities of that kingdom, and continued for a long time under their dominion. About the year 115, in the reign of the emperor Trajan, it was almoſt entirely ruined by one of the moſt dreadful earthquakes mentioned in hiſtory. Trajan himſelf happened to be there at that time, being returned from an expedition againſt the Parthians; ſo that the city was then full of troops, and ſtrangers come from all quarters either out of curioſity or upon buſineſs and embaſſies: the calamity was by this means felt almoſt in every province of the Roman empire. The earthquake was preceded by violent claps of thunder, unuſual winds, and a dreadful noiſe under ground. The ſhock was ſo terrible, that great numbers of houſes were overturned, and others toſſed to and fro like a ſhip at ſea. Thoſe who happened to be in their houſes were for the moſt part buried under their ruins: thoſe who were walking in the ſtreets, or in the ſquares, were, by the violence of the ſhock, daſhed againſt each other, and moſt of them either killed or dangerouſly wounded.—This earthquake continued, with ſome ſmall intermiſſion, for many days and nights; ſo that vaſt numbers periſhed. The moſt violent ſhock, according to the Acts of St Ignatius, was on a Sunday, December 23. By this Trajan was much hurt, but eſcaped through a window. Dio Caſſius pretends, that he was taken out of the window by one who exceeded the human ſize in tallneſs. The ſame hiſtorian adds, that mount Liſon, which ſtood at a ſmall diſtance from the city, bowed with its head and threatened to fall down upon it; that other mountains fell; that new rivers appeared; and others, that had flowed before, forſook their courſe and vaniſhed. When the earthquake ceaſed, a woman was heard crying under the ruins; which being immediately removed, ſhe was found, with a living child in her arms. Search was made for others; but none was found alive, except one child, which continued ſucking its dead mother.

No doubt, Trajan, who was an eye-witneſs of this terrible calamity, would contribute largely towards the re-eſtabliſhment of Antioch in its ancient ſplendor. Its good fortune, however, did not continue long; for in 155, it was almoſt entirely burnt by accidental fire; when it was again reſtored by Antoninus Pius. In 176 or 177, the inhabitants having ſided with Caſſius, the abovementioned Roman general, who had revolted from M. Aurelius, that emperor publiſhed a ſevere edict againſt them, deprived them of all their privileges, ſuppreſſed their public aſſemblies, and took from them the ſhews and ſpectacles to which they were greatly addicted: but his anger being ſoon appeaſed, he reſtored them to their former condition, and even condeſcended to viſit their city. In 194, having ſided with Niger againſt Severus, the latter deprived them of all their privileges, and ſubjected Antioch as a mere village to Laodicea; but, however, pardoned them the next year at the intreaties of his eldeſt ſon, then a child.

When the power of the Roman empire began to decline, Antioch became the bone of contention between them and the eaſtern nations; and accordingly, on the breaking out of a Perſian war, it was almoſt always ſure to ſuffer. In 242, it was taken and plundered by Sapor; and, though he was defeated by Gordian, it underwent the ſame misfortune in the time of Valerian, about 18 years after; and after the defeat and captivity of Valerian, being taken by the Perſian monarch a third time, he not only plundered it, but levelled all the public buildings with the ground. The Perſians, however, being ſoon driven out, this unfortunate city continued free from any remarkable calamity till about the time of the diviſion of the Roman empire by Conſtantine in 331. It was then afflicted with ſo grievous a famine, that a buſhel of wheat was ſold for 400 pieces of ſilver. During this grievous diſtreſs, Conſtantine ſent to the biſhop 30,000 buſhels of corn; beſides an incredible quantity of all kinds of proviſions, to be diſtributed among the eccleſiaſtics, widows, orphans, &c. In the year 347, Conſtantine II. cauſed an harbour to be made at Seleucia, for the conveniency of Antioch. This was effected at an immenſe expence, the mouth of the Orontes, where the port was made, being full of ſands and rocks. When the emperor Julian ſet out on his expedition againſt the Perſians, he made a long ſtay at Antioch; during which time, many of the Roman provinces were afflicted with a famine, but which raged more violently at Antioch than in other places. The eccleſiaſtic writers of thoſe times ſay, that this famine followed Julian from place to place; and as he continued longer at Antioch than any other city, it raged more violently there than any where elſe. To remedy this evil, Julian fixed the prices of corn, by which means the famine was greatly increaſed, the merchants conveying their corn privately to other places, ſo that this metropolis was reduced to a moſt deplorable ſituation. In 381, in the reign of Theodoſius the Great, Antioch was again viſited by a famine, accompanied by a grievous plague. The latter ſoon ceaſed: but, the famine ſtill continuing, the biſhop, Libanius, applied to Icarius, count of the Eaſt, requeſting him by ſome means or other to relieve the poor, who had flocked from all parts to the metropolis, and were daily periſhing in great numbers; but to this Icarius gave no other anſwer, than that they were abhorred and juſtly puniſhed by the gods. This inhuman anſwer raiſed great diſturbances; which, however, were terminated without bloodſhed. In 387, Theodoſius finding his exchequer quite drained, and being obliged to be at an extraordinary expence in celebrating the fifth year of the reign of his ſon Arcadius, and the tenth of his own, an extraordinary tax was laid upon all the people in the empire. Moſt of the cities ſubmitted willingly to this; but the people of Antioch, complaining of it as an unreaſonable oppreſſion, crowded to the houſe of Flavianus their biſhop, as ſoon as the edict was publiſhed, to implore his protection. Being unable to find him, they returned to the forum; and would have torn the governor in pieces, had not the officers who attended him kept back with great difficulty the enraged multitude, till he made his eſcape. Upon this, they broke ſome of the emperor's ſtatues and dragged others through the city, uttering the moſt injurious and abuſive expreſſions againſt him and his whole family. They were, however, diſperſed by a body of archers, who, by wounding only two of the rabble, ſtruck terror into all the reſt. The governor proceeded againſt the offenders with the utmoſt cruelty; expoſing ſome to wild beaſts in the theatre, and burning others alive. He did not ſpare even the children, who had inſulted the emperor's ſtatues; and cauſed ſeveral perſons to be executed, who had been only ſpectators of the diſorder. In the mean time, a report was ſpread, that a body of troops was at hand, with orders to plunder the city, and put all to the ſword, without diſtinction of ſex or age; upon which, the citizens abandoned their dwellings in the utmoſt terror and confuſion, retiring to the neighbouring mountains with their wives and families. As the report proved groundleſs, ſome of them returned; but the greater part, dreading the cruelty of the governor, and the diſpleaſure of the emperor, continued in their retreats. To thoſe who returned, St Chryſoſtom preached ſome Homilies, which have reached our times, and are greatly admired; and which are ſaid by St Chryſoſtom himſelf, as well as ſome cotemporary writers, to have had a conſiderable effect in reforming the lives of this licentious and diſſolute people. On hearing the news of this tumult, Theodoſius was ſo much enraged, that he commanded the city to be deſtroyed, and its inhabitants to be put to the ſword without diſtinction; but this order was revoked before it could be put into execution, and he contented himſelf with a puniſhment ſimilar to that inflicted by Severus above-mentioned. He appointed judges to puniſh the offenders; who proceeded with ſuch ſeverity, and condemned ſuch numbers, that the city was thrown into the utmoſt conſternation. On this occaſion, St Chryſoſtom and the hermits,

mits, who were very numerous in the neighbourhood, exerted all their eloquence in behalf of the unhappy people, and obtained a reſpite for thoſe who had been condemned. They next proceeded to draw up a memorial to the emperor in favour of the citizens in general; and being joined by Flavianus, at laſt obtained a general pardon, and had the city reſtored to all its former privileges.

In the year 458, Antioch was almoſt entirely ruined by an earthquake, which happened on the 14th of September; ſcarce a ſingle houſe being left ſtanding in the moſt beautiful quarter of the city. The like misfortune it experienced in 525, during the reign of the emperor Juſtin; and 15 years after, being taken by Coſrhoes king of Perſia, that inſulting and haughty monarch gave it up to his ſoldiers, who put all they met to the ſword. The king himſelf ſeized on all the gold and ſilver veſſels belonging to the great church; and cauſed all the valuable ſtatues, pictures, &c. to be taken down and conveyed to Perſia, while his ſoldiers carried off every thing elſe. The city being thus completely plundered, Coſrhoes ordered his men to ſet fire to it; which was accordingly done ſo effectually, that none of the buildings even without the walls eſcaped. Such of the inhabitants as eſcaped ſlaughter were carried into Perſia, and ſold as ſlaves.

Notwithſtanding ſo many and ſo great calamities, the city of Antioch ſoon recovered its wonted ſplendor; but in a ſhort time underwent its uſual fate, being almoſt entirely deſtroyed by an earthquake in 587, by which 30,000 perſons loſt their lives. In 634, it fell into the hands of the Saracens, who kept poſſeſſion of it till the year 858, when it was ſurpriſed by one Burtzas, and again annexed to the Roman empire. The Romans continued maſters of it for ſome time, till the civil diſſenſions in the empire gave the Turks an opportunity of ſeizing upon it as well as the whole kingdom of Syria. From them it was again taken by the Cruſaders in 1098. In 1262, it was taken by Bibaris ſultan of Egypt, who put a final period to its glory. It is now only a ſmall and contemptible village, known by the name of *Anthakia;* and the name of the river Orontes is changed for that of *Aſſi*. The walls of each quarter, as well as thoſe which ſurrounded the whole, are ſtill remaining; but as the houſes are entirely deſtroyed, theſe quarters look like ſo many incloſed fields. Its former grandeur, however, appears in the many magnificent ruins that ſtill remain.

ANTIOCHETTA, a town of Turky, in Aſia, in Carimania, with a biſhop's ſee, over-againſt the iſland of Cyprus. E. Long. 32. 15. N. Lat. 36. 42.

ANTIOCHUS THE GREAT, king of Syria, ſucceeded his brother Seleucus Ceraunus, 223 years before Chriſt. He was defeated in a bloody battle, by Ptolemy Philopater, near Raphia, 217 years before Chriſt. Some time after, he took Sardes; attacked the Medes and Parthians; conquered Judea, Phœnicia, and Cœloſyria; and formed the deſign of reducing Smyrna, Lampſacus, and other cities of Aſiatic Greece. Theſe cities implored the aſſiſtance of the Romans; who ſent ambaſſadors to oblige him to reſtore to Ptolemy Philadelphus the countries he had taken from him, and to ſuffer the free cities of Greece to enjoy the bleſſings of peace. Antiochus being enraged, at the ſolicitation of Hannibal declared war againſt the Romans; but was defeated by Acilius Glabrio, and loſt a great battle againſt Scipio Aſiaticus, near Magneſia: in ſhort, the Romans granted him a peace on very diſgraceful conditions. At laſt, finding his exchequer low, and going to recruit it with the plunder of the temple of Belus, he was killed by the rabble, who came to ſave the ſacred treaſure, about 187 years before Chriſt; and was ſucceeded by Seleucus Philopater.

ANTIOCHUS EPIPHANES, or *the Illuſtrious*, uſurped the throne of Syria from his nephew Demetrius, 175 years before Chriſt, and attempted to take Egypt from his nephew Ptolemy Philometer; but was repulſed. He depoſed Onias, the high-prieſt of the Jews; and beſieged and took Jeruſalem, 170 years before Chriſt, when he prophaned the temple of God, offered ſacrifices in it to Jupiter Olympius, carried away the ſacred veſſels, and committed the moſt horrid acts of cruelty. At his return to Antioch, 167 years before Chriſt, he put to death the ſeven brothers, the Maccabees, with old Eleazar. However, Matthias and Judas Maccabeus defeated his armies; and he himſelf was routed by the Elymeans, and obliged to return to Babylon, where he was ſeized with a dreadful diſeaſe, and died in the greateſt inward agonies, 164 years before the Chriſtian æra. He was ſucceeded by his ſon,—

ANTIOCHUS EUPATOR, king of Syria, 164 years before Chriſt. By the advice of Lyſias his ſon-in-law, he entered Judea, with an army of 80,000 foot, and 80 elephants; but was defeated by Judas Maccabeus. He was killed by Demetrius his couſin-german, 162 years before the Chriſtian æra.

There have been ſeveral other princes of the ſame name.

ANTIOCHUS of *Aſcalon*, a celebrated philoſopher, the diſciple of Philo of Lariſſa, the maſter of Cicero, and the friend of Lucullus and Brutus. He was founder of a fifth academy; but, inſtead of attacking other ſects, he ſet himſelf down to reconcile them together, particularly the ſect of the ſtoics with that of the ancient academy.

ANTIOPE, in fabulous hiſtory, the wife of Lycus, king of Thebes, who, being deflowered by Jupiter in the form of a ſatyr, brought forth Amphion and Zethus.—Another Antiope was queen of the Amazons; and, with the aſſiſtance of the Scythians, invaded the Athenians; but was vanquiſhed by Theſeus.

ANTIPAROS, an iſland in the Archipelago, oppoſite to Paros, from which it is ſeparated by a ſtrait about ſeven miles over. It is the *Olearos*, or *Oliaros*, mentioned by Strabo, Pliny, Virgil, Ovid, *&c.;* and was, according to Heraclides Ponticus as quoted by Stephanus, firſt peopled by a Phœnician colony from Sidon.—According to Mr Tournefort's account, it is about 16 miles in circumference, produces a little wine and cotton, with as much corn as is neceſſary for the maintenance of 60 or 70 families, who live together in a village at one end of the iſland, and are moſtly Malteſe and French corſairs.

This iſland is remarkable for a ſubterraneous cavern or grotto, accounted one of the greateſt natural curioſities in the world. It was firſt diſcovered in the laſt century by one Magni an Italian traveller, who has given us the following account. "Having been informed (ſays he) by the natives of Paros, that in the little iſland of Antiparos, which lies about two miles from the former, of a gigantic ſtatue that was to be ſeen at the mouth of a cavern in that place, it was reſolved that we (the French conſul and himſelf) ſhould pay it a viſit. In purſuance of this reſolution, after we had landed on the iſland, and walked about four miles through the midſt of beautiful plains and ſloping woodlands, we at length came to a little hill, on the ſide of which yawned a moſt horrid cavern, that with its gloom at firſt ſtruck us with terror, and almoſt repreſſed curioſity. Recovering the firſt ſurpriſe, however, we entered boldly; and had not proceeded above 20 paces, when the ſuppoſed ſtatue of the giant preſented itſelf to our view. We quickly perceived, that what the ignorant natives had been terrified at as a giant, was nothing more than a ſparry concretion, formed by the water dropping from the roof of the cave, and by degrees hardening into a figure that their fears had formed into a monſter. Incited by this extraordinary appearance, we were induced to proceed ſtill farther, in queſt of new adventures in this ſubterranean abode. As we proceeded, new wonders offered themſelves: the ſpars, formed into trees and ſhrubs, preſented a kind of petrified grove; ſome white, ſome green; and all receding in due perſpective. They ſtruck us with the more amazement, as we knew them to be mere productions of Nature, who, hitherto in ſolitude, had, in her playful moments, dreſſed the ſcene, as if for her own amuſement.

“ But we had as yet ſeen but a few of the wonders of the place; and we were introduced as yet only into the portico of this amazing temple. In one corner of this half-illuminated receſs, there appeared an opening of about three feet wide, which ſeemed to lead to a place totally dark, and that one of the natives aſſured us contained nothing more than a reſervoir of water. Upon this we tried, by throwing down ſome ſtones, which rumbling along the ſides of the deſcent for ſome time, the ſound ſeemed at laſt quaſhed in a bed of water. In order, however, to be more certain, we ſent in a Levantine mariner, who, by the promiſe of a good reward, with a flambeaux in his hand, ventured into this narrow aperture. After continuing within it for about a quarter of an hour, he returned, carrying ſome beautiful pieces of white ſpar in his hand, which art could neither imitate nor equal. Upon being informed by him that the place was full of theſe beautiful incruſtations, I ventured in once more with him, for about 50 paces, anxiouſly and cautiouſly deſcending by a ſteep and dangerous way. Finding, however, that we came to a precipice which led into a ſpacious amphitheatre, if I may ſo call it, ſtill deeper than any other part, we returned; and being provided with a ladder, flambeaux, and other things to expedite our deſcent, our whole company, man by man, ventured into the ſame opening, and, deſcending one after another, we at laſt ſaw ourſelves all together in the moſt magnificent part of the cavern.

“ Our candles being now all lighted up, and the whole place completely illuminated, never could the eye be preſented with a more glittering or a more magnificent ſcene. The roof all hung with ſolid icicles, tranſparent as glaſs, yet ſolid as marble. The eye could ſcarce reach the lofty and noble cieling; the ſides were regularly formed with ſpars; and the whole preſented the idea of a magnificent theatre, illuminated with an immenſe profuſion of lights. The floor conſiſted of ſolid marble; and in ſeveral places, magnificent columns, thrones, altars, and other objects, appeared, as if nature had deſigned to mock the curioſities of art. Our voices, upon ſpeaking or ſinging, were redoubled to an aſtoniſhing loudneſs; and, upon the firing of a gun, the noiſe and reverberations were almoſt deafening. In the midſt of this grand amphitheatre roſe a concretion of about 15 feet high, that, in ſome meaſure, reſembled an altar; from which, taking the hint, we cauſed maſs to be celebrated there. The beautiful columns that ſhot up round the altar, appeared like candleſticks; and many other natural objects repreſented the cuſtomary ornaments of this ſacrament.

“ Below even this ſpacious grotto, there ſeemed another cavern; down which I ventured with my former mariner, and deſcended about 50 paces by means of a rope. I at laſt arrived at a ſmall ſpot of level ground, where the bottom appeared different from that of the amphitheatre, being compoſed of ſoft clay, yielding to the preſſure, and in which I thruſt a ſtick to about ſix feet deep. In this, however, as above, numbers of the moſt beautiful cryſtals were formed; one of which, particularly, reſembled a table. Upon our egreſs from this amazing cavern, we perceived a Greek inſcription upon a rock at the mouth; but ſo obliterated by time, that we could not read it. It ſeemed to import, that one Antipater, in the time of Alexander, had come thither; but whether he penetrated into the depths of the cavern, he does not think fit to inform us.”

From this account Mr Tournefort's differs conſiderably. Mr Magni mentions only one deſcent or precipice from the entry of the cave to the grotto, or moſt magnificent part: Mr Tournefort ſays that there were many very dangerous precipices and rugged ways, through which they were obliged to paſs ſometimes on their back, and ſometimes on their belly; but gives no particular account of his journey till he comes to the grand cavern. This indeed he deſcribes very pompouſly; but as by it he evidently wants to ſupport a favourite hypotheſis, namely, the vegetation of ſtones, perhaps the particulars are not altogether to be depended upon. He informs us, that, at the entry into the cavern, he met with a Greek inſcription almoſt defaced, containing a good number of proper names; and that there was a tradition among the inhabitants, that theſe were the names of ſome who had conſpired againſt Alexander the Great, and having miſſed their aim, had taken refuge in this grotto.

The moſt particular acount, however, of this famous grotto that hath hitherto been publiſhed, appeared in the Britiſh magazine, in a letter ſigned *Charles Saunders*, and dated Feb. 24th 1746-7; which, as it is very particular, and ſeems to bear ſufficient marks of authenticity, we ſhall here inſert. “ Its entrance lies in the ſide of a rock, about two miles from the ſea-ſhore; and is a ſpacious and very large arch, formed of rough craggy rocks, overhung with brambles and a great many climbing plants, that give it a gloomineſs which is very awful and agreeable. Our ſurgeon, myſelf, and four paſſengers, attended by ſix guides with lighted torches, entered this cavern about eight o'clock in the morning, in the middle of Auguſt laſt. We had not gone 20 yards in this cavity, when we loſt all ſight of day-light: but our guides going before us with lights, we entered into a low narrow kind of alley, ſurrounded every way with ſtone all glittering like diamonds by the light of our torches; the whole being covered and lined throughout with ſmall cryſtals, which gave a thouſand various colours by their different reflections. This alley grows lower and narrower as one goes on, till at length one can ſcarce get along it. At the end of this paſſage, we were each of us preſented with a rope to tie about our middles; which when we had done, our guides led us to the brink of a moſt horrible precipice. The deſcent into this was quite ſteep, and the place all dark and gloomy. We could ſee nothing, in ſhort, but ſome of our guides with torches in a miſerable dark place, at a vaſt diſtance below us. The dreadful depth of this place, and the horror of the deſcent thro' a miſerable darkneſs into it, made me look back to the lane of diamonds, if I may ſo call it, thro' which we had juſt paſſed; and I could not but think I was leaving heaven, to deſcend into the infernal regions. The hope of ſomething fine at my journey's end, tempted me, however, to truſt myſelf to the rope and my guides at the top, to let myſelf down. After about two minutes dangling in this poſture, not without much pain as well as terror, I found myſelf ſafe, however, at the bottom; and our friends all ſoon followed the example. When we had congratulated here with one another on our ſafe deſcent; I was inquiring where the grotto, as they called it, was. Our guides, ſhaking their heads, told us, we had a great way to that yet; and led us forward about 30 yards under a roof of ragged rocks, in a ſcene of terrible darkneſs, and at a vaſt depth from the ſurface of the earth, to the brink of another precipice much deeper and more terrible than the former. Two of the guides went down here with their torches firſt; and by their light we could ſee, that this paſſage was not ſo perpendicular indeed as the other, but lay in a very ſteep ſlant, with a very ſlippery rock for the bottom; vaſt pieces of rough rugged rocks jutting out in many places on the right hand, in the deſcent, and forcing the guides ſometimes to climb over, ſometimes to creep under them, and ſometimes to round them; and on the left, a thouſand dark caverns, like ſo many monſtrous wells, ready, if a foot ſhould ſlip, to ſwallow them up for ever. We ſtood on the edge to ſee theſe people with their lights deſcend before us; and were amazed and terrified to ſee them continue deſcending till they ſeemed at a monſtrous and moſt frightful depth. When they were at the bottom, however, they hallowed to us; and we, trembling and quaking, began to deſcend after them. We had not gone 30 feet down, when we came to a place where the rock was perfectly perpendicular; and a vaſt cavern ſeemed to open its mouth to ſwallow us up on one ſide, while a wall of rugged rock threatened to tear us to pieces on the other. I was quite diſheartened at this terrible proſpect, and declared I would go back: but our guides aſſured us there was no danger; and the reſt of the company reſolving to ſee the bottom now they were come ſo far, I would not leave them: ſo on we went to a corner where there was placed an old ſlippery and rotten ladder, which hung down cloſe to the rock; and down this, one after another, we at length all deſcended. When we had got to the bottom of this we found ourſelves at the entrance of another paſſage, which was terrible enough indeed; but in this there was not wanting ſomething of beauty. This was a wide and gradual deſcent; at the entrance of which one of our guides ſeated himſelf on his breech, and began to ſlide down, telling us we muſt do the ſame. We could diſcover, by the light of his torch, that this paſſage was one of the nobleſt vaults in the world. It is about nine feet high, ſeven wide, and has for its bottom a fine green gloſſy marble. The walls and arch of the roof of this being as ſmooth and even in moſt places as if wrought by art, and made of a fine gliſtering red and white granite, ſupported here and there with columns of a deep blood-red ſhining porphyry, made, with the reflection of the lights, an appearance not to be conceived. This paſſage is at leaſt 40 yards long; and of ſo ſteep a deſcent, that one has enough to do, when ſeated on one's breech, not to deſcend too quickly. Our guides that we kept with us, could here keep on each ſide of us: and, what with the prodigious grandeur and beauty of the place, our eaſy travelling thro' it, and the diverſion of our now and then running over one another whether we would or not; this was much the pleaſanteſt part of our journey. When we had entered this paſſage, I imagined we ſhould at the bottom join the two guides we had firſt ſent down: but alas! when we were got there, we found ourſelves only at the mouth of another precipice, down which we deſcended by a ſecond ladder not much better than the former. I could have admired this place alſo, would my terror have ſuffered me; but the dread of falling, kept all my thoughts employed during my deſcent. I could not but obſerve, however, as my companions were coming down after me, that the wall, if I may ſo call it, which the ladder hung by, was one maſs of blood-red marble, covered with white ſprigs of rock cryſtal as long as my finger, and making, with the glow of the purple from behind, one continued immenſe ſheet of amethyſts. From the foot of this ladder we ſlided on our bellies through another ſhallow vault of poliſhed green and white marble, about 20 feet; and at the bottom of this joined our guides. Here we all got together once again; and drank ſome rum, to give us courage before we proceeded any farther. After this ſhort refreſhment, we proceeded by a ſtrait, but ſomewhat ſlanting paſſage, of a rough, hard, and ſomewhat coarſe ſtone, full of a thouſand ſtrange figures of ſnakes rolled round, and looking as if alive; but in reality as cold and hard as the reſt of the ſtone, and nothing but ſome of the ſtone itſelf in that ſhape. We walked pretty eaſily along this deſcent for near 200 yards; where we ſaw two pillars ſeemingly made to ſupport the roof from falling in: but in reality it was no ſuch thing; for they were very brittle, and made of a fine glittering yellow marble. When we had paſſed theſe about 20 yards, we found ourſelves at the brink of another very terrible precipice: but this our guides aſſured us was the laſt; and there being a very good ladder to get down by, we readily ventured. At the bottom of this ſteep wall, as I may call it, we found ourſelves for ſome way upon plain even ground; but, after about 40 yards walking, were preſented by our guides with ropes again; which we faſtened about our middles, though not to be ſwung down by, but only for fear of danger, as there are lakes and deep waters all the way from hence on the left hand. With this caution, however, we entered the laſt alley;

Antiparos.

and horrible work it was indeed to get through it. All was perfectly horrid and diſmal here. The ſides and roof of the paſſage were all of black ſtone; and the rocks in our way were in ſome places ſo ſteep, that we were forced to lie all along on our backs, and ſlide down; and ſo rough, that they cut our clothes, and bruiſed us miſerably in paſſing. Over our heads, there were nothing but ragged black rocks, ſome of them looking as if they were every moment ready to fall in upon us; and, on our left hands, the light of our guides torches ſhewed us continually the ſurface of dirty and miſerably looking lakes of water. If I had heartily repented of my expedition often before, here I aſſure you I was all in a cold ſweat, and fairly gave myſelf over for loſt; heartily curſing all the travellers that had written of this place, that they had deſcribed it ſo as to tempt people to ſee it, and never told us of the horrors that lay in the way. In the midſt of all theſe reflections, and in the very diſmaleſt part of all the cavern, on a ſudden we had loſt four of our ſix guides. What was my terror on this ſight! The place was a thouſand times darker and more terrible for want of their torches; and I expected no other, but every moment to follow them into ſome of theſe lakes, into which I doubted not but they were fallen. The remaining two guides ſaid all they could, indeed, to cheer us up; and told us we ſhould ſee the other four again ſoon, and that we were near the end of our journey. I don't know what effect this might have upon the reſt of my companions; but I aſſure you I believed no part of the ſpeech but the laſt, which I expected every moment to find fulfilled in ſome pond or precipice. Our paſſage was by this time become very narrow, and we were obliged to crawl on all-fours over rugged rocks; when in an inſtant, and in the midſt of theſe melancholy apprehenſions, I heard a little hiſſing noiſe, and ſaw myſelf in utter, and not to be deſcribed, darkneſs. Our guides called indeed cheerfully to us, and told us that they had accidentally dropped their torches into a puddle of water, but we ſhould ſoon come to the reſt of them, and they would light them again; and told us there was no danger, and we had nothing to do but to crawl forward. I cannot ſay but I was amazed at the courage of theſe people; who were in a place where, I thought, four of them had already periſhed, and from whence we could none of us ever eſcape; and determined to lie down and die where I was. Words cannot deſcribe the horror, or the extreme darkneſs, of the place. One of our guides, however, perceiving that I did not advance, came up to me, and clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this ſtrange condition, expecting every moment death in a thouſand ſhapes, and trembling to think what the guide meant by this rough proceeding, he lifted me at once over a great ſtone, ſet me down on my feet, and took his hand from before my eyes. What words can deſcribe at that inſtant my aſtoniſhment and tranſport! Inſtead of darkneſs and deſpair, all was ſplendor and magnificence before me; our guides all appeared about us; the place was illuminated by 50 torches, and the guides all welcomed me into the grotto of Antiparos. The four that were firſt miſſing, I now found, had only given us the ſlip, to get the torches lighted up before we came; and the other two had put out their lights on purpoſe, to make us enter out of utter darkneſs into this pavilion of ſplendor and glory. I am now come to the proper buſineſs of this letter; which was, to deſcribe this grotto. But I muſt confeſs to you that words cannot do it. The amazing beauties of the place, the eye that ſees them only can conceive. The beſt account I can give you, however, pray accept of.

The people told us, the depth of this place was 485 yards. The grotto, in which we now were, is a cavern of 120 yards wide, and 113 long, and ſeems about 60 yards high in moſt places. Theſe meaſures differ ſomething from the accounts travellers in general give us; but you may depend upon them as exact, for I took them with my own hand. Imagine then with yourſelf, an immenſe arch like this, almoſt all over lined with fine and bright chryſtalized white marble, and illuminated with 56 torches; and you will then have ſome faint idea of the place I had the pleaſure to ſpend three hours in. This, however, is but a faint deſcription of its beauties. The roof, which is a fine vaulted arch, is hung all over with icicles of white ſhining marble, ſome of them ten foot long, and as thick as one's middle at the root: and among theſe there hang 1000 feſtoons of leaves and flowers of the ſame ſubſtance; but ſo very glittering, that there is no bearing to look up at them. The ſides of the arch are planted with ſeeming trees of the ſame white marble, riſing in rows one above another, and often incloſing the points of the icicles. From theſe trees there alſo hung feſtoons, tied as it were from one to another in vaſt quantities; and in ſome places among them there ſeem rivers of marble winding through them in a thouſand meanders. All theſe things are only made, in a long courſe of years, from the dropping of water, but really look like trees and brooks turned to marble. The floor we trod upon was rough and uneven, with cryſtals of all colours growing irregularly out of it, red, blue, green, and ſome of a pale yellow. Theſe were all ſhaped like pieces of ſalt-petre; but ſo hard, that they cut our ſhoes: among theſe, here and there, are placed icicles of the ſame ſhining white marble with thoſe above, and ſeeming to have fallen down from the roof and fixed there; only the big end of theſe is to the floor. To all theſe our guides had tied torches, two or three to a pillar, and kept continually beating them to make them burn bright. You may gueſs what a glare of ſplendor and beauty muſt be the effect of this illumination, among ſuch rocks and columns of marble. All round the lower part of the ſides of the arch are a thouſand white maſſes of marble, in the ſhape of oak-trees. Mr Tournefort compares them to cauliflowers, but I ſhould as ſoon compared them to toad-ſtools. In ſhort, they are large enough to incloſe, in many places, a piece of ground big enough for a bed-chamber. One of theſe chambers has a fair white curtain, whiter than ſattin, of the ſame marble, ſtretched all over the front of it. In this we all cut our names, and the date of the year, as a great many people have done before us. In a courſe of years afterwards, the ſtone bliſters out like this white marble over the letters. Mr Tournefort thinks the rock grows like oaks or apple-trees for this reaſon; but I remember I ſaw ſome of the fineſt cockle and muſcle ſhells, in the rock thereabouts, that ever I ſaw in my life. I wonder whether he thinks they grow there too. Beſides, if this rock grows ſo faſt, the cavern ought to be all grown up by this time;

and yet, according to his meaſures and mine, it ſeems on the other hand to be grown bigger ſince. Indeed, all that I can gather from his account of this glorious place is, that he had drank a bottle or two too much before he went down into it."

ANTIPATER, the diſciple of Ariſtotle, and one of Alexander the Great's generals, was a man of great abilities, and a lover of the ſciences; but was accuſed of poiſoning Alexander. He ſubdued the revolted Thracians, relieved Megalopolis, and overthrew the Spartans there. He died 321 years before the Chriſtian æra.

Antipater, an Idumean of illuſtrious birth, and poſſeſſed of great riches and abilities, taking advantage of the confuſion into which the two brothers Hyrcanus and Ariſtobulus plunged Judea by their conteſt for the office of high-prieſt, took ſuch meaſures as to gain Hyrcanus that office, and under his government to obtain the abſolute direction of all affairs; while his great abilites and application to buſineſs made him ſo conſiderable, that he was honoured as much as if he had been inveſted with the royal authority in form: but he was at laſt poiſoned by a Jew, named Malachus, 43 years before the Chriſtian æra. He left among his other children, the famous Herod king of the Jews.

Antipater (Cælius), a Roman hiſtorian, who wrote a hiſtory of the Punic war, much valued by Cicero. The emperor Adrian preferred him to Salluſt.

Antipater of Sydon, a Stoic philoſopher, and likewiſe a poet, commended by Cicero and Seneca: he flouriſhed about the 171st Olympiad. We have ſeveral of his epigrams in the *Anthologia*.

ANTIPATHY, in phyſiology, is formed from the two Greek words, αντι *contrary*, and παθος *paſſion*. Literally taken, the word ſignifies *incompatibility*: but for the moſt part the term *antipathy* is not uſed to ſignify ſuch incompatibilities as are merely phyſical; it is reſerved to expreſs the averſion which an animated or ſenſitive being feels at the real or ideal preſence of particular objects. In this point of view, which is the light in which we at preſent conſider the term, *antipathy*, in common language, ſignifies, "a natural horror and deteſtation, an inſuperable hatred, an involuntary averſion, which a ſenſitive being feels for ſome other object, whatever it is, though the perſon who feels this abhorrence is entirely ignorant of its cauſe, and can by no means account for it." Such is, they ſay, the natural and reciprocal hoſtility between the ſalamander and the tortoiſe; between the toad and the weaſel; or between ſheep and wolves. Such is the invincible averſion of particular perſons againſt cats, mice, ſpiders, &c.; a prepoſſeſſion which is ſometimes ſo violent, as to make them faint at the ſight of theſe animals. Of theſe and a thouſand other antipathies the ancient naturaliſts, the ſchoolmen, and the vulgar, form ſo many legends; and relate them as certain facts, that they may demand an explication of them from the philoſophers. But theſe ſages begin with inveſtigating whether ſuch antipathies actually exiſt or not.

To explore the matter without prejudice, we ſhall find it neceſſary to abſtract from the ſubjects of this diſquiſition, 1. All ſuch antipathies as are not aſcertained; as that which is ſuppoſed to be felt by hens at the ſound of an harp whoſe ſtrings are made of a fox's bowels, between the ſalamander and tortoiſe, and between the weaſel and the toad. Nothing is leſs confirmed, or rather nothing is more falſe, than theſe facts, with which vulgar credulity and aſtoniſhment are amuſed and actuated: and though ſome of theſe antipathies ſhould be aſcertained, this would be no proof that the animals which feel them are not acquainted with their cauſes, according to their mode and proportion of knowledge; in which caſe, it will be no longer the antipathy which we have defined.

2. We muſt abſtract thoſe antipathies which can be extinguiſhed or reſumed at pleaſure; thoſe fictitious averſions, which certain perſons feel, or pretend to feel, with affected airs, that they may appear more preciſe and finical, or ſingularly and prodigiouſly elegant; that they may ſeem to have qualities ſo exquiſitely fine, as require to be treated with peculiar delicacy. One who beſtows any attention on the ſubject, would be aſtoniſhed to find how many of theſe chimerical averſions there are, which are pretended, and paſſed upon the world by thoſe who affect them as natural and unconquerable.

3. When we abſtract thoſe averſions the cauſes of which are known and evident; we ſhall be ſurpriſed, after our deduction of theſe pretended antipathies from the general ſum, how ſmall, how inconſiderable, is the quantity of thoſe which are conformable to our definition. Will any one pretend to call by the name of *antipathy*, thoſe real, innate, and inconteſtable averſions which prevail between ſheep and wolves? Their cauſe is obvious: the wolf devours the ſheep, and ſubſiſts upon his victims; and every animal naturally flies with terror from pain or deſtruction: ſheep ought therefore to regard wolves with horror, which for their nutrition tear and mangle the unreſiſting prey. From principles ſimilar to this, ariſes that averſion which numbers of people feel againſt ſerpents; againſt ſmall animals, ſuch as reptiles in general, and the greateſt number of inſects. During the credulous and ſuſceptible period of infancy, pains have been taken to impreſs on our minds the frightful idea that they are venomous; that their bite is mortal; that their ſting is dangerous, productive of tormenting inflammations or tumours, and ſometimes fatal: they have been repreſented to us as ugly and ſordid; as being, for that reaſon, pernicious to thoſe who touch them; as poiſoning thoſe who have the misfortune to ſwallow them. Theſe horrible prepoſſeſſions are induſtriouſly inculcated from our infancy; they are ſometimes attended and ſupported by diſmal tales, which are greedily imbibed, and indelibly engraven on our memories. It has been taught us both by precept and example, when others at their approach have aſſumed in our view the appearance of deteſtation and even of terror, that we ſhould fly from them, that we ſhould not touch them. Is it then wonderful (if our falſe impreſſions as to this ſubject have been corrected neither by future reflections nor experiments), that we ſhould entertain, during our whole lives, an averſion from theſe objects, even when we have forgot the admonitions, the converſations, and examples, which have taught us to believe and apprehend them as noxious beings? and in proportion to the ſenſibility of our frame, in proportion as our nerves are irritable, our emotions at the ſight of what we fear will be more violent, eſpecially if they anticipate our expectation, and ſeize us unprepared, though our ideas of

what we have to fear from them are the moſt confuſed and indiſtinct imaginable. To explain theſe facts, is it neceſſary to fly to the exploded ſubterfuge of occult qualities inherent in bodies, to latent relations productive of antipathies, of which no perſon could ever form an idea?

It is often ſufficient to influence a perſon who had formerly no averſion for an object, if he lives with ſome other aſſociate who gives himſelf up to ſuch capricious panics; the habit is inſenſibly contracted to be agitated with diſagreeable emotions at the preſence of an object which had been formerly beheld with indifference and cold blood. I was acquainted, (ſays the author of the article *Antipathy* in the French Encyclopédie) with a perſon of a very ſound underſtanding, whom thunder and lightning by no means terrified; nay, to whom the ſpectacle appeared magnificent and the ſound majeſtic; yet to a mind thus ſeemingly fortified againſt the infectious terror, no more was neceſſary than ſpending the ſummer with a friend in whom the appearance of lightning excited the ſtrongeſt emotions, and whom the remoteſt clap of thunder affected with extravagant paroxiſms, to become timid in exceſs at the approach of thunder, nor could he ever afterwards ſurmount the fear which it inſpired.—The frightful ſtories of dogs and cats, which have killed their maſters, or which have given them mortal wounds, are more than ſufficient to inſpire a timorous perſon with averſion againſt theſe animals; and if the olfactory nerves of ſuch a perſon be delicate, he will immediately diſcover the ſmell of them in a chamber: diſturbed by the apprehenſion which theſe effluvia excite in his mind, he gives himſelf up to the moſt violent uneaſineſs, which is tranquillized when he is aſſured that the animal is no longer in the room. If by chance, in the ſearch which is made to calm the uneaſineſs of this timorous perſon, one of theſe creatures ſhould at laſt be diſcovered, every one preſently exclaims, *A miracle!* and admits the reality of *antipathies* into his creed; whilſt all this is nothing but the effect of a childiſh fear, founded on certain confuſed and exaggerated ideas of the hazard which one may run with theſe animals. The *antipathy* which ſome people entertain againſt eels, tho' they are eaten by others with pleaſure, ariſes from nothing but the fear of ſerpents, to which theſe fiſhes are in ſome degree ſimilar. There are likewiſe other *antipathies* which do not originate in the imagination, but ariſe from ſome natural incongruity; ſuch as we often remark in children, for particular kinds of victuals, with which their taſte is not offended, but which their ſtomachs cannot digeſt, and which are therefore diſgorged as ſoon as ſwallowed.

To what then are thoſe *antipathies*, of which we have heard ſo much, reducible? Either to legendary tales; or to averſions againſt objects which we believe dangerous; or to a childiſh terror of imaginary perils; or to a diſreliſh, of which the cauſe is diſguiſed; or to a ridiculous affectation of delicacy; or to an infirmity of the ſtomach; in a word, to a real or pretended reluctance for things which are either inveſted, or ſuppoſed to be inveſted, with qualities hurtful to us. Too much care cannot be taken in preventing, or regulating, the *antipathies* of children; in familiarizing them with objects of every kind; in diſcovering to them, without emotion, ſuch as are dangerous; in teaching them the means of defence and ſecurity, or the methods of eſcaping their noxious influence; and, when the rational powers are matured by age, in reflecting on the nature of thoſe objects which we fear, in aſcertaining what has been told concerning their qualities, or in vigorouſly operating upon our own diſpoſitions to overcome thoſe vain repugnances which we may feel. See SYMPATHY, which is the oppoſite of *Antipathy*.

ANTIPATHY, in ethics, hatred, averſion, repugnancy. *Hatred* is entertained againſt perſons; *averſion*, and *antipathy*, indiſcriminately againſt perſons or things; and *repugnancy*, againſt actions alone.

Hatred is more voluntary than *averſion*, *antipathy*, or *repugnancy*. Theſe laſt have greater affinity with the animal conſtitution. The cauſes of ANTIPATHY are leſs known than thoſe of *averſion*. *Repugnancy* is leſs permanent than either the one or the other.—We hate a vitious character, we feel *averſion* to its exertions: we are affected with ANTIPATHY for certain perſons at firſt ſight; there are ſome affairs which we tranſact with *repugnancy*.—*Hatred* calumniates; *averſion* keeps us at a diſtance from certain perſons; ANTIPATHY makes us deteſt them; *repugnancy* hinders us from imitating them.

ANTIPHONY, in muſic, the name which the Greeks gave to that kind of ſymphony which was executed in octave or double octave. It is likewiſe the anſwer made by one choir to another, when an anthem is ſung between them.

ANTIPODES, in geography, a name given to thoſe inhabitants of the globe that live diametrically oppoſite to each other. The word is Greek, and compounded of αντι *oppoſite*, and πους a *foot*; becauſe their feet are oppoſite to each other.

The antipodes lie under oppoſite meridians and oppoſite parallels; in the ſame degreee of latitude, but of oppoſite denominations, one being north and the other ſouth. They have nearly the ſame degree of heat and cold, days and nights of equal length, but in oppoſite ſeaſons. It is noon to one, when midnight to the other; and the longeſt day with the one, is the ſhorteſt with the other.

Plato is eſteemed the firſt who thought it poſſible that the antipodes ſubſiſted, and is looked upon as the inventor of the word. As this philoſopher apprehended the earth to be ſpherical, he had only one ſtep to make to conclude the exiſtence of the antipodes.

The ancients, in general, treated this opinion with the higheſt contempt; never being able to conceive how men and trees could ſubſiſt ſuſpended in the air with their feet upwards, for ſo they apprehended they muſt be in the other hemiſphere.

They never reflected that theſe terms *upwards* and *downwards* are merely relative; and ſignify only nearer to, or farther from, the centre of the earth, the common centre to which all heavy bodies gravitate; and that, therefore, our antipodes have not their feet upwards and head downwards any more than ourſelves; becauſe they, like us, have their feet nearer the centre of the earth, and their heads further from it. To have the head downwards and feet upwards, is to place the body in a direction of gravity tending from the feet to the head: but this cannot be ſuppoſed with regard to the antipodes; for they, like us, tend toward the centre of the earth, in a direction from head to foot.

ANTIQUARY, a perſon who ſtudies and ſearches after monuments and remains of antiquity.

There were formerly, in the chief cities of Greece and Italy, perſons of diſtinction called *antiquaries*, who made it their buſineſs to explain the ancient inſcriptions, and give every other aſſiſtance in their power to ſtrangers who were lovers of that kind of learning. There is a ſociety of antiquaries in London, incorporated by the king's charter. See Society.

ANTIQUATED, ſomething obſolete, out of date, or out of uſe.

ANTIQUE, in a general ſenſe, ſomething that is ancient: but the term is chiefly uſed by ſculptors, painters, and architects, to denote ſuch pieces of their different arts as were made by the ancient Greeks and Romans. Thus we ſay, an antique buſt, an antique ſtatue, &c.

Antique is ſometimes contradiſtinguiſhed from *ancient*, which ſignifies a leſs degree of antiquity. Thus, antique architecture is frequently diſtinguiſhed from ancient architecture.

ANTIQUITIES, a term implying all teſtimonies, or authentic accounts, that have come down to us, of ancient nations. Bacon calls *antiquities* the wrecks of hiſtory, or ſuch particulars as induſtrious and learned perſons have collected from genealogies, inſcriptions, monuments, coins, names, etymologies, archives, inſtruments, fragments of hiſtory, &c.

Antiquities form a very extenſive ſcience, including "an hiſtorical knowledge of the edifices, magiſtrates, offices, habiliments, manners, cuſtoms, ceremonies, worſhip, and other objects worthy of curioſity, of all the principal ancient nations of the earth."

This ſcience is not a matter of mere curioſity, but is indiſpenſable to the theologian; who ought to be thoroughly acquainted with the antiquities of the Jews, to enable him properly to explain numberleſs paſſages in the Old and New Teſtaments: to the lawyer; who, without the knowledge of the antiquities of Greece and Rome, can never well underſtand, and properly apply, the greateſt part of the Roman laws: to the phyſician and the philoſopher, that they may have a complete knowledge of the hiſtory and principles of the phyſic and philoſophy of the ancients: to the critic, that he may be able to underſtand and interpret ancient authors: to the orator and poet; who will be thereby enabled to ornament their writings with numberleſs images, alluſions, compariſons, &c.

Antiquities are divided into ſacred and profane, into public and private, univerſal and particular, &c. It is true, that the antiquaries (eſpecially ſuch as are infected with a ſpirit of pedantry, and the number of theſe is great) frequently carry their inquiries too far, and employ themſelves in laborious reſearches after learned trifles: but the abuſe of a ſcience ought never to make us neglect the applying it to rational and uſeful purpoſes.

Many antiquaries alſo reſtrain their learned labours to the eclairciſſement of the antiquities of Greece and Rome: but this field is far too confined, and by no means contains the whole of this ſcience, ſeeing it properly includes the antiquities of the Jews, Egyptians, Perſians, Phenicians, Carthaginians, Hetruſcans, Germans, and, in general, all thoſe principal nations mentioned in ancient hiſtory *; ſo far as any accounts of them are come down to us.

If to the general ſubjects above-mentioned we add the particular ſtudy of antiques, of the ſtatues, baſſ-relieves, and the precious relics of architecture, painting, camaieus, medals, &c. it is eaſy to conceive that antiquities form a ſcience very extenſive and very complicated, and with which only a very ſmall acquaintance could have been attainable by any one man, if our predeceſſors had not prepared the way for us; if they had not left us ſuch ineſtimable works as thoſe of Gronovius, Grævius, Montfaucon, count Caylus, Winckelman, the Hebraic antiquities of D. Iken of Bremen, the Grecian antiquities of Brunings, the Roman antiquities of Nieupoort, and eſpecially that work which is intitled *Bibliographia Antiquaria Joh. Alberti Fabricii*, profeſſor at Hamburg; &c. &c. Nor muſt we here forget that very valuable work, with which our countryman Mr Robert Wood has lately enriched this ſcience, and which is ſo well known, and ſo juſtly eſteemed by all true connoiſſeurs, under the title of the *Ruins of Palmyra*, and thoſe of *Balbeck*. It is by this work that we are fully convinced of the grandeur and magnificence, the taſte and elegance, of the buildings of the ancients. We here ſee that the invention of theſe matters is not all owing to the Greeks, but that there were other nations who ſerved them as models. For, tho' many of the edifices of Palmyra are to be attributed to the emperor Aurelian, and to Odenatus and his wife Zenobia, who reigned there about the year 264, yet there are found, at the ſame place, ruins of buildings, that appear to be of far greater antiquity, and that are not leſs beautiful. The ancient Perſepolis is ſufficient to prove this aſſertion. When we duly reflect on all theſe matters, and eſpecially if we attempt to acquire any knowledge of this ſcience, we ſhall ſoon be convinced that it but ill becomes a petit-maitre to laugh at a learned antiquary.

The knowledge of thoſe monuments of the ancients, the works of ſculpture, ſtatuary, graving, painting, &c. which they call *antiques*, requires a ſtrict attention, with regard to the matter itſelf on which the art has been exerciſed; as the wax, clay, wood, ivory, ſtones of every kind, marble, flint, bronze, and every ſort of metal. We ſhould begin by learning on what matter each ancient nation principally worked, and in which of the fine arts they excelled. For the matter itſelf, as the different ſorts of marble, compoſitions of metals, and the ſpecies of precious ſtones, ſerve frequently to characterize the true antique, and to diſcover the counterfeit. The connoiſſeurs pretend alſo to know, by certain diſtinct characters in the deſign and execution of a work of art, the age and nation where it was made. They find, moreover, in the invention and execution, a degree of excellence, which modern artiſts are not able to imitate. Now, though we ought to allow, in general, the great merit of the ancients in the polite arts, we ſhould not, however, ſuffer our admiration to lead us into a blind ſuperſtition. There are pieces of antiquity of every ſort, which have come down to us; ſome that are perfectly excellent; and others ſo wretched, that the meaneſt among modern artiſts would not acknowledge them. The mixture of the good and bad has taken place in all ſubjects, at all times, and in all nations. The miſfortune is, that moſt of our great antiquaries have

* See Hiſtory, Part II.

been ſo little ſkilled in deſigning, as ſcarcely to know how to draw a circle with a pair of compaſſes. It is prejudice, therefore, which frequently directs them to give the palm to the ancients, rather than a judgement directed by a knowledge of the art. That character of expreſſion, which they find ſo marvellous in the works of antiquity, is often nothing more than a mere chimera. They pretend that the artiſts of our days conſtantly exaggerate their expreſſions; that a modern Bacchus has the appearance of a man diſtracted with intoxication; that a Mercury ſeems to be animated with the ſpirit of a fury; and ſo of the reſt. But let them not decide too haſtily. Almoſt all the antique figures are totally void of all ſpirit of expreſſion; we are forced to gueſs at their characters. Every artificial expreſſion requires, moreover, to be ſomewhat exaggerated. A ſtatue or portrait is an inanimate figure; and muſt therefore have a very different effect from one which, being endowed with life, has the muſcles conſtantly in play, and where the continual change of the features, the motion of the eyes, and the looks, more or leſs lively, eaſily and clearly expreſs the paſſions and ſentiments. Whereas, in a figure that is the produce of art, the delicate touches, that ſhould expreſs the paſſions, are loſt to the eyes of the ſpectators: they muſt therefore be ſtruck by ſtrong, bold characters, which can affect them at the firſt glance of the eye. A very moderate artiſt is ſenſible, at the ſame time, that he is not to give his figures extravagant expreſſions, nor to place them in diſtorted attitudes.

Beſides the knowledge above explained, there remain, 1. That of medals and coins *: 2. The diplomatic, and the explication of inſcriptions †: And, 3, The knowledge of books ‡.

* See the article *Medals*.
† See *Diplomatics*.
‡ See *Hiſtory*, Part VII.

ANTIQUITY ſignifies times or ages paſt long ago. Thus, we ſay, the heroes of antiquity, &c.

ANTIQUITY is alſo uſed to denote the works or monuments of antiquity. See ANTIQUITIES.

ANTIQUITY likewiſe expreſſes the great age of a thing; and in this ſenſe we ſay the antiquity of a family, the antiquity of a kingdom.

ANTIRRHINUM, SNAP-DRAGON, or CALVES-SNOUT; a genus of the angioſpermia order, belonging to the didynamia claſs of plants. To this genus Linnæus has joined the linaria and aſſarina; but as theſe are generally kept ſeparate by other botanical writers, and ſeveral ſpecies of each of them deſcribed, we chuſe to follow their example.

Species. 1. The majus, with ſpear-ſhaped leaves, having footſtalks. This is not a native of Britain; but having been brought into gardens, the ſeeds ſcattered about in ſo great plenty, that it is become common upon walls and old buildings in many parts of the country. Of this ſort there are ſeveral varieties, which differ in the colour of their flowers; ſome having red flowers with white mouths, ſome with yellow mouths, and others have white flowers with yellow mouths. There is alſo one with ſtripped leaves. 2. The latifolium, with ſmooth ſpear-ſhaped leaves, is a native of the Archipelago iſlands. The leaves are much broader, the flowers greatly larger and more beautiful, than thoſe of any other ſpecies, and therefore this beſt deſerves a place in gardens. The other ſpecies are the minus, with obtuſe ſpear-ſhaped leaves; the Italicum, with narrow, hairy leaves; and the Siculum, with foot-ſtalks proceeding from the wings of the leaves.

Culture. Theſe plants grow beſt on old walls, or on a ſandy rocky ſoil. In rich ground they grow very luxuriant for a while, but are apt to rot in winter. They are propagated by ſeeds, which ſhould be ſown in the beginning of March where they are to remain. When the plants come up, they require no other care than to be kept free from weeds. The variety of the firſt ſpecies with ſtripped leaves, may alſo be propagated by cuttings. They begin to flower in July, and continue flowering till prevented by froſt. When planted on walls, they will have ſtrong woody ſtems, which are rarely hurt by froſt.

ANTIRRHIUM, a promontory at the mouth of the Corinthian bay, where it is ſcarce a mile broad, and where it ſeparates the Ætolians from the Peloponneſus; ſo called from its oppoſite ſituation to Rhium in Peloponneſus, (Pliny): both are now called the *Dardanelles* of *Lepanto*.

ANTISABBATARIANS, a modern religious ſect, who oppoſe the obſervance of the Chriſtian ſabbath. The great principle of the Antiſabbatarians is, that the Jewiſh ſabbath was only of ceremonial, not moral obligation; and conſequently is aboliſhed by the coming of Chriſt.

ANTISAGOGE, in rhetoric, a figure differing little from that called *conceſſion*. The following paſſage from Cicero is an inſtance of it: *Difficilis ratio belli gerendi; at plena fidei, plena pietatis: et ſi dicas, magnus labor, multa pericula proponuntur; at gloria ex his immortalis eſt conſecutura.* See CONCESSION.

ANTISCII, in geography, people who live on different ſides of the equator, whoſe ſhadows at noon are projected oppoſite ways. Thus the people of the north are Antiſcii to thoſe of the ſouth; the one projecting their ſhadows at noon toward the north pole, and the other toward the ſouth pole.

ANTISCORBUTICS, medicines good in ſcorbutical caſes.

ANTISEPTICS, among phyſicians, a denomination given to all ſubſtances that reſiſt putrefaction *; ſuch as ſalts of all kinds, vinegar, myrrh, ſnake-root, pepper, &c.

* See *Putrefaction*.

ANTISTASIS, in oratory, a defence of an action from the conſideration that had it been omitted worſe would have enſued. This is called by Latin writers *comparativum argumentum*; ſuch, *e. gr.* would be the general's defence, who had made an inglorious capitulation, that, without it, the whole army muſt have periſhed.

ANTISTHENES, a Greek philoſopher, and founder of the Cynics. He was born at Athens, and paſſed the former part of his life as a ſoldier. Having afterwards been an attendant at the lectures of Socrates, he was principally charmed with thoſe exhortations of that great philoſopher, which perſuaded to frugality, to temperance, and to moderation: theſe Antiſthenes was reſolved to practiſe by carrying every precept to its utmoſt extent. Permitting therefore his beard to grow, he went about the ſtreets in a thread-bare coat, ſcarcely to be diſtinguiſhed from a common beggar. He prided himſelf upon the moſt rigid virtue, and thought himſelf obliged to attack the vitious where-ever he found them. This gave him ſome reputation in the city; but it may be ſuppoſed, that, in a place ſo very luxurious as Athens, he had more enemies than diſciples. His philoſophy conſiſted rather in action than ſpeculation: it was therefore his conſtant maxim, That to be virtuous was to be happy, and that all virtue conſiſted in action; that the wiſe man ſhould live for himſelf, contented in all ſituations, and happy alone in the conſciouſneſs of his own virtue. He acknowledged nothing to be good but what was honourable; and aſſerted, that virtue might be acquired by practice. Laertius tells us there were 10 tomes of his works; and he has given us many of his apophthegms.

ANTISTOECHON, in grammar, the uſing one letter inſtead of another; as *olli* for *illi*.

ANTISTROPHE, in grammar, a figure by which two things mutually depending on one another, are reciprocally converted; as, *the ſervant of the maſter, the maſter of the ſervant.*

Antistrophe, among lyric poets, that part of a ſong and dance in uſe among the ancients, which was performed before the altar, in returning from weſt to eaſt; in oppoſition to ſtrophe. See Strophe, and Ode.

ANTITACTÆ, in church-hiſtory, a branch of Gnoſtics, who held, that God was good and juſt, but that a creature had created evil; and conſequently that it is our duty to oppoſe this author of evil, in order to avenge God of his adverſary.

ANTITHENAR, in anatomy, a name given to the adductor indicis. See Anatomy, *Table of the Muſcles*.

ANTITHESIS, contraſt, or oppoſition of words or ſentiments; as,

———*Though gentle, yet not dull;*
Strong, without rage; without o'erflowing, full.

Antithesis is ſometimes uſed for controverſy. In this ſenſe, we meet with *antithetic* method, *antithetic* diſcourſes, &c. Marcion compoſed a volume of Antitheſes, or contrarieties and oppoſitions between the law and the goſpel.

ANTITRAGUS musculus, in anatomy, a muſcle of the ear. See Anatomy, nº 405, a; and *Table of the Muſcles*.

ANTITRINITARIANS, a general name given to all thoſe who deny the doctrine of the Trinity, and particularly to the Arians and Socinians.

ATITYPE, among eccleſiaſtical writers, denotes a type correſponding to ſome other type or figure.

ANTIUM, (Livy;) *Antia*, Dionyſius Halicarnaſſæus; a city of the Volſci, (Livy); ſituated on the Tuſcan ſea, yet without a harbour, becauſe they had a neighbouring hamlet, called *Ceno*, with a harbour, (Strabo). The Romans gained their firſt reputation in naval affairs againſt the Antiates; part of whoſe ſhips they conveyed into the arſenal of Rome, and part they burnt, and with their beaks, or roſtra, adorned the pulpit erected in the Forum, thence called *Roſtra*, (Livy, Florus). Several colonies were ſucceſſively ſent thither, (Livy, Tacitus). The epithet is *Antianus*, *Antienſis*, *Antiatinus*, and *Antias,-atis;* the people *Antiates*. Here ſtood a famous temple of Fortune, (Horace). Addiſon ſays, there were two Fortunæ worſhiped at Antium.—The birth-place of Caligula and Nero, (Sueton): but, according to Pliny, the Ambiatinus Vicus was the birth-place of Caligula. It is now extinct, but the name ſtill remains in the *Capo d' Anzo*.

ANTIVARI, a ſtrong town of Turky, in Europe, in Dalmatia, a Greek archbiſhop's ſee, and ſubject to the Turks. E. Lon. 29. 15. N. Lat. 43. 0.

ANTLER, among ſportſmen, a ſtart or branch of a deer's attire.

Brow-Antler, denotes the branch next the head; and,

Bes-Antler, the branch next above the brow-antler.

ANTLIA, an ancient machine, ſuppoſed to be the ſame with our pump. Hence the phraſe, *in antliam condemnari*, according to the critics, denotes a kind of puniſhment, whereby criminals were condemned to drain ponds, ditches, or the like.

ANTOECI, in geography, thoſe inhabitants of the earth who live under the ſame meridian, and at the ſame diſtance from the equator; the one toward the north, and the other toward the ſouth. Hence they have the ſame longitude; and their latitude is alſo the ſame, but of a different denomination. They are in the ſame ſemicircle of the meridian, but oppoſite in parallels. They have preciſely the ſame hours of the day and night, but oppoſite ſeaſons; and the night of the one is always equal to the day of the other.

ANTOINE, a town of France, in Dauphiny, in the dioceſe of Vienne, with a celebrated abbey. It is ſeated among the mountains, 13 miles eaſt of Lyons. E. Lon. 5. 20. N. Lat. 45. 43.

ANTONIA, a citadel of Jeruſalem, the origin of which we have in Joſephus; who ſays, that Hyrcanus, the firſt high-prieſt of that name, built Baris near the temple, a houſe with turrets, where he generally reſided. Herod afterwards made it ſtronger, for the ſecucurity and defence of the temple; and in honour of Marc Antony, who then commanded in the eaſt, called it *Antonia*. It was very extenſive, and could accommodate a Roman legion: from it there was a full view of the temple.

ANTONIA (St), a town of France, in Rouergue, in the dioceſe of Rhodez, whoſe fortifications are demoliſhed. It is ſeated on the river Aveirou. E. Long. 0. 55. N. Lat. 44. 10.

ANTONIAN waters, medicinal waters of Germany, very pleaſant to the taſte, and eſteemed good in many chronic and hypochondriac caſes.

ANTONIANO (Silvio), a man of great learning, who raiſed himſelf from a low condition by his merit, was born at Rome in the year 1540. When he was but ten years old, he could make verſes upon any ſubject propoſed to him; and theſe ſo excellent, though pronounced extempore, that even a man of genius could not compoſe the like without a good deal of time and pains. The duke de Ferrara coming to Rome, to congratulate Marcellus II. upon his being raiſed to the pontificate, was ſo charmed with the genius of Antoniano, that he carried him to Ferrara, where he provided able maſters to inſtruct him in all the ſciences. From thence he was ſent for by Pius IV. who made him profeſſor of the belles lettres in the college at Rome. Antoniano filled this place with ſo much reputation, that, on the day when he began to explain the oration *pro Marco Marcello*, he had a vaſt crowd of auditors, and among theſe no leſs than 25 cardinals. He was afterwards choſen rector of the college; and after the death of Pius IV. being ſeized with a ſpirit of devotion, he joined himſelf to Philip Neri, and accepted the office of ſecretary to the

Antonides.

the ſacred college, offered him by Pius V. which he executed for 25 years with the reputation of an honeſt and able man. He refuſed a biſhopric which Gregory XIV. would have given him; but he accepted the office of ſecretary to the briefs, offered him by Clement VIII. who made him his chamberlain, and afterwards a cardinal. Antoniano killed himſelf by too great fatigue: for he ſpent whole nights in writing letters; which brought on a ſickneſs, whereof he died, in the 63d year of his age. He wrote with ſuch eaſe and fluency, that he never almoſt made any blot or raſure; and it is ſaid of him, that he preſerved the flower of his virginity during his whole life.

ATONIDES Vander Goes (John), an eminent Dutch poet, born at Goes, in Zealand, the 3d of April, 1647. His parents were Anabaptiſts, people of good character, but of low circumſtances. They went to live at Amſterdam when Antonides was about four years old; and, in the ninth year of his age, he began his ſtudies, under the direction of Hadrian Junius and James Cocceius. Antonides took great pleaſure in reading the Latin poets, and carefully compared them with Grotius, Heinſius, &c. By this means he acquired a taſte for poetry, and enriched his mind with noble ideas. He firſt attempted to tranſlate ſome pieces of Ovid, Horace, and other ancients; and, having formed his taſte on theſe excellent models, he at length undertook one of the moſt difficult taſks in poetry, to write a tragedy: this was intitled *Trazil*, or *The Invaſion of China*. Antonides, however, was ſo modeſt, as not to permit it to be publiſhed. Vondel, who was then engaged in a dramatic piece, which was taken alſo from ſome event that happened in China, read Antonides's tragedy; and was ſo well pleaſed with it, that he declared, if the author would not print it, he would take ſome paſſages out of it, and make uſe of them in his own tragedy. He accordingly did ſo; and it was reckoned much to the honour of Antonides, to have written what might be adopted by ſo great a poet, as Vondel was acknowledged to be by all good judges. Upon the concluſion of the peace between Great Britain and Holland, in the year 1697, Antonides wrote a piece, intitled *Bellona aan band*, i.e. "Bellona chained;" a very elegant poem, conſiſting of ſeveral hundred verſes. He next wrote an ingenious heroic poem, which he intitled *The River Y* (the river on which Amſterdam is built).

Antonides's parents had bred him up an apothecary; but his remarkable genius for poetry ſoon gained him the eſteem and friendſhip of ſeveral perſons of diſtinction; and particularly of Mr Buiſero, one of the lords of the admiralty at Amſterdam, and a great lover of poetry, who ſent him at his expence to purſue his ſtudies at Leyden, where he remained till he took his degree of doctor of phyſic, and then his patron gave him a place in the admiralty. In 1678, Antonides married Suſanna Bermans, a miniſter's daughter, who had alſo a talent for poetry. His marriage was celebrated by ſeveral eminent poets, particularly by the famous Peter Francius, profeſſor of eloquence, who compoſed ſome Latin verſes on the occaſion. After marriage, he did not much indulge his poetic genius; and within a few years he fell into a conſumption, of which he died on the 18th September, 1684, being then but thirty-ſeven years and a few months old. He is eſteemed the moſt eminent Dutch poet, after Vondel. His works have been printed ſeveral times, having been collected by his father Anthony Tanſz. The laſt edition was printed by Nicholas Ten Hoom, at Amſterdam, in the year 1714, in quarto, under the direction of David Van Hoogſtraaten, one of the maſters of the Latin ſchool of that city, who added to it alſo the life of the poet.

Antoninus.

ANTONINUS Pius, the Roman emperor, was born at Lanuvium, in Italy, A. C. 86, of a family originally from Niſmes in Languedoc. His character was in all reſpects one of the nobleſt that can be imagined; and he had the title of *Pius* given him by the ſenate. We have no regular account of the tranſactions of his reign, ſince Capitolinus has written in a very confuſed manner; and we have only an abridgment of Dion Caſſius's hiſtory by Xiphilin now remaining. He managed the public revenues with great frugality, yet was extremely generous; was fond of peace, and in war preferred the reputation of juſtice to all the advantages which might be gained by victory. He was more intent upon preſerving the bounds of his empire, than extending them; and he often made uſe of Scipio's expreſſion, That he choſe rather to ſave one citizen than kill a thouſand enemies. By this conduct he made himſelf univerſally eſteemed and revered in that age, and admired by poſterity. This great and good emperor died in 161, aged 75 years, having reigned 23.

ANTONINUS Philosophus (Marcus Aurelius), the Roman emperor, born at Rome, the 26th of April, in the 121st year of the Chriſtian æra. He was called by ſeveral names, till he was admitted into the Aurelian family, when he took that of Marcus Aurelius Antoninus. Hadrian, upon the death of Cejonius Commodus, turned his eyes upon Marcus Aurelius; but, as he was not then 18 years of age, and conſequently too young for ſo important a ſtation, he fixed upon Antoninus Pius, whom he adopted, upon condition that he ſhould likewiſe adopt Marcus Aurelius. The year after this adoption, Hadrian appointed him quæſtor, though he had not yet attained the age preſcribed by the laws. After the death of Hadrian, Aurelius married Fauſtina, the daughter of Antoninus Pius, by whom he had ſeveral children. In the year 139, he was inveſted with new honours by the emperor Pius, in which he behaved in ſuch a manner as endeared him to that prince and the whole people.

Upon the death of Pius, which happened in the year 161, he was obliged by the ſenate to take upon him the government, in the management of which he took Lucius Verus as his collegue. Dion Caſſius ſays, that the reaſon of doing this was, that he might have leiſure to purſue his ſtudies, and on account of his ill ſtate of health; Lucius being of a ſtrong vigorous conſtitution, and conſequently more fit for the fatigues of war. The ſame day he took upon him the name of Antoninus, which he gave likewiſe to Verus his collegue, and betrothed his daughter Lucilla to him. The two emperors went afterwards to the camp; where, after having performed the funeral rites of Pius, they pronounced each of them a panegyric to his memory. They diſcharged the government in a very amicable manner. It is ſaid, that, ſoon after Antoninus had performed the apotheoſis of Pius, petitions were preſented to him by the pagan prieſts, philoſophers, and governors of provinces, in order to excite him to perſecute the Chriſtians; which he rejected with indignation, and interpoſed his authority for their protection, by writing a letter to the common aſſembly of Aſia, then held at Epheſus (A). The happineſs which the empire began to enjoy under theſe two emperors was interrupted, in the year 162, by a dreadful inundation of the Tiber, which deſtroyed a vaſt number of cattle, and occaſioned a famine at Rome. This calamity was followed by the Parthian war; and at the ſame time the Catti ravaged Germany and Rhætia. Lucius Verus went in perſon to oppoſe the Parthians; and Antoninus continued at Rome, where his preſence was neceſſary.

During this war with the Parthians, about the year 163 or 164, Antoninus ſent his daughter Lucilla to Verus, ſhe having been betrothed to him in marriage, and attended her as far as Brunduſium: he intended to have conducted her to Syria; but it having been inſinuated by ſome perſons, that his deſign of going into the eaſt, was to claim the honour of having finiſhed the Parthian war, he returned to Rome. The Romans having gained a victory over the Parthians, who were obliged to abandon Meſopotamia, the two emperors triumphed over them at Rome, in the year 166; and were honoured with the title of *Fathers of their country*. This year was fatal, on account of a terrible peſtilence which ſpread itſelf over the whole world, and a famine under which Rome laboured: it was likewiſe in this year that the Marcomanni, and many other people of Germany, took up arms againſt the Romans; but the two emperors having marched in perſon againſt them, obliged the Germans to ſue for peace. The war, however, was renewed the year following, and the two emperors marched again in perſon; but Lucius Verus was ſeized with an apoplectic fit, and died at Altinum. The Romans were now defeated with great ſlaughter; and the emperor, not chuſing to burden his ſubjects with new taxes, expoſed to public ſale the furniture of the palace, the gold and ſilver plate belonging to the crown, and his wife's rich garments embroidered with gold, and a curious collection of pearls, which Adrian had purchaſed during his long progreſs thro' the provinces of the empire, and was called *Adrian's cabinet*.

In the year 170, Antoninus made vaſt preparations againſt the Germans, and carried on the war with great vigour. During this war, in 174, a very extraordinary event is ſaid to have happened, which, according to Dion Caſſius, was as follows: Antoninus's army being blocked up by the Quadi, in a very diſadvantageous place, where there was no poſſibility of procuring water; in this ſituation, being worn out with fatigue and wounds, oppreſſed with heat and thirſt, and incapable of retiring or engaging the enemy, in an inſtant the ſky was covered with clouds, and there fell a vaſt quantity of rain: the Roman army were about to quench their thirſt, when the enemy came upon them with ſuch fury, that they muſt certainly have been defeated, had it not been for a ſhower of hail, accompanied with a ſtorm of thunder and lightning, which fell upon the enemy, without the leaſt annoyance to the Romans, who by this means gained the victory (B). In 175, Antoninus made a treaty with ſeveral nations of Germany. Soon after, Avidius Caſſius, governor of Syria, revolted from the emperor: this inſurrection, however, was put an end to by the death of Caſſius, who was killed by a centurion named *Anthony*. Antoninus behaved with great lenity towards thoſe who had been engaged in Caſſius's party: he would not put to death, nor impriſon, nor even ſit in judgment himſelf upon any of the ſenators engaged in this revolt; but he referred them to the ſenate, fixing a day for their appearance, as if it had been only a civil affair. He wrote alſo to the ſenate, deſiring them to act with indulgence rather than ſeverity; not to ſhed the blood of any ſenator or perſon of quality, or of any other perſon whatſoever, but to allow this honour to his reign, that, even under the misfortune of a rebellion, none had loſt their lives, except in the firſt heat of the tumult. In 176, Antoninus viſited Syria and Egypt: the kings of thoſe countries, and ambaſſadors alſo from Parthia, came to viſit him. He ſtaid ſeveral days at Smyrna; and, after he had ſettled the affairs of the eaſt, went to Athens, on which city he conferred ſeveral honours, and appointed public profeſſors there. From thence he returned to Rome with his ſon Commodus, whom he choſe conſul for the year following, though he was then but 16 years of age, having obtained a diſpenſation for that purpoſe. On the 27th of September, the ſame year, he gave him the title of *Imperator*; and on the 23d of December, he entered Rome in triumph, with Commodus, on account of the victories gained over the Germans. Dion Caſſius tells us, that he remitted all the debts which were due to himſelf and the public treaſury during 46 years, from the time that Hadrian had granted the ſame favour, and burnt all the writings relating to thoſe debts. He applied himſelf likewiſe to correct many enormities, and introduced ſeveral excellent regulations. In the year 179, he left Rome with his ſon Commodus, in order to go againſt the Marcomanni, and other barbarous nations; and the year following gained a conſiderable victory over them, and would, in all probability, have entirely ſubdued them in a very ſhort time, had he not been taken with an illneſs, which carried him off on the 17th of March, 180, in the 59th year of his age, and 19th of his reign. The whole empire regretted the loſs of ſo valuable a prince, and paid the greateſt regard to his memory: he was ranked amongſt the gods, and almoſt every perſon had a ſtatue of him in their houſes. His book of Meditations has been much admired

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(A) Euſebius has preſerved this letter, Hiſt. Eccleſ. lib. iv. cap. 13. but he falſely aſcribes it to Antoninus Pius, whereas it was wrote by Marcus Antoninus, as Valerius makes it appear in his annotations on Euſebius.

(B) The pagans as well as Chriſtians, according to Mr Tillemont (p. 621. art. xvi.), have acknowledged the truth of this prodigy, but have greatly differed as to the cauſe of ſuch a miraculous event; the former aſcribing it, ſome to one magician and ſome to another: In Antoninus's Pillar, the glory is aſcribed to Jupiter the god of rain and thunder. But the Chriſtians affirmed, that God granted this favour at the prayer of the Chriſtian ſoldiers in the Roman army, who are ſaid to have compoſed the twelfth or Melitene legion; and, as a mark of diſtinction, we are told that they received the title of the *Thundering Legion*, from Antoninus, (Euſeb. Eccleſ. Hiſt. lib. v. cap. 5.). Mr Moyle, in the letters publiſhed in the ſecond volume of his works, has endeavoured to explode this ſtory of the Thundering Legion; which occaſioned Mr Whiſton to publiſh an anſwer, in 1726, intitled, *Of the Thundering Legion; or, Of the miraculous deliverance of Marcus Antoninus and his army, upon the prayers of the Chriſtians*.

Antoninus's Wall.

admired by the beſt judges.

ANTONINUS's *Wall*, the name of the third rampart or defence that had been built or repaired by the Romans againſt the incurſions of the North Britons. It is called by the people in the neighbourhood, *Graham's Dyke;* from the notion that one Graham, or Grimus, firſt made a breach in it after the retreat of the Romans out of Britain. The firſt barrier erected by the Romans was the chain of forts made by Agricola † from the frith of Forth to that of Clyde, in the year 81, to protect his conqueſts from the inroads of the Caledonians. The ſecond was the vallum, or dyke, flung up by Adrian * in the year 121. It terminated on the weſtern ſide of the kingdom, at *Axelodunum*, or *Brugh*, on the Solway ſands; and was ſuppoſed to have reached no further than *Pons Ælii*, or *Newcaſtle*, on the eaſtern. But from an inſcription lately diſcovered, it appears to have extended as far as the wall of Severus ‡. This rampart of Adrian's was ſituated much further ſouth than Agricola's chain; the country to the north having been either, according to ſome authors, recovered by the native Britons after the departure of Agricola; or, according to others, voluntarily ſlighted by Adrian. However, this work of Adrian's did not long continue to be the extreme boundary of the Roman territories to the north in Britain. For Antoninus Pius, the adopted ſon and immediate ſucceſſor of Adrian, having, by his lieutenant Lollius Urbicus, recovered the country once conquered by Agricola, commanded another rampart to be erected between the friths of Forth and Clyde, in the tract where Agricola had formerly built his chain of forts. The great number of inſcriptions which have been found in or near the ruins of this wall, or rampart, to the honour of Antoninus Pius, leave us no room to doubt its having been built by his direction and command. If the fragment of a Roman pillar with an inſcription, now in the college library of Edinburgh, belonged to this work, as it is generally ſuppoſed to have done, it fixes the date of its execution to the third conſulſhip of Antoninus, which was A. D. 140, only 20 years after that of Adrian, of which this ſeems to have been an imitation. This wall or rampart, as ſome imagine, reached from Caer-ridden on the frith of Forth, to Old Kirkpatrick on the Clyde; or, as others think, from Kinniel on the eaſt, to Dunglaſs on the weſt. Theſe different ſuppoſitions hardly make a mile of difference in the length of this work, which, from ſeveral actual menſurations, appears to have been 37 Engliſh or 40 Roman miles. Capitolinus, in his life of Antoninus Pius, directly affirms, that the wall which that emperor built in Britain was of turf. This in the main is unqueſtionably true; though it is evident (from the veſtiges of it ſtill remaining, which not very many years ago were dug up and examined for near a mile together) that the foundation was of ſtone. Mr Camden alſo tells us, from the papers of one Mr Anthony Pont, that the principal rampart was faced with ſquare ſtone, to prevent the earth from falling into the ditch. The chief parts of this work were as follows: 1. A broad and deep ditch, whoſe dimenſions cannot now be diſcovered with certainty and exactneſs, tho' Mr Pont ſays it was 12 feet wide. 2. The principal wall or rampart was about 12 feet thick at the foundation, but its original height cannot now be determined. This wall was ſituated on the ſouth brink of the ditch. 3. A military way on the ſouth ſide of the principal wall, well paved, and raiſed a little above the level of the ground. This work, as well as that of Adrian, was defended by garriſons placed in forts and ſtations along the line of it. The number of theſe forts or ſtations, whoſe veſtiges were viſible in Mr Pont's time, were 18, ſituated at about the diſtance of two miles from each other. In the intervals between the forts, there were turrets or watch-towers. But the number of theſe, and their diſtance from each other, cannot now be diſcovered.

It is not a little ſurpriſing, that though it is now more than 1600 years ſince this work was finiſhed, and more than 1300 ſince it was ſlighted, we can yet diſcover, from authentic monuments, which are ſtill remaining, by what particular bodies of Roman troops almoſt every part of it was executed. This diſcovery is made from inſcriptions upon ſtones, which were originally built into the face of the wall, and have been found in or near its ruins, and are carefully preſerved. The number of ſtones with inſcriptions of this kind now extant, is 11: of which ſix may be ſeen at one view in the college of Glaſgow, one in the college of Aberdeen, one in the college of Edinburgh, one in the collection of Baron Clerk, one at Cochnoch-houſe, and one at Calder-houſe. From theſe inſcriptions it appears in general, that this great work was executed by the ſecond legion, the vexillations of the ſixth legion and of the twentieth legion, and one cohort of auxiliaries. If theſe corps were all complete, they would make in all a body of 7800 men. Some of theſe inſcriptions have ſuffered greatly by the injuries of time and other accidents; ſo that we cannot diſcover from them with abſolute certainty, how many paces of this work were executed by each of theſe bodies of troops. The ſum of the certain and probable information contained in theſe inſcriptions, as it is collected by the learned and illuſtrious Mr Horſley, ſtands thus:

	Paces.
The ſecond legion built - -	11,603
The vexillation of the ſixth legion -	7,411
The vexillation of the twentieth legion	7,801
All certain - -	26,815
The vexillation of the twentieth legion, the monument certain, and the number probable	3,411
The ſame vexillation, on a plain monument, no number viſible, ſuppoſed -	3,500
The ſixth legion, a monument, but no number, ſuppoſed - -	3,000
Cohors prima Cugernorum - -	3,000
Total	39,726

or 39 miles 726 paces, nearly the whole length of the wall. It would have been both uſeful and agreeable to have known how long time theſe troops were employed in the execution of this great work. But of this we have no information. Neither do we know what particular bodies of troops were in garriſon in the ſeveral forts and ſtations along the line of this wall, becauſe theſe garriſons were withdrawn before the *Notitia Imperii* was written.

Though we cannot diſcover exactly how many years this wall of the emperor Antoninus continued to be

† See *Agricola*.

* See *Adrian*.

‡ See *Severus*.

the boundary of the Roman territories in Britain, yet we know with certainty that it was not very long. For we are told by an author of undoubted credit, that, in the reign of Commodus, A. D. 180, "he had wars with ſeveral foreign nations, but none ſo dangerous as that of Britain. For the people of the iſland, having paſſed the wall which divided them from the Romans, attacked them, and cut them in pieces."

l. 72. 810.

ANTONIO (Nicholas), knight of the order of St James and canon of Seville, did great honour to the Spaniſh nation by his Bibliotheque of their writers. He was born at Seville, in 1617, being the ſon of a gentleman whom king Philip IV. made preſident of the admiralty eſtabliſhed in that city in 1626. After having gone through a courſe of philoſophy and divinity in his own country, he went to ſtudy law at Salamanca, where he cloſely attended the lectures of Franciſco Ramos del Manzano, afterwards counſellor to the king, and preceptor to Charles II. Upon his return to Seville, after he had finiſhed his law-ſtudies at Salamanca, he ſhut himſelf up in the royal monaſtery of Benedictines, where he employed himſelf ſeveral years in writing his *Bibliotheca Hiſpanica*, having the uſe of the books of Bennet de la Sana, abbot of that monaſtery, and dean of the faculty of divinity at Salamanca. In the year 1659, he was ſent to Rome by king Philip IV. in the character of agent-general from this prince: he had alſo particular commiſſions from the inquiſition of Spain, the viceroys of Naples and Sicily, and the governor of Milan, to negociate their affairs at Rome. The cardinal of Arragon procured him, from pope Alexander VII. a canonry in the church of Seville, the income whereof he employed in charity and purchaſing of books: he had above 30,000 volumes in his library. By this help, joined to continual labour and indefatigable application, he was at laſt enabled to finiſh his Bibliotheca Hiſpanica, in four volumes in folio, two of which he publiſhed at Rome in the year 1672. The work conſiſts of two parts; the one containing the Spaniſh writers who flouriſhed before the 15th century, and the other thoſe ſince the end of that century. After the publication of theſe two volumes, he was recalled to Madrid by king Charles II. to take upon him the office of counſellor to the cruſade; which he diſcharged with great integrity till his death, which happened in 1684. He left nothing at his death but his vaſt library, which he had brought from Rome to Madrid; and his two brothers, and nephews, being unable to publiſh the remaining volumes of his Bibliotheca, ſent them to cardinal d'Aguiſne, who paid the charge of the impreſſion, and committed the care thereof to Monſieur Marti, his librarian, who added notes to them, in the name of the cardinal.

ANTONIO (St), one of the Cape de Verd iſlands, lying in E. Long. 0. 26. N. Lat. 18. 10. It is ſeparated from St Vincent's by a clear navigable channel two leagues in breadth. On the north ſide, it has a good road for ſhipping, with a collection of freſh water riſing from ſprings, which, however, ſcarcely merits the name of a pond. The iſland ſtretches from north-eaſt to ſouth-weſt, and is filled with mountains; one of which is of ſo extraordinary a height, as to be compared with the Peak of Teneriffe: Its top is conſtantly covered with ſnow, and, notwithſtanding the clearneſs of the ſky, is generally hid in clouds. Here are produced a variety of fruits; oranges, lemons, palms, melons, &c. and ſome ſugar-canes. The potatoes and melons are particularly excellent, and are much ſought after by mariners. But, notwithſtanding all this plenty, the inhabitants live in the moſt wretched poverty. They are in number about 500, chiefly negroes, under the protection of the Portugueſe, whoſe language they ſpeak, and imitate their manners. To the north-weſt ſtands a village, containing about 20 huts, and at leaſt 50 families, under the direction of a governor, or, as they call him, a *captain*; a prieſt, and a ſchoolmaſter. The latter trains up the children in the Chriſtian religion, and the firſt principles of knowledge; which, however, ſeldom exceeds the being able to read the bible in a bungling manner.

ANTONIO (St), a Dutch fort in Axim, on the gold coaſt of Africa. It ſtands on a high rock, which projects into the ſea in form of a peninſula; and is ſo environed by rocks and dangerous ſhoals, as to be inacceſſible to an enemy but by land, where it is fortified by a parapet, draw-bridge, and two batteries of heavy cannon. Beſides this it has a battery towards the ſea. The three batteries conſiſt of 24 cannon. Its form is triangular; the building is neat, ſtrong, and commodious for the extent, that being but ſmall, on account of the narrowneſs of the rock on which it is built. The garriſon is uſually compoſed of 25 white men, and an equal number of negroes, under the command of a ſerjeant. It is maintained at the expence of the Weſt-India Company; and, when well ſtored with proviſions, is capable of making a long defence againſt any number of negroes. It is, however, as well as all other forts on this coaſt, liable to inconveniences from the heavy and continual rains, which damage the walls, and render frequent reparations neceſſary. This obliges the Dutch always to keep ready a quantity of lime or cement made of calcined oyſter-ſhells, of which the coaſt produces great numbers.

This ſettlement was firſt founded by the Portugueſe during the reign of Emanuel. They fixed at firſt upon a ſmall point; where finding themſelves inſecure, they built the fort where it now ſtands. They were driven out by the Dutch in 1642; and, upon the concluſion of a peace with the States-General, the fort remained by treaty in the hands of the Dutch Weſt-India Company, who have kept poſſeſſion of it ever ſince.

ANTONIUS (Marcus), a famous Roman orator. While he filled the office of prætor, Sicily fell to his lot, and he cleared the ſeas of the pirates which infeſted that coaſt. He was made conſul with A. Poſthumius Albinus, in the year of Rome 653; when he oppoſed the turbulent deſigns of Sextus Titus, tribune of the people, with great reſolution and ſucceſs. Some time after, he was made governor of Cilicia, in quality of proconſul; where he performed ſo many great exploits, that he obtained the honour of a triumph. We cannot omit obſerving, that, in order to improve his great talent for eloquence, he became a ſcholar to the greateſt men at Rhodes and Athens, in his way to Cilicia, and when on his return to Rome. Soon after, he was appointed cenſor; which office he diſcharged with great reputation, having carried his cauſe before the people, againſt Marcus Duronius, who had preferred an accuſation of bribery againſt him, in revenge for Antonius's having eraſed his name out of the liſt of ſenators,

nators, which this wiſe cenſor had done, becauſe Duronius, when tribune of the people, had abrogated a law which reſtrained immoderate expence in feaſts. He was one of the greateſt orators ever known at Rome; and it was owing to him, according to the teſtimony of Cicero, that Rome might boaſt herſelf a rival even to Greece itſelf in the art of eloquence. He defended, amongſt many others, Marcus Aquilius; and moved the judges in ſo ſenſible a manner, by the tears he ſhed, and the ſcars he ſhewed upon the breaſt of his client, that he carried his cauſe. He never would publiſh any of his pleadings, that he might not, as he ſaid, be proved to ſay in one cauſe, what might be contrary to what he ſhould advance in another. He affected to be a man of no learning. His modeſty, and many other qualifications, rendered him no leſs dear to many perſons of diſtinction, than his eloquence made him univerſally admired. He was unfortunately killed during thoſe bloody confuſions raiſed at Rome by Marius and Cinna. He was diſcovered in the place where he hid himſelf, and ſoldiers were ſent to diſpatch him; but his manner of addreſſing them had ſuch an effect, that none but he who commanded them, and had not heard his diſcourſe, had the cruelty to kill him. His head was expoſed before the roſtra, a place which he had adorned with his triumphal ſpoils. This happened 90 years before the Chriſtian æra.

ANTONIUS (Marcus) the triumvir, grandſon to the former, was very handſome in his youth; for which reaſon he was greatly beloved by Curio a ſenator, who, by carrying him about in all his debaucheries, made him contract ſuch heavy debts, that his own father forbad him his houſe. Curio, however, was ſo generous as to bail him for 250 talents. When the civil war broke out, Curio took Cæſar's party, and prevailed with Antonius to do the ſame; for which he was made a tribune of the people, and in that office did Cæſar great ſervice. Cæſar, having made himſelf maſter of Rome, gave Antonius the goverment of Italy: at the battle of Pharſalia, Cæſar confided ſo much in him, that he gave him the command of the left wing of his army, whilſt he himſelf led the right. After Cæſar was made dictator, he made Antonius general of the horſe, though he had never been prætor; in which command he exerted his power with the utmoſt violence. He was made conſul, when Cæſar enjoyed that honour for the fifth time, the laſt year of that uſurper's life. On Cæſar's death he harangued the populace with great art, and raiſed their fury againſt his murderers; flattering himſelf that he ſhould eaſily get into the place which Cæſar had filled: but his haughty behaviour made him loſe all the advantages his affected concern for Cæſar had gained him. His ill treatment of Octavius, and quarrel with him, produced another civil war; which ended in an accommodation between him, Octavius, and Lepidus, fatal to the peace of Rome. They agreed to ſhare the ſupreme power among them; and many of the moſt illuſtrious Romans were ſacrificed by proſcription to cement this bloody league, which is known by the name of the *Second Triumvirate*. But the triumvirs were too ambitious, and hated one another too much, to be long united. Antonius went into Aſia to raiſe money for his ſoldiers; during his abſence, Fulvia his wife quarreled with Octavius. When Antonius was in Aſia, indulging himſelf in all manner of luxury, the famous Cleopatra inſpired him with the moſt violent paſſion. Hearing of the quarrel between Fulvia and Octavius, and finding Octavius was become publicly his enemy, Antonius entered into a confederacy with Sextus Pompeius, who was ſtill maſter of Sicily. He then went into Italy in order to fight Octavius; but Fulvia, who had been the author and promoter of this war, dying, Octavius and Antonius came to an agreement. One of the conditions of this new peace was, that they ſhould together attack Pompey, though the former had lately made an alliance with him. Antonius then married Octavia, ſiſter to Octavius, as a pledge of their renewed friendſhip; but returned ſoon after to his beloved Cleopatra, and again lived with her in Alexandria. Octavius took hold of this pretence to inveigh againſt him, and begin the war again. At laſt they engaged in a ſea-fight at Actium, in which Octavius gained a complete victory; which was followed by the deaths both of Antonius and Cleopatra. The infatuated Antonius fell upon his own ſword; and Cleopatra ſtung herſelf to death with an aſp, as was ſuppoſed, to avoid gracing the victor's triumph at Rome.

ANTONOMASIA, a form of ſpeech, in which, for a proper name, is put the name of ſome dignity, office, profeſſion, ſcience, or trade; or when a proper name is put in the room of an appellative. Thus a king is called his *majeſty*; a nobleman, his *lordſhip*. We ſay the *philoſopher* inſtead of Ariſtotle, and the *orator* for Cicero: Thus a man is called by the name of his country, a *German*, an *Italian*; and a grave man is called a *Cato*, and a wiſe man a *Solomon*.

ANTRIM, the moſt northerly county of Ireland. It is bounded by that of Down on the ſouth-eaſt, that of Londonderry on the weſt, from which it is ſeparated by the river Bann, part of Armagh on the ſouth, St George's channel on the eaſt, and the Deucaledonian ocean on the north. Its greateſt length is about 46 miles, its greateſt breadth about 27; and the number of acres it contains, plantation-meaſure, are computed at 383,000. Though the country is much incumbered with bogs and marſhes, yet it enjoys a pretty good air, and is well peopled, chiefly with proteſtants. Where it is free from bogs the ſoil is fruitful. It ſends two members for the ſhire, and two for each of the following towns, *viz.* Liſburn, Belfaſt, Antrim, and Randalſtown.

Certain narrow valleys, called *glyns*, beginning here, and running a great way along the coaſt, belonged formerly to the Biſſets, noblemen of Scotland, who, having been obliged to quit that country for having aſſaſſinated Patrick earl of Athol upon a private quarrel, came hither, and had a great eſtate beſtowed upon them by Henry III. of England; of which, in the reign of Edward II. a part was forfeited by the rebellion of Hugh, then chief of the family. Another tract near this, called the *Rowte*, belonged anciently to the Macguillers, but now to the M'Donnels, earls of Antrim.

Upon the coaſt of this country are the promontories called by Ptolemy, *Robogdium*, *Vennicinium*, and *Boræum*, now *Fair-Foreland*, *Ramſhead*, and *St Helen's-head*. The river alſo, ſtyled by the ſame author *Vidua*, and now *Crodagh*, runs thro' this country.—Here alſo is the remarkable natural curioſity called the *Giant's-cauſeway*; for a particular deſcription of which ſee that article.

Antrim ‖ Antwerp.

ANTRIM, the capital town of the county of Antrim, in Ireland, ſeated at the north end of the lake Lough-Neagh. It is but a poor place, 13 miles weſt of Carrickfergus. W. Long. 6. 26. N. Lat. 54. 45. It ſends two members to parliament.

ANTRUM, among anatomiſts, a term uſed to denote ſeveral cavities of the body: as the *antrum highmorianum*, or that in the maxillary or jaw-bone; *antrum pylori*, or that at the bottom of the pylorus, &c.

ANTWERP, a city of the duchy of Brabant, in the Auſtrian Netherlands, capital of the marquiſate of Antwerp, otherwiſe called the *marquiſate of the holy Roman empire*, ſituated in E. Long. 4. 15. N. Lat. 51. 12. It lies in a low marſhy ground on the Scheld, 25 miles from Bruſſels to the north. It is the third city in rank in Brabant, large and well built, containing 22 ſquares, and above 200 ſtreets, all ſtraight and broad, eſpecially that called the *Mere*, in which ſix coaches can go abreaſt. Moſt of the houſes are of freeſtone, and have an air of antiquity, being high, with courts before and gardens behind. At the head of the Mere is a crucifix of braſs thirty-three feet high. The cathedral dedicated to the Virgin Mary, the ſtadt-houſe, and the exchange, are magnificent ſtructures: the latter is the firſt building of that kind in Europe, and on its model the exchanges of London and Amſterdam are built: its pillars are all of blue marble, and carved, but all in a different manner. The exchange coſt the city 300,000 crowns. Antwerp, towards the end of the fifteenth century, was one of the moſt celebrated towns that ever exiſted. The Scheld, on which it ſtands, being 20 feet at low water, and riſing 20 feet more at flood, ſhips of the greateſt burden came up to the keys, as in the river Thames at London; but when the United Provinces formed themſelves into a free ſtate, after having ſhaken off the yoke of Spain, they got the entire command of the navigation of the Scheld; which ruined the trade of Antwerp, and transferred it to Amſterdam. This made the inhabitants turn their heads to painting, jewelling, and banking, which they have continued to this day, with great ſucceſs and reputation: for at Antwerp bills of exchange may be negotiated for any ſum to any part of Europe; and in the war before the laſt, two brothers of the name of de Koning, paid the one the army of France, and the other that of the confederates. Beſides, here is a fine manufacture of tapeſtry and lace; and, for the promoting of trade, an inſurance-company has been erected. This city is the ſee of a biſhop, who, as abbot of St Bernard, is the ſecond prelate in Brabant. The biſhopric is of great extent, and the cathedral a moſt noble pile, with one of the fineſt ſteeples in the world. The emperor Charles V. when he made his entry into Antwerp, ſaid it ought to be put in a caſe, and ſhewed only once a-year for a rarity. The houſe of the hanſe-towns, built when the city was in its flouriſhing condition, is a ſtately building, with magazines above for dry goods, and cellars below for wet, and in the middle ſtory were 300 lodging rooms for merchants; but now it is turned to a horſe-barrack. There is a market here called the *Fridays market*, becauſe it is held every Friday, where all ſorts of houſehold goods, pictures, and jewels, are ſold by auction. No city in the Netherlands has ſo many and ſo fine churches as this. Many of them, particularly the cathedral and Jeſuits church, are adorned with paintings, by Sir Peter Paul Rubens, who was a native of this city; and by Quintin Maſſeys, who is ſaid to have been a blackſmith; but having fallen in love with a painter's daughter, and been told by her father, when he aſked her of him in marriage, that he would have none but a painter for his ſon-in-law, he went to Italy to ſtudy painting, and, in a few years, returned ſo eminent in his new profeſſion, that he found no difficulty in obtaining the father's conſent. He is interred at the entry of the cathedral, where his effigy is put up, with an inſcription, ſignifying, that conjugal love made an Apelles of a blackſmith. The abovementioned Jeſuits church is extremely magnificent, and the chapel of the Virgin, joining to it, ſtill more ſo. Among the cloiſters the moſt remarkable are, the noble and rich abbey of St Michael, on the banks of the Scheld, the apartments of which are truly royal, and in which all ſovereign princes that paſs this way actually lodge; and the Engliſh nunnery, of the order of St Tereſa, the nuns of which never wear linen, nor eat fleſh, and lie upon ſtraw: the grates of the convent are ſo diſmal, that it looks like a priſon. As to the fortifications of the city, it is environed with a fine wall, planted with rows of trees on each ſide, with walks between, broad enough for two coaches to go abreaſt, being alſo defended by a very ſtrong, large, regular citadel, in form of a pentagon, erected by the duke of Alva in 1568, which commands the town, and the neighbouring country. The magiſtracy of this city is choſen only out of the ſeven patrician families; and conſiſts of two burgomaſters, and 18 echevins, beſides inferior magiſtrates. Among the privileges granted to it by its princes, there is one by which every perſon born in it is a citizen, though both his father and mother were foreigners.

Antwerp.

In 1585, Antwerp underwent a remarkable ſiege by the duke of Parma. It was then the moſt wealthy city in the Netherlands, and had long been the object of his deſigns; but the difficulties attending the enterprize obliged him to poſtpone it for a conſiderable time. In order to ſucceed, it was neceſſary to cut off the communication of the city with Holland, Ghent, and all places above and below Antwerp on the Scheld. To effect this, he laid ſiege to Liſkenſhouk and Tillo, places of the utmoſt conſequence to the ſecurity and commerce of the city; both were obſtinately defended; and the ſiege of the latter was raiſed, after it had been carried on for three months: however, the duke gained ſeveral other poſts on the river, where he built forts, and greatly annoyed the ſhipping and trade of the city. He next laid ſiege to Dendermonde, in order to cut off the communication with Ghent, in which he ſucceeded by the reduction of the town. His next attempt was on Vilvorde: this place he took by aſſault, and thereby cut off the communication with Bruſſels. Finding, however, this method of hemming in the city tedious, and ineffectual while an opening to the mouth of the river remained, he formed a deſign of building a bridge acroſs the Scheld, the extremities of which were to be defended by ſtrong forts and out-works. He began with collecting great quantities of wood at Callo and fort St Philip, where he intended the bridge ſhould be built; but his project was for ſome time retarded by the Antwerpers, who broke down the dykes, overflowed the whole country, and carried off his magazines by the inundation. Not diſcouraged by this loſs, he applied himſelf diligently to repair it, and with incredible expedition cut a canal from Steken to Callo, by which he carried off the waters. He then ſet to work upon the bridge, and finiſhed it in ſeven months, without any interruption from the Zealanders. During the building of this bridge, Aldegonde, governor of Antwerp, propoſed building a fort on Couvenſteyn dyke, in order to ſecure that important poſt, and then breaking down the dyke, when the bridge was near finiſhed: but he was violently oppoſed by certain citizens, who apprehended that their lands and villas would be deſtroyed by the inundation. This unſeaſonable oppoſition, with the negligence of the magiſtrates, who, becauſe the markets were high, had not laid in a ſufficient ſtock of corn, occaſioned the loſs of the city. However, in deſpite of all the duke of Parma's precautions, the Zealanders found means to throw in a convoy of corn: but the citizens, knowing they would not run the riſk of carrying it back again, ſo cheapened the price, that theſe bold traders refuſed ever to bring their goods again to ſo bad a market. The Antwerpers, having thus through avarice brought on their ruin, began in a ſhort time to ſuffer by famine; they then preſſed the Zealanders to attempt ſomething for their relief, but it was now too late. While the magiſtrates were deliberating on ſome means for deſtroying the bridge, which they might have prevented from being ever completed, one Ginebelli, a Mantuan engineer, offered his ſervices, undertaking at a certain expence to blow it into the air. Even in this extremity the expence was grudged: but neceſſity at laſt overcame this obſtacle; Ginebelli was furniſhed with two large veſſels, a number of ſmall boats, and every thing neceſſary. He formed the two large veſſels into fire-ſhips, which he ſet adrift with the ſtream, deceiving the enemy by means of falſe fires lighted up in the fleet of ſmall boats. The train of one of the fire-ſhips was expended before the time expected, and ſhe blew up with a terrible exploſion, but with little damage to the bridge. The other was more ſucceſsful, carrying off all the outworks, ſetting fire to the whole bridge, and burying above 500 ſoldiers in the ruins it made. The fire however was ſoon extinguiſhed, and the bridge repaired by the duke of Parma, while the Antwerpers were prevented by avarice from repeating the experiment; ſo that they were ſoon reduced to the greateſt ſtraits, and obliged to ſurrender. It is ſaid that the city of Amſterdam had obſtructed every meaſure for the relief of Antwerp, hoping to profit by its deſtruction. It was not doubted but the proteſtants would forſake it as ſoon as it fell into the hands of an arbitrary catholic prince; and this conjecture was ſoon fulfilled by the removal of many families with their effects to Amſterdam.—After the battle of Ramillies, the city of Antwerp ſurrendered to the duke of Marlborough. It was taken by the French in 1746, but reſtored to the houſe of Auſtria at the treaty of Aix-la-Chapelle.

ANXUR, a city of the Volſci, (Pliny, Livy), in Latium; called *Tarracina*, by the Greeks and Latins: now *Terracina;* ſituated on an eminence, (Livy, Horace, Sil. Italicus). *Anxuras*, a citizen of Anxur, (Livy). And the epithet, *Anxurus*, a name of Jupiter, worſhipped without a beard at Anxur, (Virgil). Though others read *Axurus*, or *Axyrus*, without a razor. E. Long. 14. 5. Lat. 41. 18.

AONIDES, in mythology, one of the many appellations of the muſes; ſo called from Aonia, a part of ancient Bœotia.

AORASIA, in antiquity, the inviſibility of the gods. The word is Greek, αορασια, and derived from α, priv. and οϱαω, to ſee. The opinion of the ancients with regard to the appearance of the gods to men, was, that they never ſhewed themſelves face to face, but were known from their backs as they withdrew. Neptune aſſumed the form of Calchas to ſpeak to the two Ajaxes; but they knew him not till he turned his back to leave them, and diſcovered the god by his majeſtic ſtep as he went from them. Venus appeared to Æneas in the character of a huntreſs: but her ſon knew her not till ſhe departed from him; her divinity was then betrayed by her radiant head, her flowing robe, and her majeſtic pace.

AORIST, among grammarians, a tenſe peculiar to the Greek language, comprehending all the tenſes; or rather, expreſſing an action in an indeterminate manner, without any regard to paſt, preſent, or future.

AORISTIA, in the ſceptic philoſophy, denotes that ſtate of the mind wherein we neither aſſert nor deny any thing poſitively, but only ſpeak of things as ſeeming or appearing to us in ſuch a manner. The aoriſtia is one of the great points or terms of ſcepticiſm, to which the philoſophers of that denomination had continual recourſe by way of explication, or ſubterfuge. Their adverſaries, the Dogmatiſts, charged them with dogmatizing, and aſſerting the principles and poſitions of their ſect to be true and certain.

AORNUS, a very high rock of India, having its name from its extraordinary height, as being above the flight of a bird. Its circuit was about 25 miles, its height 11 furlongs, and the way leading up to the top artificial and narrow. At the bottom, on one ſide, ran the river Indus; on the top was a fine plain, part of which was covered with a thick wood; the reſt arable land, with a fountain furniſhing abundance of excellent water. This rock was taken by Alexander the Great, in whoſe time there was a report that Hercules had attempted it in vain; however, according to Arrian, this report was without foundation. It is probable indeed, that it was raiſed after the place was taken, in order to magnify Alexander's exploit. While the Macedonian monarch was preparing all things neceſſary for the ſiege, an old man with his two ſons, who had long lived in a cave near the ſummit, came and offered to ſhew him a private way of aſcending. This being readily accepted, Ptolemy, with a conſiderable body of light-armed troops, was diſpatched with them, with orders, in caſe they ſucceeded, to entrench themſelves ſtrongly upon the rock, in the wood to which the old man was to direct them, before they ventured to attack the Indians. Ptolemy exactly executed his orders; and gave notice by a lighted torch ſet upon a pole, that he had got ſafely up. Upon this, Alexander gave immediate orders for a body of troops to attempt the paſſage by which the rock was commonly aſcended; but they were repulſed with great ſlaughter. He then ſent an Indian with letters to Ptolemy, deſiring him, the next time an attack was made by the common way, to fall upon the enemy behind. But in the mean time, thoſe who defended the rock attacked Ptolemy with great vigour; but were at laſt repulſed, though with much difficulty: but the next day, when Alexander renewed the attack, though Ptolemy attacked the Indians in the rear, the Macedonians were repulſed on both ſides. At laſt the king, perceiving that the ſtrength of the Indians lay in the ſtraitneſs and declivity of the way by which they were attacked, cauſed a great quantity of trees to be felled, and with them filled the cavities between the plain on which the Indians were encamped, and the higheſt of his own advanced poſts. The Indians at firſt derided his undertaking; but at length perceiving the ardour with which the work was carried on, and having felt the effects of the miſſile weapons of the Macedonians, they ſent deputies to propoſe terms of capitulation. Alexander, ſuſpecting that their deſign was only to amuſe him till they made their eſcape, withdrew his guards from the avenues. As ſoon as he knew the Indians were deſcended, he, with 700 of Ptolemy's light-armed foot, took poſſeſſion of the deſerted rock, and then made a ſignal for his forces to fall upon the flying Indians. They ſetting up a loud ſhout, ſo terrified the fugitives, that numbers of them fell from the rocks and precipices, and were daſhed to pieces, while the greateſt part of the remainder were cut off in the roads.

AORTA, in anatomy, the great artery which riſes immediately from the left ventricle of the heart, and is from thence diſtributed to all parts of the body. It is divided into two grand trunks, diſtinguiſhed by the epithets *aſcending* and *deſcending*. See Anatomy, n° 387.

AOUSTA, or Aost, a town of Italy, in Piedmont, and capital of the duchy of the ſame name, a biſhop's ſee, and ſubject to the king of Sardinia. It is remarkable for ſeveral monuments of the Romans, and for the birth of Anſelm archbiſhop of Canterbury. It is ſeated at the foot of the Alps, on the river Doria. E. Long. 7. 33. N. Lat. 45. 38.

Aousta, a territory of Piedmont, with the title of a duchy. It is a valley 30 miles in length, and extends from the paſs of St Martin's, near the frontiers of Yvree, to St Bernard. It abounds in paſtures, and all ſorts of fruits; the capital is of the ſame name.

APACHES, a people of New Mexico in North America. They are brave, reſolute, and warlike, fond of liberty, and the inveterate enemies of tyranny and oppreſſion. Of this diſpoſition the Spaniards had fatal experience towards the end of the laſt century, when they revolted againſt the Catholic king, maſſacred ſeveral of his officers, and committed the greateſt devaſtations. Ever ſince, they have remained the allies, not the ſubjects, of the Spaniards; and the viceroy of Mexico has been obliged to maintain a more formidable garriſon, and a greater number of troops.

APÆDEUSIA, denotes ignorance or unſkilfulneſs in what relates to learning and the ſciences. Hence alſo perſons uninſtructed and illiterate are called *apædeutæ*. The term *apædeutæ* was particularly uſed among the French in the time of Huet; when the men of wit at Paris were divided into two factions, one called by way of reproach *apædeutæ*, and the others *eruditi*. The *apædeutæ* are repreſented by Huet, as perſons who, finding themſelves either incapable or unwilling to undergo a ſevere courſe of ſtudy in order to become truly learned, conſpired to decry learning, and turn the knowledge of antiquity into ridicule, thus making a merit of their own incapacity. The *apædeutæ* in effect were the men of pleaſure; the *eruditi* the men of ſtudy. The *apædeutæ* in every thing preferred the modern writers to the ancient, to ſuperſede the neceſſity of ſtudying the latter. The *eruditi* derided the moderns, and valued themſelves wholly on their acquaintance with the ancients.

APAGOGE, in logic. See Abduction.

Apagoge, in the Athenian law, the carrying a criminal taken in the fact, to the magiſtrate. If the accuſer was not able to bring him to the magiſtrate, it was uſual to take the magiſtrate along with him to the houſe where the criminal lay concealed, or defended himſelf.

Apagoge, in mathematics, is ſometimes uſed to denote a progreſs or paſſage from one propoſition to another; when the firſt having been once demonſtrated, is afterwards employed in the proving of others.

APAGOGICAL Demonstration, an indirect way of proof, by ſhewing the abſurdity of the contrary.

APALACHIAN Mountains, more properly called the *Aligany Mountains*, have their ſouthern beginning near the bay of Mexico, in the Latitude of 30°, extending northerly on the back of the Britiſh colonies, and running parallel with the ſea-coaſt to the Latitude of 40° North; but their diſtance from the ſea, on the weſt, is not exactly known, though it is generally thought to be above 200 miles. A great part of theſe mountains are covered with rocks, ſome of which are of a ſtupendous height and bulk; the ſoil between them is generally black and ſandy, but in ſome places differently coloured, compoſed of pieces of broken rock and ſpar, of a glittering appearance, which ſeem to be indications of minerals and ores if proper ſearch was made for them. Cheſnuts and ſmall oaks are the trees that principally grow on theſe mountains, with ſome *chinkapin* * and other ſmall ſhrubs. The graſs is thin, mixed with vetch and ſmall peaſe; and in ſome places there is very little vegetable appearance.

The rocks of the Apalachian mountains ſeem to engroſs one half of the ſurface. They are moſtly of a light grey colour: ſome are of a coarſe-grained marble like alabaſter; others, of a metallic luſtre: ſome pieces are in the form of ſlate, and brittle; others in lumps, and hard: and ſome appear with ſpangles, or covered over with innumerable ſmall ſhining ſpecks, like ſilver. Theſe frequently appear at the roots of trees when blown down. The different ſpars are found moſt on the higheſt and ſteepeſt parts of the hills, where there is little graſs and few trees; but the greateſt part of the ſoil between the rocks is generally a dark ſandy-coloured kind of mould, and ſhallow; yet fertile, and productive of good corn, which encourages the Tallipooſes, a clan of the Cherokee Indians, to ſettle among them in Latitude 34°; and they are the only Indian nation that has a conſtant reſidence upon theſe mountains.

APAMEA, or Apamia, a city of Bithynia, formerly called *Myrlea*, from Myrlus, general of the Colophonians: deſtroyed by Philip, father of Perſeus; and given to his ally Pruſias, who rebuilt it, and called it *Apamea*, from the name of his queen Apama, (Strabo). Stephanus ſays, that Nicomedes Epiphanes, ſon of Pruſias, called it after his mother; and that it had its ancient

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* Fagus pumila. See *Fagus*.

cient name from Myrlea, an Amazon. The Romans led a colony thither, (Strabo); called *Colonea Apamena*, (Pliny, Appian). The gentilitious name is *Apamæus*, and *Apamenus*, (Trajan in a letter to Pliny).—Another *Apamea*, called *Cibotos*, of Phrygia, at ſome diſtance from the Meander, (Agathodæmon); but by a coin of Tiberius, on the Meander. The name is from Apame, mother of Antiochus Soter, the founder, and the daughter of Artabazus, (Strabo). The riſe, or at leaſt the increaſe, of Apamea, was owing to the ruins of Celenæ. The inhabitants are called *Apamienſes*, (Tacitus).—A third, on the confines of Parthia and Media, ſurnamed *Raphane*, (Strabo, Pliny).—A fourth *Apamea*, a town of Meſene, an iſland in the Tigris, (Pliny, Ammian); where a branch of the Euphrates, called the *Royal river*, falls into the Tigris, (Ptolemy). A fifth in Meſopotamia, on the other ſide the Euphrates, oppoſite to Zeugma on this ſide, both founded by Seleucus, and joined by a bridge, from which the latter takes its name, (Pliny, Iſidor, Characenus).—A ſixth *Apamea*, now *Aſamia*, alſo in Syria, below the confluence of the Orontes and Marſyas; a ſtrong city, and ſituated in a peninſula, formed by the Orontes and a lake: it was a place of ſuch plenty, that Seleucus, the founder of it, there maintained 500 elephants, (Strabo).—*Apamea* was alſo the ancient name of *Pella*, in the Decapolis.

APANAGE, or Appennage, in the French cuſtoms, lands aſſigned by a ſovereign for the ſubſiſtence of his younger ſons, which revert to the crown upon the failure of male iſſue in that branch to which the lands are granted.

APANOMIA, a town of Santorin, an iſland in the Mediterranean ſea, called in this part, by ſome, the *Sea of Candia*: it has a ſpacious harbour, in the form of a half-moon; but the bottom is ſo deep, that ſhips cannot anchor there. E. Long. 25. 59. N. Lat. 36. 18.

APANTHROPY, in medicine, denotes a love of ſolitude, and averſion for the company of mankind. Apanthropy is by ſome reckoned among the ſymptoms, by others among the ſpecies or degrees, of melancholy; and alſo paſſes for an ill indication in leucophlegmatic caſes.

APARINE, in botany, a ſynonime of the utricularia and ſeveral other plants.

APARITHMESIS, in rhetoric, denotes the anſwer to the protaſis or propoſition itſelf. Thus, if the protaſis be, *Appellandi tempus non erat*,—the aparithmeſis is, *At tecum anno plus vixi*.

APARTISMENUS, in the ancient poetry, an appellation given to a verſe, which comprehended an entire ſenſe or ſentence in itſelf. This is ſometimes alſo written, *apartemenus*, i. e. ſuſpended, as not needing any following verſe.

APATHY, among the ancient philoſophers, implied an utter privation of paſſion, and an inſenſibility of pain. The word is compounded of α priv. and παθος, affection. The Stoics affected an entire apathy: they conſidered it as the higheſt wiſdom to enjoy a perfect calmneſs or tranquillity of mind, incapable of being ruffled by either pleaſure or pain. The primitive Chriſtians uſed the word to expreſs a contempt for the things of this world.

APATURIA, in antiquity, a ſolemn feaſt celebrated by the Athenians in honour of Bacchus. It laſted four days: the firſt day, thoſe of the ſame tribe made merry together; and this they called δορπια. The ſecond day, which they called αναρρυσις, they ſacrificed to Jupiter and Minerva. The third day, which they called κυρεωτις, ſuch of their young men and maids as were of age were admitted into their tribes. The fourth day they called επιβδης.

APAULIA, in antiquity, the third day of a marriage ſolemnity. It was thus called, becauſe the bride, returning to her father's houſe, did απαυλιζεσθαι τω νυμφιω, lodge apart from the bridegroom. Some will have the apaulia to have been the ſecond day of the marriage, *viz.* that whereon the chief ceremony was performed; thus called by way of contradiſtinction from the firſt day, which was called προαυλια. On the day called απαυλια (whenever that was), the bride preſented her bridegroom with a garment called απαυλητηρια.

APE, in zoology, the general Engliſh name of a very numerous race of animals, the natural hiſtory of which is given at large under the article Simia: comprehending *Apes* properly ſo called, or ſuch as want tails; and *Monkeys* and *Baboons*, or ſuch as have tails, the former *long*, and the other *ſhort*, ones. See Simia.

APELITES, Chriſtian heretics in the ſecond century, who affirmed that Chriſt received a body from the four elements, which at his death he rendered back to the world, and ſo aſcended into heaven without a body.

APELLA, among phyſicians, a name given to thoſe, whoſe prepuce is either wanting, or ſhrunk, ſo that it can no longer cover the glans. Many authors have ſuppoſed this ſenſe of the word *Apella* warranted from the paſſage in Horace, *credat Judæus Apella, non ego*. But, according to Salmaſius and others, *Apella* is the proper name of a certain Jew, and not an adjective ſignifying *circumciſed*.

APELLES, one of the moſt celebrated painters of antiquity. He was born in the iſle of Cos, and flouriſhed in the time of Alexander the Great, with whom he was in high favour. He executed a picture of this prince, holding a thunderbolt in his hand: a piece, finiſhed with ſo much ſkill and dexterity, that it uſed to be ſaid there were two Alexanders; one invincible, the ſon of Philip; the other inimitable, the production of Apelles. Alexander gave him a remarkable proof of his regard: for when he employed Apelles to draw Campaſpe, one of his miſtreſſes, having found that he had conceived an affection for her, he reſigned her to him; and it was from her that Apelles is ſaid to have drawn his Venus Anadyomene.

One of Apelles's chief excellencies was his making his pictures ſo exactly reſemble the perſons repreſented; inſomuch that the phyſiognomiſts are ſaid to have been able to form a judgment as readily from his portraits as if they had ſeen the originals. His readineſs and dexterity at taking a likeneſs was of great ſervice to him, in extricating him from a difficulty in which he was involved at the court of Egypt: He had not the good fortune to be in favour with Ptolemy; a ſtorm forced him, however, to take ſhelter at Alexandria, during the reign of this prince: a miſchievous fellow, in order to do him a diſkindneſs, went to him, and in the king's name invited him to dinner. Apelles went; and ſeeing the king in a prodigious paſſion, told him, by way of excuſe, that he ſhould not have come to his table but by his orders. He was commanded to ſhew the man who had invited him; this was impoſſible, the perſon who had put the trick upon him not being preſent: Apelles, however, drew a ſketch of his picture upon the wall with a coal, the firſt lines of which diſcovered him immediately to Ptolemy.

Apelles left many excellent pictures, which are mentioned with great honour by the ancients; but his Venus Anadyomene is reckoned his maſter-piece. His Antigonus has alſo been much celebrated; this was drawn with a ſide-face, to hide the deformity of Antigonus, who had loſt an eye. His picture of Calumny has alſo been much taken notice of; and he is ſaid to have painted a horſe ſo naturally, that horſes neighed when they ſaw it.

APENE, in antiquity, a kind of chariot wherein the images of the Gods were carried in proceſſion on certain days, attended with a ſolemn pomp, ſongs, hymns, dancing, &c. It was very rich, made ſometimes of ivory, or of ſilver itſelf, and variouſly decorated.

APENNINUS, now the *Apennine*, a mountain, or ridge of mountains, running thro' the middle of Italy, from north-weſt to the ſouth-eaſt for ſeven hundred miles, in the form of a creſcent, (Pliny); beginning at the Alps in Liguria, or the Rivierra di Genoa; and terminating at the ſtrait of Meſſana, or at Reggio, and the promontory Leucopetra; and ſeparating, as by a back or ridge, the Adriatic from the Tuſcan ſea, (Pliny, Strabo, Ptolemy, Polybius, Vitruvius). This mountain, though high, is greatly ſhort of the height of the Alps. Its name is Celtic, ſignifying a *high mountain*.

APENRADE, a town of Denmark, in the duchy of Sleſwick, ſeated at the bottom of a gulph in the Baltic ſea, between Flenſbourg and Hadaſchleben. It is 25 miles north from Sleſwick. E. Long. 9. 28. N. Lat. 55. 4.

APENZEL, a town of Switzerland, in the canton of the ſame name, ſeated on the river Chuz, E. Long. 9. 1. N. Lat. 47. 31. The canton itſelf, which was allied to the others in 1513, conſiſts only of three or four valleys; having the town and abbey of St Gall on the north; the county of Toggenburg on the weſt; the lordſhip of Sax in the canton of Zurich, and that of Gambs in the canton of Schweiz, on the ſouth; and the Rheinthal, or Rhine valley, on the eaſt. Its greateſt length is about 30 miles, and its breadth about 20. It yields good paſturage, and conſequently is not deſtitute of cattle, milk, butter, or cheeſe. Conſiderable quantities alſo of wheat, rye, barley, oats, beans, peaſe, flax, and wine, are produced in it; beſides a great deal of fruit, wood, and turf; with mineral waters, and warm baths. There are many mountains in the canton, the higheſt of which is that called the *Hoheſantis*, or the *Hohe-Meſmer*, which commands a proſpect of a prodigious extent. There are alſo ſeveral lakes and rivers. The inhabitants, who are partly Proteſtants, and partly Roman-catholics, ſubſiſt chiefly by their manufactures of linen, crape, fuſtian, and thread, or by bleaching, and the ſale of their cattle, butter, cheeſe, horſes, wood, and coal. Of the twenty-three pariſhes in the canton, four are Popiſh and nineteen Proteſtant. Before the Reformation, the inhabitants were ſubject to the abbot of St Gall; but they then ſhook off his yoke, and united themſelves with the other cantons; after that, however, there were violent animoſities between the Papiſts and Proteſtants, the former continually perſecuting the latter, till at laſt, in 1587, by the mediation of the other cantons, the two parties came to an accommodation, by which certain diſtricts were aſſigned to each party, whereas before they lived promiſcuouſly together; and though theſe two diviſions now conſtitute but one canton, yet each forms a diſtinct community or free ſtate, ſending its particular repreſentatives to the diets of the confederacy, and having its ſeparate councils and officers. In ſpirituals the Papiſts are ſubject to the biſhop of Conſtance, but the Proteſtants to their own conſiſtory. The militia of the former does not exceed three thouſand, whereas thoſe of the latter amount to ten thouſand.

APEPSIA, (from α, neg. and πεπτω, to *digeſt.*) Indigeſtion.

Abſtemiouſneſs and exceſs are alike cauſes of indigeſtion. An over diſtenſion of the ſtomach may in ſome meaſure injure its proper tone; and long faſting, by inducing a bad quality in the juices ſecerned into the ſtomach, renders it feeble, and generates wind. Hard drinking, and any of the cauſes of an anorexy, alſo injure digeſtion.

The columbo root is particularly uſeful when the ſtomach is languid, the appetite defective, digeſtion with difficulty carried on, or when a nauſea with flatulence attends. It may be given in ſubſtance with any grateful aromatic, or infuſed in Madeira wine, now and then interpoſing gentle doſes of the tincture of rhubarb.

A mixture of muſtard-ſeed with the columbo root is of admirable utility in complaints of this kind; particularly where acidity and flatulence prevail much in the primæ viæ.

APER, in zoology, a ſynonime of the ſus feroſa *.

APERIENTS, in the materia medica, an appellation given to ſuch medicines as facilitate the circulation of the humours by removing obſtructions.—The five aperient roots of the ſhops are ſmallage, fennel, aſparagus, parſley, and butcher's broom.

APERTURE, the opening of any thing, or a hole or cleft in any continuous ſubject.

Aperture, in geometry, the ſpace between two right lines which meet in a point and form an angle.

Aperture, in optics, a round hole in a turned bit of wood or plate of tin, placed within the ſide of a teleſcope or microſcope, near to the object-glaſs, by means of which more rays are admitted, and a more diſtinct appearance of the object is obtained.

Apertures, or *Apertions*, in architecture, are uſed to ſignify doors, windows, chimneys, &c.

APETALOSE, or apetalous, among botaniſts, an appellation given to ſuch plants as have no flower-leaves.

APEX, in antiquity, the creſt of a helmet, but more eſpecially a kind of cap worn by the flamens.

Apex, among grammarians, denotes the mark of a long ſyllable, falſely called a *long accent*.

APHACA, the name of a place in Syria, ſituated between the Heliopolis and Byblus, near Lebanon, (Zoſimus); infamous for a temple of Venus, called *Aphacitis*, near which was a lake, round which fire uſually burſt forth, and its waters were ſo heavy, that bodies

* See Sus.

bodies floated on them. The temple was deſtroyed by Conſtantine, as being a ſchool of incontinence, (Euſebius). The name is of Syriac origin, ſignifying *embraces*.

APHÆRESIS, in grammar, a figure by which a letter or ſyllable is cut off from the beginning of a word.

Aphæresis, that part of ſurgery which teaches to take away ſuperfluities.

APHANES, a genus of the monogynia order, belonging to the tetrandria claſs of plants, of which there is only one ſpecies known. It is extremely common in corn-fields. The ſtalks riſe five or ſix together; they are three inches long, round, hairy, and procumbent the leaves ſtand very thick upon them, and are roundiſh, but divided, as it were, into three parts, and thoſe deeply ſerrated at their edges. The flowers come out in a double ſeries, arranged all along the branches, and are of a greeniſh white, and the whole plant is of a greyiſh, or whitiſh-green colour.

APHELIUM, or APHELION, in aſtronomy, is that point in any planet's orbit, in which it is furtheſt diſtant from the ſun, being that end of the greater axis of the elliptical orbit of the planet moſt remote from the focus where the ſun is.

APHIOM KARAHISSART, a town of Natolia, in Aſiatic Turky; it is called *Aphiom* becauſe it produces a great deal of opium, called *aphiom* by the Turks. E. Long. 32. 18. N. Lat. 38. 35.

APHIS, in zoology, the PUCERON, VINE-FRETTER, or PLANT-LOUSE; a genus of inſects belonging to the order of inſecta hemiptera. The roſtrum or beak of the aphis is inflected; the antennæ or feelers are longer than the thorax; the wings are four, and erect, or they are wanting; the feet are of the ambulatory kind; and the belly often ends in two horns, from which is ejected that moſt delicate juice called *Honey-dew* *.

* See *Honey-dew.*

Linnæus enumerates 33 ſpecies of the Aphis, all of them inhabitants of particular plants, from which their trivial names are taken; as, aphis *ribis*, *ulmi*, *roſæ*, &c.: And he adds, that there ſeem to be a greater variety of plants producing aphides, than there are different ſorts of this inſect. But ſome late obſervers have been able to diſtinguiſh more than double the above number of ſpecies; and it is probable that many more remain ſtill to be added, as many of the ſame kind of plants are found to ſupport two or three quite different ſorts of aphides. Thus the plum-tree has two ſorts very diſtinct from each other: one of a yellowiſh green, with a round ſhort body; the other of a bluiſh green, as it were enamelled with white, and the ſhape more oblong. On the gooſeberry-buſh and currant the ſame aphides may be found; but each of theſe is inhabited by two very different ſpecies: one being of a duſky green, with a ſhort plump body; the other of a paler green, the body more taper, and tranſverſely wrinkled. The roſe-tree, again, ſupports not leſs than three diſtinct ſpecies: the largeſt is of a deep green, having long legs of a browniſh caſt, with the joints of a very dark brown, as are alſo the horns and antennæ; a ſecond ſort is of a paler green, has much ſhorter legs, and a more flat body; the third ſort is of a pale red, its body tranſverſely wrinkled, and is moſt frequently on the ſweet-briar.

The extraordinary nature of theſe inſects have for ſome time paſt juſtly excited the wonder and attention of naturaliſts. They were long ranked among the animals which had been claſſed with the true androgynes ſpoken of Mr Breynius; for having never been catched copulating, it was haſtily concluded that they multiplied without copulation. This, however, was but a doubt, or at beſt a mere ſurmiſe: but this ſurmiſe was believed and adopted by Mr Reaumur; and tho' he ſupported it by ſome obſervations peculiar to himſelf, the queſtion remained ſtill undecided, till Mr Bonnet ſeemed to have cleared it up in the affirmative, by taking and ſhutting up a young aphis, at the inſtant of its birth, in the moſt perfect ſolitude, which yet brought forth in his ſight ninety-five young ones. The ſame experiment being made on one of the individuals of this family, that had been tried with its chief, the new hermit ſoon multiplied like its parent; and one of this third generation, in like manner brought up in ſolitude, proved no leſs fruitful than the former. Repeated experiments, in this reſpect, as far as the fifth or ſixth generation, all uniformly preſenting the obſerver with *fecund virgins*, were communicated to the Royal Academy of Sciences; when an unforeſeen and very ſtrange ſuſpicion, imparted by Mr Trembley to Mr Bonnet, engaged him anew in a ſeries of ſtill more painful experiments than the foregoing. In a letter which that celebrated obſerver wrote to him from the Hague, the 27th January 1741, he thus expreſſes himſelf: “I formed, ſince the month of November, the deſign of rearing ſeveral generations of ſolitary pucerons, in order to ſee if they would all equally bring forth young. In caſes ſo remote from uſual circumſtances, it is allowed to try all ſorts of means; and I argued with myſelf, Who knows, but that one copulation might ſerve for ſeveral generations? This “*who knows*,” to be ſure, was next to avouching nothing; but, as it came from Mr Trembley, it was ſufficient to perſuade Mr Bonnet that he had not gone far enough in his inveſtigation. If the fecundity of aphides was owing to the ſecret copulation ſuggeſted by Mr Trembley, this copulation ſerved at leaſt five or more ſucceſſive generations. Mr Bonnet therefore reared to the amount of the tenth generation of ſolitary aphides, and had the patience to keep an account of the days and hours of the births of each generation. In ſhort, it was diſcovered, That they are really diſtinguiſhed by ſexes: that there are males and females amongſt them, whoſe amours are the leaſt equivocal of any in the world: that the males are produced only in the tenth generation, and are but few in number: that theſe, ſoon arriving at their full growth, copulate with the females: that the virtue of this copulation ſerves for ten generations: that all theſe generations, except the firſt (from the fecundated eggs), are produced viviparous; and all the individuals are females, except thoſe of the laſt generation, among whom, as we have already obſerved, ſome males make their appearance, to lay the foundations of a freſh ſeries.—Theſe circumſtances have been confirmed by other naturaliſts. In particular, we have a curious and accurate detail of them by Dr Richardſon of Rippon, in the Philoſophical Tranſactions, Vol. xi. art. 22. an extract of which we ſhall here inſert, in order to give the reader as full an inſight into the nature of theſe ſingular inſects, as can be done by a mere detail of facts in themſelves utterly unaccountable.

“ The great variety of ſpecies which occur in the inſects now under conſideration, may make an inquiry into their particular natures ſeem not a little perplexed; having them, however, ſkillfully reduced under their proper genus, the difficulty is by this means conſiderably diminiſhed. All the inſects comprehended under any diſtinct genus, we may reaſonably ſuppoſe to partake of one general nature; and, by diligently examining any of the particular ſpecies, may thence gain ſome inſight into the nature of all the reſt. With this view I have choſen, out of the various ſort of aphides, the largeſt of thoſe found on the roſe-tree; not only as its ſize makes it the more conſpicuous, but as there are few others of ſo long a duration. This ſort, appearing early in the ſpring, continues late in the autumn; while ſeveral are limited to a much ſhorter term, in conformity to the different trees and plants from whence they drew their nouriſhment.

1. “ If at the beginning of February the weather happens to be ſo warm, as to make the buds of the roſe-tree ſwell and appear green; ſmall aphides are frequently to be found upon them, not larger than the young ones in ſummer when firſt produced. But there being no old ones to be found at this time of the year, which in ſummer I had obſerved to be viviparous, I was formerly not a little perplexed by ſuch appearances, and almoſt induced to give credit to the old doctrine of equivocal generation. That the ſame kind of animal ſhould at one time of the year be viviparous, and at another time oviparous, was an opinion I could then by no means entertain. This, however, frequent obſervation has at laſt convinced me to be fact; having found thoſe aphides which appear early in the ſpring, to proceed from ſmall black oval eggs which were depoſited on the laſt years ſhoots in autumn: though, when it happens that the inſects make too early an appearance, I have obſerved the greateſt part to ſuffer from the ſharp weather that uſually ſucceeds, by which means the roſe-trees are ſome years in a manner freed from them.

“ Thoſe which withſtand the ſeverity of the weather ſeldom come to their full growth before the month of April; at which time they uſually begin to breed, after twice caſting off their exuviæ or outward covering. It appears then that they are all females, which produce each of them a very numerous progeny, and that without having intercourſe with any male inſect. As I obſerved before, they are viviparous; and what is equally uncommon, the young ones all come into the world backwards. When they firſt come from the parent, they are enveloped by a thin membrane, having in this ſituation the appearance of an oval egg; which, I apprehend, muſt have induced Reaumur to ſuſpect that the eggs diſcovered by Bonnet were nothing more than mere abortions. Theſe egg-like appearances adhere by one extremity to the mother; while the young ones contained in them extend the other; by that means gradually drawing the ruptured membrane over the head and body, to the hind feet. During this operation, and for ſome time after, by means of ſomething glutinous, the fore part of the head adheres to the vent of the parent. Being thus ſuſpended in the air, it ſoon frees itſelf from the membrane in which it was confined, and, after its limbs are a little ſtrengthened, is ſet down on ſome tender ſhoot, and then left to provide for itſelf.

2. “ In the ſpring-months, there appear on the roſe-trees but two generations of aphides, including thoſe which immediately proceed from the laſt years eggs; the warmth of the ſummer adds ſo much to their fertility, that no leſs than five generations ſucceed one another in the interval. One is produced in May, which caſts off its covering; while the months of June and July each ſupply two more, which caſt off their coverings three or four times, according to the different warmth of the ſeaſon. This frequent change of the outward covering is the more extraordinary, as it is the ofteneſt repeated when the inſects come the ſooneſt to their growth; which I have ſometimes obſerved to happen in ten days, where warmth and plenty of nouriſhment have mutually conſpired. From which conſiderations I am thoroughly convinced that theſe various coverings are not connate with the inſect; but that they are, like the ſcarf-ſkin, ſucceſſively produced.

“ Early in the month of June, ſome of the third generation which were produced about the middle of May, after caſting off their laſt covering, diſcover four erect wings, much longer than their bodies: and the ſame is obſervable in all the ſucceeding generations, which are produced during the ſummer-months; without, however, diſtinguiſhing any diverſity of ſex, as is uſual in ſeveral other kinds of inſects. For ſome time before the aphides come to their full growth, it is eaſy to diſcover which of them will have wings, by a remarkable fullneſs of the breaſt, which, in the others, is hardly to be diſtinguiſhed from the body. When the laſt covering is rejected, the wings, which were before folded up in a very narrow compaſs, gradually extend themſelves in a moſt ſurpriſing manner, till their dimenſions are at laſt very conſiderable. But theſe winged ones have the peculiarity, that the number of them does not ſeem ſo much to depend on their original ſtructure, as on the quantity or quality of the nouriſhment with which they are ſupplied: it being frequently obſerved, that thoſe on a ſucculent ſhoot have few or none with wings among them, while others of the ſame generation, on a leſs tender branch, are moſt of them winged; as if only the firſt rudiments of wings were compoſed in the former, while nature thought proper to expand them in the latter, that they might be more at liberty to ſupply their wants.

“ The increaſe of theſe inſects in the ſummer-time is ſo very great, that, by wounding and exhauſting the tender ſhoots, they would frequently ſuppreſs all vegetation, had they not many enemies which reſtrain them. To enumerate the variety of other inſects that in their worm and fly ſtate are conſtantly deſtroying them, would exceed the bounds of the preſent deſign: there is one, however, ſo ſingular in the manner of executing its purpoſe, that I cannot paſs by it without ſome further notice: This is a very ſmall, black, ichneumon fly, with a ſlender body and very long antennæ, which darts its pointed tail into the bodies of the aphides, at the ſame time depoſiting an egg in each. This egg produces a worm, which feeds upon the containing inſect till it attains its full growth; when it is uſually changed to that kind of fly from whence it came. In this, however, it is ſometimes prevented by another ſort of ſmall black fly, which wounds this worm through its pearl-like habitation; and by laying one of its eggs therein, inſtead of the former fly, produces its own likeneſs. I muſt, however, further obſerve, notwithſtanding theſe inſects have many enemies, they are not without friends; if we may conſider thoſe as ſuch who are very officious in their attendance, for the good things they expect to reap thereby. The ant and the bee are both of this kind, collecting the honey in which the aphides abound; but with this difference, that the ants are conſtant viſitors, the bee only when flowers are ſcarce. To which let me alſo add, that the ants will ſuck in the delicious nectar while the aphides are in the act of diſcharging it from the anus; but the bees only collect it from the leaves on which this honey-dew has fallen.

3. "In the autumn I find three more generations of aphides to be produced; two of which make their appearance in the month of Auguſt, and the third uſually appear before the middle of September. As the two firſt differ in no reſpect from thoſe which we meet with in ſummer, it would be waſting time to dwell any longer upon them; but the third, differing greatly from all the reſt, demands our giving it a more ſerious attention. Though all the aphides which have hitherto appeared were females, in this tenth generation are found ſeveral male inſects; not that they are by any means ſo numerous as the females, being only produced by a ſmall number of the former generation. To which I muſt further add, that I have obſerved thoſe which produce males, previouſly to have produced a number of females; which in all reſpects reſembling thoſe already deſcribed, I ſhall decline taking into any further conſideration.

"The females have at firſt altogether the ſame appearance with thoſe of the former generations; but in a few days their colour changes from a green to a yellow, which is gradually converted into an orange colour before they come to their full growth. They differ likewiſe in another reſpect, at leaſt from thoſe which occur in the ſummer, that all thoſe yellow females are without wings. The male inſects are however ſtill more remarkable, their outward appearance readily diſtinguiſhing them from the females of this and of all other generations. When firſt produced, they are not of a green colour like the reſt, but of a reddiſh brown; and have afterwards, when they begin to thicken about the breaſt, a dark line along the middle of the back. Theſe male inſects come to their full growth in about three weeks time, and then caſt off their laſt covering; the whole inſect being, after this operation, of a bright yellow colour, the wings only excepted. But after this they ſoon change to a darker yellow, and in a few hours to a very dark brown; if we except the body, which is ſomething lighter coloured, and has a reddiſh caſt. They are all of the winged ſort; and the wings, which are white at firſt, ſoon become tranſparent, and at length appear like very fine black gauze.

"The males no ſooner come to maturity than they copulate with the females; in which act they are readily diſcovered, as they remain in conjunction for a conſiderable time, and are not eaſily diſturbed. The commerce between them continues the whole month of October, and may be obſerved at all times of the day, though I have found it moſt frequent about noon; eſpecially when the weather is moderately warm, and the ſun overcaſt. The females, in a day or two after their intercourſe with the males, I have obſerved to lay their eggs; which they uſually do near the buds, when they are left to their own choice. Where there are a number crowded together, they of courſe interfere with each other; in which caſe they will frequently depoſit their eggs on other parts of the branches, or even on the ſpines with which they are beſet."

APHLASTUM, in the ancient navigation, a wooden ornament, ſhaped like a plume of feathers, faſtened on the gooſe's or ſwan's neck uſed by the ancient Greeks in the heads of their ſhips. The Aphlaſtum had much the ſame office and effect in a ſhip, that the creſt had on the helmet. It ſeems alſo to have had this further uſe, *viz.* by the waving of a party-coloured ribband faſtened to it, to indicate from what quarter the wind blew.

APHONIA, among phyſicians, ſignifies a ſuppreſſion or total loſs of voice. It is never a primary diſeaſe, but a conſequence of many different diſorders. The cure is to be effected by removing the diſorder from whence the Aphonia proceeds.

APHORISM, a maxim, or principle, of a ſcience; or a ſentence which comprehends a great deal in a few words.

APHRACTI, in the ancient military art, denotes open veſſels, without decks or hatches, furniſhed only at head and ſtern with croſs planks, whereon the men ſtood to fight.

APHRODISIA, in antiquity, feſtivals kept in honour of Venus, the moſt remarkable of which was that celebrated by the Cyprians. At this ſolemnity ſeveral myſterious rites were practiſed: all who were initiated to them offered a piece of money to Venus as an harlot, and received as a token of the goddeſs's favour a meaſure of ſalt, and a φαλλος; the former, becauſe ſalt is a concretion of ſea-water, to which Venus was thought to owe her birth; the latter, becauſe ſhe was the goddeſs of wantonneſs.

APHRODISIACS, among phyſicians, medicines which increaſe the quantity of ſeed, and create an inclination to venery.

APHRODISIAS, an iſland on the coaſt of Carmania, (Pliny;) ſacred to Venus, (Arrian). Another iſland on the coaſt of Cyrene, with a road for ſhips, (Scylax;) called *Laea*, or the iſland of Venus, (Ptolemy.)

APHRODISIUS, an inland city of Caria, called the *Metropolis*, (Ptolemy, Stephanus); ſaid by Suidas to have been called *Ninoe*. Another of Cilicia, (Ptolemy); ſo called from the worſhip and a temple of Venus, (Pliny). A third of Thrace, to the north of the iſthmus of the Cherſoneſus; an open town, till ſtrongly fortified by Juſtinian, (Procopius).

APHRODITA, in zoology, an inſect of the order of vermes molluſca. The body of the aphrodita is oval, with many ſmall tentacula or protuberances on each ſide, which ſerve as ſo many feet: The mouth is cylindrical, at one end of the body, and capable of being retracted, with two briſtly tentacula. There are four ſpecies of this inſect, viz. 1. The aculeata, with 32 tentacula, or feet, an inhabitant of the European ſeas, and often found in the belly of the codfiſh. See Plate XXIII. fig. 4. This figure is taken from the life. It was found on the ſhore of the frith of Forth, about a mile eaſt from Leith, by Dr Letſom, and by him communicated to the proprietors of this work. Johnſton, Seba, and other authors, have given figures of the aphrodita; but they are not ſo accurate as could be wiſhed. 2. The ſcabra, of an oblong ſhape, ſcabrous on the back, with about 20 tentacula. 3. The ſquamata, with 24 feet, and ſcaly on the back. 4. The imbricata, is very like the former, only its ſcales are more glabrous.

APHRONITRE, in natural hiſtory, a name given by the ancients to a particular kind of natrum.

APHTHÆ, in medicine, ſmall, round, and ſuperficial ulcers ariſing in the mouth. The principal ſeat of this diſeaſe, is the extremity of the excretory veſſels, ſalival glands, and, in ſhort, all glands that furniſh a humour like the ſaliva, as the lips, gums, &c. See the *Index* ſubjoined to MEDICINE.

APHYLLANTHES, or BLUE MONTPELIER PINK, a genus of the monogynia order, belonging to the hexandria claſs of plants; of which there is only one ſpecies known. It is a native of France; the root conſiſts of a number of ſlender, hard, woody, long, and contorted fibres: the radical leaves are very numerous, two inches long, extremely narrow, and wither very quickly. The ſtalk is round, ſmooth, without a joint or knot, naked, and tolerably firm; at its top ſtands a ſingle and very beautiful blue flower, ariſing from a kind of compound imbricated cup.

APHYTIS, a town of the Cherſoneſus, called *Pallare*, in Macedonia, (Pliny); famous for an oracle of Apollo.

APIARY, a place where bees are kept. See APIS.

APIASTER, in ornithology, the trivial name of a ſpecies of the merops. See MEROPS.

APICES, in botany, the ſame with antheræ *.

* See *Antheræ*.

APICIUS. There were at Rome three of that name, famous for their gluttony: the ſecond is the moſt celebrated of the three. He lived under Tiberius, ſpent immenſe ſums on his belly, and invented divers ſorts of cakes which bore his name. He kept as it were a ſchool of gluttony at Rome. After having ſpent two millions and a half in entertainments, finding himſelf very much in debt, he examined into the ſtate of his affairs; and ſeeing that he had but 250,000 livers remaining, he poiſoned himſelf, out of apprehenſion of ſtarving with ſuch a ſum. He had proſtituted himſelf when very young to Sejanus.

APINA, or *Apinæ*, a town of Apulia, built by Diomedes, as was alſo Tricæ, (Pliny). *Apinæ* and *Tricæ* is a proverbial ſaying for things trifling and of no value, (Martial); and *Apinarii* was the appellation for triflers or buffoons, (Trebellius Pollio.)

APION, a famous grammarian, born in Egypt, was a profeſſor at Rome in the reign of Tiberius. He had all the arrogance of a mere pedant, and amuſed himſelf with difficult and inſignificant inquiries. One of his principal works was his Antiquities of Egypt.

APIS, in Pagan mythology, one of the Egyptian gods, worſhipped in the form of a living bull. Mythologiſts ſay, that Apis was a king of the Argives, who, leaving his dominions to his brother, went into Egypt, where he was known under the name of *Oſiris*: that he married Iſis; and having civilized the Egyptians, and taught them the manner of planting the vine, they revered him after his death as a god, under the figure of a bull. See the article EGYPT.

APIS, or BEE, in zoology, a genus of inſects belonging to the order of inſecta hymenoptera. The mouth is furniſhed with two jaws, and a proboſcis infolded in a double ſheath; the wings are four in number, the two foremoſt covering thoſe behind when at reſt: In the anus or tail of the females, and working bees, which are of no ſex, there is a hidden ſting. Linnæus enumerates no leſs than 55 ſpecies of the apis, *viz.*

1 Deſcription of the honey-bee.

1. The mellefica, or honey-bee, is furniſhed with downy hairs, has a duſky-coloured breaſt, and browniſh belly; the tibiæ of the hind-legs are ciliated, and tranſverſely ſtreaked on the inſide. Each foot of this bee terminates in two hooks, with their points oppoſite to each other; in the middle of theſe hooks there is a little thin appendix, which, when unfolded, enables the bees to faſten themſelves to glaſs or the moſt poliſhed bodies. This part they likewiſe employ for tranſmitting the ſmall particles of crude wax which they find upon flowers to the cavity in their thigh, hereafter deſcribed. The queen and drones, who never collect wax in this manner, have no ſuch cavity. The bee is alſo furniſhed with a proboſcis or trunk, which ſerves to extract the honey from flowers; and have, beſides, a real mouth ſituated in the forepart of the head, with which they are able to feed on the farina of flowers, from which afterwards is made wax. The belly of the bee is divided into ſix rings or joints; which ſometimes ſhorten the body, by ſlipping the one over the other. In the inſide of the belly there is a ſmall bladder or reſervoir, in which the honey is collected, after having paſſed thro' the proboſcis and a narrow pipe which runs through the head and breaſt. This bladder, when full of honey, is about the ſize of a ſmall pea.

2 Its ſting.

The ſting, which is ſituated at the extremity of the belly, is a very curious weapon; and, when examined by the microſcope, appears of a ſurpriſing ſtructure. It has a horny ſheath or ſcabbard, which includes two bearded darts. This ſheath ends in a ſharp point, near the extremity of which a ſlit opens, through which, at the time of ſtinging, the two bearded darts are protruded beyond the end of the ſheath: one of theſe is a little longer than the other, and fixes its beard firſt; and the other inſtantly following, they penetrate alternately deeper and deeper, taking hold of the fleſh with their beards or hooks, till the whole ſting is buried in the fleſh; and then a venomous juice is injected through the ſame ſheath, from a little bag at the root of the ſting, which occaſions an acute pain and ſwelling of the part, which ſometimes continues ſeveral days. But this is beſt prevented by enlarging the wound directly, to give it ſome diſcharge. This poiſon ſeems to owe its miſchievous efficacy to certain pungent ſalts. Let a bee be provoked to ſtrike its ſting againſt a plate of glaſs, and there will be a drop of the poiſon diſcharged and left upon the glaſs. This being placed under a double microſcope, as the liquor evaporates, the ſalts will be ſeen to concrete, forming oblong, pointed, clear cryſtals.—Mr Derham counted on the ſting of a waſp eight beards on the ſide of each dart, ſomewhat like the beards of fiſh-hooks; and the ſame number are to be counted on the darts of the bee's ſting. When theſe beards are ſtruck deep in the fleſh, if the wounded perſon ſtarts, or diſcompoſes the bee before it can diſengage them, the ſting is left behind ſticking in the wound; but if he have patience to ſtand quiet, the creature brings the hooks down cloſe to the ſides of the darts, and withdraws the weapon; in which caſe, the wound is always much leſs painful. The danger of being ſtung by bees may be in a great meaſure prevented by a quiet compoſed behaviour. A thouſand bees will fly and buzz about a perſon without hurting him, if he ſtand perfectly ſtill, and forbear diſturbing them even when near his face; in which caſe, he may obſerve them for hours together without danger: but if he moleſts or beats them away, he uſually ſuffers for it. It has been lately affirmed *, that a perſon is in perfect ſafety in the midſt of myriads of bees, if he but carefully keep his mouth ſhut, and breathe gently through the noſtrils only; the human breath, it would ſeem, being peculiarly offenſive to their delicate organs: and merely with this precaution, it is ſaid, the very hives may be turned up, and even part of the comb cut out, while the bees are at work.

As the honey-bees are both uſeful inſects, and endowed with peculiar inſtincts, we ſhall give a particular account of their generation and œconomy, and of the moſt approved methods of managing them.

I. Oeconomy, Instincts, &c. *of the* Honey-bee.

We may conſider a hive of bees as a well peopled city, in which are commonly found from 15,000 to 18,000 inhabitants. This city is in itſelf a monarchy;—compoſed of a *queen;* of males, which are the *drones;* and of *working bees*, which are not of either ſex. The combs, which are of pure wax, ſerve as their magazine of ſtores, and for the nurſing places of their young offſpring. There is between the combs a ſpace ſufficient for two bees to march abreaſt, without embarraſſing each other; and in ſome parts it is more ſpacious. There are alſo holes, or narrow paſſes, which croſs the combs tranſverſely, and are intended to ſhorten the way when the bees paſs from one comb to another.

3 Queen-bee. The queen is eaſily diſtinguiſhed from the other bees, by the form of her body: ſhe is longer and larger than they are, and her wings are much ſhorter than theirs in proportion to her body; for the wings of the other bees cover their whole body, whereas thoſe of the queen hardly reach beyond her middle, or end at about the third ring of her belly. Her hinder parts are more taper than thoſe of the other bees, terminating ſharper. Her belly and legs are of a deep yellow, much reſembling the pureſt gold. The queen, like the working bees, has a ſting; contrary to the opinion of many writers, who may have taken this for granted, becauſe ſhe is extremely pacific. One may handle her, turn her, and even teaze her for ſome time, before ſhe determines herſelf to vengeance. Her ſting differs not from that of the working bee, excepting that it is bigger, and a little curved.

4 Attachment of her ſubjects. A hive of bees cannot ſubſiſt without a queen, as ſhe alone produces their numerous poſterity; and on this account their fidelity and attachment to their ſovereign is admirable.

5 Mr Wildman's feats by means of the queen. Mr Wildman, by his dexterity in the management of bees, has lately ſurpriſed the whole kingdom. He can order a ſwarm to light where he pleaſes, almoſt inſtantaneouſly; he can order them to ſettle on his head, then remove them to his hand; command them to depart and ſettle on a window, table, &c. at pleaſure. We ſhall ſubjoin his method of performing theſe feats, in his own words: "Spectators," ſays he, "wonder much at my attaching bees to different parts of my body, and wiſh much to be poſſeſſed of the ſecret means by which I do it. I have unwarily promiſed to reveal it; and am therefore under a neceſſity of performing that promiſe: but while I declare, that their fear and the queen are the chief in theſe operations, I muſt warn my readers that there is an art neceſſary to perform it, namely practice, which I cannot convey to them, and which they cannot ſpeedily attain; yet till this art is attained, the deſtruction of many hives of bees muſt be the conſequence; as every one will find on their firſt attempt to perform it.

"Long experience has taught me, that as ſoon as I turn up a hive, and give it ſome taps on the ſides and bottom, the queen immediately appears, to know the cauſe of this alarm; but ſoon retires again among her people. Being accuſtomed to ſee her ſo often, I readily perceive her at firſt glance; and long practice has enabled me to ſeize her inſtantly, with a tenderneſs that does not in the leaſt endanger her perſon. This is of the utmoſt importance; for the leaſt injury done to her brings immediate deſtruction to the hive, if you have not a ſpare queen to put in her place, as I have too often experienced in my firſt attempts. When poſſeſſed of her, I can, without injury to her, or exciting that degree of reſentment that may tempt her to ſting me, ſlip her into my other hand, and, returning the hive to its place, hold her there, till the bees miſſing her, are all on wing, and in the utmoſt confuſion. When the bees are thus diſtreſſed, I place the queen where-ever I would have the bees to ſettle. The moment a few of them diſcover her, they give notice to thoſe near them, and thoſe to the reſt; the knowledge of which ſoon becomes ſo general, that in a few minutes they all collect themſelves round her; and are ſo happy in having recovered this ſole ſupport of their ſtate, that they will long remain quiet in their ſituation. Nay, the ſcent of her body is ſo attractive of them, that the ſlighteſt touch of her, along any place or ſubſtance, will attach the bees to it, and induce them to purſue any path ſhe takes.

"My attachment to the queen, and my tender regard for her precious life, makes me moſt ardently wiſh that I might here cloſe the detail of this operation, which, I am afraid, when attempted by unſkilful hands, will coſt many of their lives; but my love of truth forces me to declare, that, by practice, I am arrived at ſo much dexterity in the management of her, that I can, without hurt to her, tie a thread of ſilk round her body, and thus confine her to any part in which ſhe might not naturally wiſh to remain; or I ſometimes uſe the leſs dangerous way of clipping her wings on one ſide.

"I ſhall conclude this account in the manner of C. Furius Creſinus, who being cited before the Curule Edile and an aſſembly of the people, to anſwer to a charge of ſorcery, founded on his reaping much larger crops from his ſmall ſpot of ground, than his neighbours did from their extenſive fields, produced his ſtrong implements of huſbandry, his well-fed oxen, and a hale young woman his daughter; and, pointing to them, ſaid,

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* See *Edinburgh Medical Commentaries*, Vol. IV. p. 352.

Theſe, Romans, are my inſtruments of witchcraft; but I cannot ſhew you my toil, my ſweats, and anxious cares. So may I ſay, Theſe, Britons, are my inſtruments of witchcraft; but I cannot ſhew you my hours of attention to this ſubject, my anxiety and care for theſe uſeful inſects; nor can I communicate to you my experience, acquired during a courſe of years."

6 Conſequences of her death.

When a queen dies by any accident, the bees of her hive immediately ceaſe working, conſume their own honey, fly about their own and other hives at unuſual hours, when other bees are at reſt, and die rather than be without her, on whom alone depends the ſupply of future labourers. Her loſs is proclaimed by a clear and interrupted humming. This ſign ſhould be a warning to the owner of the bees, to take what honey remains in the hive, or to procure them another queen.

The diſſection of the queen-bee ſhews evidently that ſhe lays many thouſand eggs; and obſervations as well as anatomy evince, that theſe eggs are impregnated by the drones or males, in the ſame manner as other inſects couple. It is computed that the ovaria of a queen-bee contain more than 5000 eggs at one time; and therefore it is not difficult to conceive that a queen-bee may produce 10,000 or 12,000 bees, or even more, in the ſpace of two months.

7 Of the drones.

Drones are ſmaller than the queen, and larger than the working bees; and in flying they make a greater noiſe. If a hive is opened in the beginning of ſpring, not a ſingle drone will be found in it; from the middle of May to the end of June, hundreds of them will be found, commonly from 200 or 300 to 1000; and from thence to the following ſpring, it would be in vain to ſeek for them. They go not out till 11 in the morning, and return before ſix in the evening. To live, ſeems to be their only buſineſs; yet their diſſection informs us that they have the male parts of generation, and obſervations have aſſured us that they couple with the queen. While their preſence is thus neceſſary for the queen, or whilſt, in the opinion of many, their warmth is neceſſary to cheriſh the young, they are ſuffered to enjoy the ſweets of love and life; but as ſoon as they become uſeleſs in the hive, the working bees declare the moſt cruel war againſt them, and make terrible ſlaughter of them. The ſtings of the working bees give them an advantage, which more than counterbalance the ſize of the drones, who have not any ſting: beſides, we frequently ſee ſeveral working bees ſet on one drone. This war affects not only the bees already in life, but even the eggs and maggots; for the law which has pronounced the deſtruction of the males has no exception, it extends equally to thoſe which do not yet breathe and to thoſe which do; the hive is cleared of every egg, maggot, or nymph; the whole is torn away and carried off. After the ſeaſon proper for increaſing the number of bees is paſt, and when they ſhould attend only to the ſupplying of their magazines ſufficiently with winter-ſtores, every veſtige of the drones is deſtroyed, to make room for honey. Whenever drones are obſerved to remain in a hive late in the autumn, it is held to be a bad ſign of the ſtate of the hive.

8 The working bees.

The working bees compoſe the greateſt body of the ſtate. Columella informs us, that the ancients diſtinguiſhed ſeveral kinds of them. He joins in opinion with Virgil, who approves of thoſe which are ſmall, oblong, ſmooth, bright, and ſhining, of a gentle and mild diſpoſition: "for," continues he, "by how much the larger and rounder the bee is, by ſo much the worſe it is; but if it be fierce and cruel, it is the worſt of all. The angry diſpoſition of bees of a better character is eaſily ſoftened by the frequent intercourſe of thoſe who take care of them, for they grow more tame when they are often handled." The experience of ages has now eſtabliſhed the ſort of bees which have been found to anſwer beſt the purpoſes of keeping them.

The working bees have the care of the hive, collect the wax and honey, fabricate and work up the wax, build the cells, feed the young, keep the hive clean, drive from thence ſtrangers, and employ themſelves in all other concerns relating to the hive.

The working bee has two ſtomachs; one which contains the honey, and a ſecond in which is contained the crude wax. The working bees have no parts analogous to the ovaria of the queen, or that reſemble the male organs of the drones.

The ſting is very neceſſary for a working bee, both as an offenſive and as a defenſive weapon: for their honey and wax excite the envy of many greedy and lazy inſects; and they have alſo to defend themſelves againſt enemies, who are fonder of eating them than their honey. There is likewiſe a time when the drones muſt be ſacrificed and exterminated for the good of the ſociety; and as they are larger and ſtronger than the working bees, theſe laſt would have a very unequal match, were it not for this poiſonous ſting.

9 Of their battles.

There happen alſo among bees, either of the ſame or of different hives, moſt deadly feuds, in which their ſtings are their chief weapons. In theſe conteſts, great ſkill may be diſcerned in their manner of pointing the ſting between the ſcaly rings which cover their bodies, or to ſome other eaſily vulnerable part. The bee which firſt gains the advantage remains the conqueror: tho' the victory coſts the victor his life, if he has left his ſting in the body of the enemy; for, with the ſting, ſo much of his body is torn out, that death inevitably follows. Bees have very ſevere conflicts when whole hives engage in a pitched battle, and many are ſlain on both ſides. Their fighting and plundering one another ought chiefly to be imputed, as Mr Thorley obſerves, either to their perfect abhorrence of ſloth and idleneſs, or to their inſatiable thirſt for honey; for when, in ſpring or autumn, the weather is fair, but no honey can be collected from plants, and is to be found only in the hives of other bees, they will venture their lives to get it there.

Dr Warder aſſigns another cauſe of their fighting, which is, the neceſſity that the bees are reduced to when their own hive has been plundered, at a ſeaſon when it is too late for them to repair the loſs by any induſtry in the fields.

Sometimes one of the queens is killed in battle. In this caſe, the bees of both hives unite as ſoon as her death is generally known among them. All then become one people; the vanquiſhed go off with the robbers, richly laden with their own ſpoils, and return every day with their new aſſociates to pillage their old habitation. This cauſes a throng, unuſual for the ſeaſon, at the door of the hive they are plundering; and if the owner lifts it up at night, when all are gone home, he will find it empty of inhabitants; though there perhaps will remain in it ſome honey, which he takes as his property.

When two ſwarms take flight at the ſame time, they ſometimes quarrel, and great numbers are deſtroyed on both ſides, till one of the queens is ſlain. This ends the conteſt, and the bees of both ſides unite under the ſurviving ſovereign.

10 Their labours.

When the bees begin to work in their hives, they divide themſelves into four companies: one of which roves in the fields in ſearch of materials; another employs itſelf in laying out the bottom and partitions of their cells; a third is employed in making the inſide ſmooth from the corners and angles; and the fourth company bring food for the reſt, or relieve thoſe who return with their reſpective burdens. But they are not kept conſtant to one employment; they often change the taſks aſſigned them: thoſe that have been at work, being permitted to go abroad; and thoſe that have been in the fields already, take their places. They ſeem even to have ſigns, by which they underſtand each other: for when any of them want food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets ſome drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is ſo great, that, in a day's time, they are able to make cells which lie upon each other numerous enough to contain 3000 bees.

11 Of the combs.

In the plan and formation of theſe cells, they diſcover a moſt wonderful ſagacity. In conſtructing habitations within a limited compaſs, an architect would have three objects in view: firſt, to uſe the ſmalleſt quantity that can be of materials; next, to give to the edifice the greateſt capacity on a determined ſpace; and thirdly, to employ the ſpot in ſuch a manner that none of it may be loſt. On examination, it will be found that the bees have obtained all theſe advantages in the hexagonal form of their cells: for, firſt, there is an œconomy of wax, as the circumference of one cell makes part of the circumferences of thoſe contiguous to it; ſecondly, the œconomy of the ſpot, as theſe cells which join to one another leave no void between them; and thirdly, the greateſt capacity or ſpace; as, of all the figures which can be contiguous, that with ſix ſides gives the largeſt area. This thriftineſs prompts them to make the partitions of their cells thin; yet they are conſtructed ſo as that the ſolidity may compenſate for the ſcantineſs of materials. The parts moſt liable to injury are the entrance of the cells. Theſe the bees take care to ſtrengthen, by adding quite round the circumference of the apertures a fillet of wax, by which means this mouth is three or four times thicker than the ſides: and they are ſtrengthened at the bottom by the angle formed by the bottom of three cells falling in the middle of an oppoſite cell. The combs lie parallel to each other; and there is left between every one of them, a ſpace which ſerves as a ſtreet, broad enough for two bees to paſs by each other. There are holes which go quite through the combs, and ſerve as lanes for the bees to paſs from one comb to another, without being obliged to go a great way about. When they begin their combs, they form at the top of the hive a root or ſtay to the whole edifice, which is to hang from it. Though they generally lay the foundations of the combs ſo that there ſhall be no more between them than what is ſufficient for two bees to paſs, yet they ſometimes place thoſe beginings of two combs too far aſunder; and, in this caſe, in order to fill up part of the void ſpace ariſing from that bad diſpoſition, they carry their combs on obliquely, to make them gradually approach each other. This void ſpace is ſometimes ſo conſiderable, that the bees build in it an intermediate comb, which they terminate as ſoon as the original combs have only their due diſtances. As the combs would be apt, when full, to overcome by their weight all the ſecurity which the bees can give them againſt falling; they who prepare hives, ſet in them, croſſwiſe, ſticks, which ſerve as props to the combs, and ſave the bees a great deal of labour. It is not eaſy to diſcover the particular manner of their working; for, notwithſtanding the many contrivances uſed for this purpoſe, there are ſuch numbers in continual motion, and ſucceed one another with ſuch rapidity, that nothing but confuſion apears to the ſight. Some of them, however, have been obſerved carrying pieces of wax in their talons, and running to the places where they are at work upon the combs. Theſe they faſten to the work by means of the ſame talons. Each bee is employed but a very ſhort time in this way: but there is ſo great a number of them that go on in a conſtant ſucceſſion, that the comb increaſes very perceptibly. Beſides theſe, there are others that run about beating the work with their wings and the hinder part of their body, probably with a view to make it more firm and ſolid.

Whilſt part of the bees are occupied in forming the cells, others are employed in perfecting and poliſhing thoſe that are new modelled. This operation is performed by their talons, taking off every thing that is rough and uneven. Theſe poliſhers are not ſo deſultory in their operations as thoſe that make the cells; they work long and diligently, never intermitting their labour, excepting to carry out of the cell the particles of wax which they take off in poliſhing. Theſe particles are not allowed to be loſt; others are ready to receive them from the poliſhers, and to employ them in ſome other part of the work.

12 Of their building materials, and proviſions. 1. *Wax.*

The balls which we ſee attached to the legs of bees returning to the hives are not wax, but a powder collected from the ſtamina of flowers, and yet brought to the ſtate of wax. The ſubſtance of theſe balls, heated in any veſſel, does not melt as wax would do, but becomes dry, and hardens: it may even be reduced to a coal. If thrown into water, it will ſink; whereas wax ſwims. To reduce this crude ſubſtance into wax, it muſt firſt be digeſted in the body of the bee.

Every bee, when it leaves the hive to collect this precious ſtore, enters into the cup of the flower, particularly ſuch as ſeem charged with the greateſt quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itſelf within the flower, and ſoon becomes quite covered with the duſt, which it ſoon after bruſhes off with its two hind legs, and kneads into two little balls. In the thighs of the hind-legs there are two cavities, edged with hair; and into theſe, as into a baſket, the animal ſticks its pellets. Thus employed, the bee flies from flower to flower, increaſing its ſtore, and adding to its ſtock of wax; until the ball, upon each thigh, becomes as big as a grain of pepper: by this time, having got a ſufficient load, it returns, making the beſt of its way to the hive.

After the bees have brought home this crude ſubſtance, they eat it by degrees; or, at other times, three or four bees come and eaſe the loaded bee, by eating each of them a ſhare, the loaded bee giving them a hint ſo to do. Hunger is not the motive of their thus eating the balls of waxy matter, eſpecially when a ſwarm is firſt hived; but it is their deſire to provide a ſpeedy ſupply of real wax for making the combs. At other times, when there is no immediate want of wax, the bees lay this matter up in repoſitories, to keep it in ſtore.

When this waxy matter is ſwallowed, it is, by the digeſtive powers of the bee, converted into real wax, which the bees again diſgorge as they work it up into combs; for it is only while thus ſoft and pliant from the ſtomach, that they can fabricate it properly. That the wax thus employed is taken from their ſtomachs, appears from their making a conſiderable quantity of comb ſoon after they are hived, and even on any tree or ſhrub where they have reſted but a ſhort while before their being hived, though no balls were viſible on their legs, excepting thoſe of a few which may be juſt returned from the field. This is farther confirmed by what happened in a ſwarm newly hived: for two days together, from the time of their quitting their former home, it rained conſtantly; inſomuch that not one bee was able to ſtir out during that time: yet at the end of the two days, they had made a comb 15 or 16 inches long, and thick in proportion.

The crude wax, when brought home by the bees, is often of as different colours as are the flowers from which it is collected: but the new combs are always of a white colour, which is afterwards changed only by the impurities ariſing from the ſteam, *&c.* of the bees.

Bees collect crude wax alſo for food; for if this was not the caſe, there would be no want of wax after the combs are made: but they are obſerved, even in old hives, to return in great numbers loaded with ſuch matter, which is depoſited in particular cells, and is known by the name of *bee-bread.* We may gueſs that they conſume a great deal of this ſubſtance in food, by the quantity collected, which, by computation, may in ſome hives amount to an hundred weight in a ſeaſon, whilſt the real wax in ſuch an hive does not perhaps exceed two pounds.

13 *pro-*

It is well known that the habitation of bees ought to be very cloſe; and what their hives want, from the negligence or unſkilfulneſs of man, theſe animals ſupply by their own induſtry: ſo that it is their principal care, when firſt hived, to ſtop up all the crannies. For this purpoſe they make uſe of a reſinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called *propolis:* it will grow conſiderably hard in the hive; tho' it will in ſome meaſure ſoften by heat; and is often found different in conſiſtence, colour, and ſmell. It has generally an agreeable aromatic odour when it is warmed; and by ſome it is conſidered as a moſt grateful perfume. When the bees begin to work with it, it is ſoft; but it acquires a firmer conſiſtence every day; till at length it aſſumes a brown colour, and becomes much harder than wax. The bees carry it on their hinder legs; and ſome think it is met with on the birch, the willow, and poplar. However it is procured, it is certain that they plaſter the inſide of their hives with this compoſition.

14 3. The honey.

Honey is originally a juice digeſted in plants, which ſweats through their pores, and chiefly in their flowers, or is contained in reſervoirs in which nature ſtores it. The bees ſometimes penetrate into theſe ſtores, and at other times find the liquor exſuded. This they collect in their ſtomachs; ſo that, when loaded with it, they ſeem, to an inattentive eye, to come home without any booty at all.

Beſides the liquor already mentioned, which is obtained from the flowers of plants, another ſubſtance, called *honey-dew* *, has been diſcovered, of which the bees are equally fond. Of this ſubſtance there are two kinds, both deriving their origin from vegetables, tho' in very different ways.

* See the article *Honey-dew.*

The firſt kind, the only one known to huſbandmen, and which paſſes for a dew that falls on trees, is no other than a mild ſweet juice, which, having circulated through the veſſels of vegetables, is ſeparated in proper reſervoirs in the flowers, or on the leaves, where it is properly called the *honey-dew:* ſometimes it is depoſited in the pith, as in the ſugar-cane; and, at other times, in the juice of pulpy ſummer-fruits, when ripe. Such is the origin of the manna which is collected on the aſh and maple of Calabria and Briançon, where it flows in great plenty from the leaves and trunks of theſe trees, and thickens into the form in which it is uſually ſeen.

The ſecond kind of honey-dew, which is the chief reſource of bees after the ſpring-flowers and dew by tranſpiration on leaves are paſt, owes its origin to a ſmall mean inſect *, the excrement thrown out by which, makes a part of the moſt delicate honey we ever taſte.

* See the articles *Aphis* and *Honey-dew.*

From whatever ſource the bees have collected their honey, the inſtant they return home, they ſeek cells in which they may diſgorge and depoſit their loads. They have two ſorts of ſtores: one which conſiſts of honey laid up for the winter; and the other of honey intended for accidental uſe, in caſe of bad weather, and for ſuch bees as do not go abroad in ſearch of it. Their method of ſecuring each of theſe is different. They have in each cell a thicker ſubſtance, which is placed over the honey, to prevent its running out of the cell; and that ſubſtance is raiſed gradually as the cell is filled, till the bees, finding that the cell cannot contain any more, cloſe it with a covering of wax, not to be opened till times of want, or during the winter.

15 Of the manner in which bees breed.

It has been already obſerved, that the cells are intended for other purpoſes beſides being places of ſtore for honey. One of the chief uſes is, their being nurſeries for the young. The cells for thoſe which are to be working bees, are commonly half an inch deep; thoſe for drones, three quarters of an inch; and thoſe which are intended for keeping of honey only, ſtill deeper. This accounts for the inequalities obſerved in the ſurface of combs.

The queen-bee is generally concealed in the moſt ſecret part of the hive, and is never viſible but when ſhe lays her eggs in ſuch combs as are expoſed to ſight. When ſhe does appear, ſhe is always attended by ten or a dozen of the common ſort, who form a kind of retinue, and follow her wherever ſhe goes with a ſedate and grave tread. Before ſhe lays her eggs, ſhe examines the cells where ſhe deſigns to lay them; and if ſhe finds that they contain neither honey, wax, nor any embryo, ſhe introduces the poſterior part of her body into a cell, and fixes to the bottom of it a ſmall white egg, which is compoſed of a thin white membrane, full of a whitiſh liquor. In this manner ſhe goes on, till ſhe fills as many cells as ſhe has eggs to lay, which are generally many thouſands. After the eggs lie four days in the cells, they appear in the form of ſmall caterpillars; and generally lie twiſted round, ſo that the two extremities touch each other. The bees then ſupply them with a little honey for food, the quantity of which they increaſe till the eighth day from the birth of the caterpillar. After this, the bees diſcover no more care about their young; but ſtop up the mouths of the cells with wax. The embryos lie in this ſtate twelve days, during which time they undergo ſurpriſing changes. They firſt change their ſituation in the cells, and inſtead of being rolled up, they extend themſelves along, and place their heads towards the mouth of the cell; after this, the head of the worm begins to have a ſmall extenſion, which is the rudiment of the proboſcis: upon this head there is likewiſe a black point; and at a little diſtance from this point, a black ſtreak upon the back: the firſt lineaments of the feet likewiſe appear; but they are very ſmall. After the head is formed, and the proboſcis lengthened, all the other parts diſplay themſelves ſucceſſively; ſo that the whole worm or embryo is changed into an aurelia or nymph, which is the fly almoſt perfect, except that it is yet white and ſoft, and wants that cruſt with which it is afterwards covered. By this tranſformation the worm is ſtripped of a white thin pellicle, which adheres to the ſides of the cell. The young bee being ſtripped of this pellicle, and all the parts being unfolded by degrees, and changed thro' ſucceſſive colours from yellow to black, arrives at perfection on the 20th day; when ſhe cuts, with her jaws or talons, the covering of wax upon the mouth of the cells, and iſſues out. When the young bees firſt get out of the cell, they appear drowſy, but ſoon acquire agility and command of their members; for they have been often obſerved to go to the fields, and return loaded with wax the ſame day that they iſſue from the cells. As ſoon as a young bee quits its cell, one of the old ones takes off the wax-cover, and kneads and employs the wax for ſome other purpoſe: Another of them repairs and cleanſes the cell, removing the pellicle and other ſordes which was left by the young one.

The eggs from which drones are to proceed, are, as already obſerved, laid in larger cells than thoſe of the working bees. The coverings of theſe cells, when the drones are in their nymph-ſtate, are convex or ſwelling outward, whilſt the cells of the working bees are flat. This, with the privilege of leading idle effeminate lives, and not working for the public ſtock, is what diſtinguiſhes the drones.

The bees depart from their uſual ſtile of building when they are to raiſe cells for bringing up ſuch maggots as will become queens. Theſe are of a longiſh oblong form, having one end bigger than the other, with their exterior ſurface full of little cavities. Wax, which is employed with ſo geometrical a thriftineſs in the raiſing of hexagonal cells, is expended with profuſion in the cell which is to be the cradle of a royal maggot. They ſometimes fix it in the middle, and at other times on one ſide of a comb. Several common cells are ſacrificed to ſerve as a baſis and ſupport to it. It is placed almoſt perpendicular to the common cells, the largeſt end being uppermoſt. The lower end is open till the ſeaſon for cloſing it comes, or till the maggot is ready for transformation. It would be difficult to conceive how a tender maggot can remain in a cell turned bottom upmoſt, if we did not find it buried in a ſubſtance ſcarcely fluid, and if it was not in itſelf, at firſt, ſmall and light enough to be ſuſpended in this clammy paſte. As it grows, it fills all the upper and larger part of the cell. As ſoon as the young queen comes out of her cell, that cell is deſtroyed, and its place is ſupplied by common cells; but as the foundation of the royal cell is left, this part of the comb is found thicker than any other. There are ſeveral ſuch cells prepared: for the queen lays from ſeven or eight to 20 royal maggots; and if there was only one reared in each hive, the ſwarms might often want a conductreſs. Many accidents may alſo deſtroy the little maggot, before it becomes a bee. It is therefore neceſſary that the queen ſhould lay more than one of theſe royal eggs; and there are ſeveral young queens in the beginning of the ſummer, more than one of which often takes flight when a ſwarm departs.

A young queen is in a condition to lead a ſwarm from a hive in which ſhe was born, in four or five days after ſhe has appeared in it with wings: and when ſhe has reſolved on her journey, her eggs have been already impregnated; as appears evidently from there being ſwarms among which there is not a ſingle male, and from eggs having been found in cells within 24 hours after the ſettling of the ſwarm. The bees of a ſwarm are in a great hurry when they know that their queen is ready to lay. In this caſe, they give to their new cells but part of the depth they are to have, and defer the finiſhing of them till they have traced the number of cells requiſite for the preſent time. The cells firſt made are intended only for working bees; theſe being the moſt neceſſary.

16 Of the ſwarming. When the hive is become too much crowded, by the addition of the young brood, a part of the bees think of finding themſelves a more commodious habitation, and with that view ſingle out the moſt forward of the young queens. A new ſwarm is therefore conſtantly compoſed of one queen at leaſt, and of ſeveral thouſand working bees, as well as of ſome hundreds of drones. The working bees are ſome old, ſome young.

Scarce has the colony arrived at its new habitation, when the working bees labour with the utmoſt diligence to procure materials for food and building. Their principal aim is not only to have cells in which they may depoſit their honey. A ſtronger motive ſeems to animate them. They ſeem to know that their queen is in haſte to lay her eggs. Their induſtry is ſuch, that in twenty-four hours they will have made combs twenty inches long, and wide in proportion. They make more wax during the firſt fortnight, if the ſeaſon is favourable, than they do during all the reſt of the year. Other bees are at the ſame time buſy in ſtopping all the holes and crevices they find in their new hive, in order to guard againſt the entrance of inſects which covet their honey, their wax, or themſelves; and alſo to exclude the cold air, for it is indiſpenſibly neceſſary that they be lodged warm.

When the bees firſt ſettle in ſwarming, indeed when they at any time reſt themſelves, there is ſomething very particular in their method of taking their repoſe. It is done, by collecting themſelves in a heap, and hanging to each other by their feet. They ſometimes extend theſe heaps to a conſiderable length. It would ſeem probable to us, that the bees from which the others hang muſt have a conſiderable weight ſuſpended to them. All that can be ſaid is, that the bees muſt find this to be a ſituation agreeable to themſelves. They may perhaps have a method of diſtending themſelves with air, thereby to leſſen their ſpecific gravity; in the ſame manner as fiſhes do, in order to alter their gravity compared with water.

When a ſwarm divides into two or more bands, which ſettle ſeparately; this diviſion is a ſure ſign that there are two or more queens among them. One of theſe cluſters is generally larger than the other. The bees of the ſmaller cluſter, or cluſters, detach themſelves by little and little, till at laſt the whole, together with the queen or queens, unite with the larger cluſter. As ſoon as the bees are ſettled, the ſupernumerary queen, or queens, muſt be ſacrificed to the peace and tranquillity of the hive. This execution generally raiſes a conſiderable commotion in the hive; and ſeveral other bees, as well as the queen or queens, loſe their lives. Their bodies may be obſerved on the ground, near the hive. The queen that is choſen is of a more reddiſh colour than thoſe which are deſtroyed: ſo that fruitfulneſs ſeems to be a great motive of preference in bees; for the nearer they are to the time of laying their eggs, the bigger, larger, and more ſhining are their bodies. The method of hiving theſe ſwarms will be explained hereafter; ſee n° 2.

17 Beſides the capital inſtincts above mentioned, bees are poſſeſſed of others, ſome of which are equally neceſſary for their preſervation and happineſs.—They anxiouſly provide againſt the entrance of inſects into the hive, by gluing up with wax the ſmalleſt holes in the ſkep. Some ſtand as centinels at the mouth of the hive, to prevent inſects of any kind from getting in. But if a ſnail, or other large inſect, ſhould get in, notwithſtanding all reſiſtance, they ſting it to death; and then cover it over with a coat of propolis, to prevent the bad ſmell or maggots which might proceed from the putrefaction of ſuch a large animal.—Bees ſeem to be warned of the appearance of bad weather by ſome particular feeling. It ſometimes happens, even when they are very aſſiduous and buſy, that they on a ſudden ceaſe from their work; not a ſingle one ſtirs out; and thoſe that are abroad hurry home in ſuch prodigious crowds, that the doors of their habitations are too ſmall to admit them. On this occaſion, look up to the ſky, and you will ſoon diſcover ſome of thoſe black clouds which denote impending rain. Whether they ſee the clouds gathering for it, as ſome imagine, or whether (as is much more probable) they feel ſome other effects of it upon their bodies, is not yet determined; but it is certain, that no bee is ever caught even in what we call a ſudden ſhower, unleſs it have been at a very great diſtance from the hive, or have been before injured by ſome accident, or be ſickly, and unable to fly ſo faſt as the reſt.—Cold is a great enemy to them. To defend themſelves againſt its effects during a cold winter, they crowd together in the middle of the hive, and buzz about, and thereby excite a warmth which is often perceptible by laying the hand upon the glaſs-windows of the hive.—They ſeem to underſtand one another by the motions of their wings: When the queen wants to quit the hive, ſhe gives a little buzz, and all the others immediately follow her example, and retire along with her.

II. *Of the* Management *of* Bees, *and moſt approved Inventions for ſaving their Lives while we take their Honey and Wax.*

18 Of the apiary.

1. *Of the Apiary, and Hives.* Columella directs that the apiary face the ſouth, and be ſituated in a place neither too hot, nor too much expoſed to the cold: that it be in a valley, in order that the loaded bees may with the greater eaſe deſcend to their homes: that it be near the manſion-houſe, on account of the conveniency of watching them; but ſo ſituated as not to be expoſed to noiſome ſmells, or to the din of men or cattle: that it be ſurrounded with a wall, which however ſhould not riſe above three feet high: that, if poſſible, a running ſtream be near them; or, if that cannot be, that water be brought near them in troughs, with pebbles or ſmall ſtones in the water, for the bees to reſt on while they drink; or that the water be confined within gently declining banks, in order that the bees may have ſafe acceſs to it; they not being able to produce either combs, honey, or food for their maggots, without water: that the neighbourhood of rivers or baſons of water with high banks be avoided, becauſe winds may whirl the bees into them, and they cannot eaſily get on ſhore from thence to dry themſelves; and that the garden in which the apiary ſtands be well furniſhed with ſuch plants as afford the bees plenty of good paſture. The trees in this garden ſhould be of the dwarf kind, and their heads buſhy, in order that the ſwarms which ſettle on them may be the more eaſily hived.

The proprietor ſhould be particularly attentive that the bees have alſo in their neighbourhood ſuch plants as yield them plenty of food. Columella enumerates many of theſe fitted to a warm climate: among them he mentions thyme, the oak, the pine, the ſweet-ſmelling cedar, and all fruit-trees. Experience has taught us, that furze, broom, muſtard, clover, heath, &c. are excellent for this purpoſe. Pliny recommends broom, in particular, as a plant exceedingly grateful and very profitable to bees.

19 Of hives.

With regard to hives, thoſe made of ſtraw are generally preferred, on ſeveral accounts: they are not liable to be over-heated by the rays of the ſun; they keep out cold better than wood or any other materials; and the cheapneſs renders the purchaſe of them eaſy. As the ingenious Mr Wildman's hives are reckoned to be of a preferable conſtruction to any other, we ſhall give an account of them in his own words.

"My hives," ſays he, "are ſeven inches in height, and ten in width. The ſides are upright, ſo that the top and bottom are of the ſame diameter. A hive holds nearly a peck. In the upper row of ſtraw, there is a hoop of about half an inch in breadth; to which are nailed five bars of deal, full a quarter of an inch in thickneſs, and an inch and quarter wide, and half an inch aſunder from one another; a narrow ſhort bar is nailed at each ſide, half an inch diſtant from the bars next them, in order to fill up the remaining parts of the circle; ſo that there are in all ſeven bars of deal, to which the bees fix their combs. The ſpace of half an inch between the bars allows a ſufficient and eaſy paſſage for the bees from one comb to another. In order to give great ſteadineſs to the combs, ſo that, upon moving the hive, the combs may not fall off, or incline out of their direction, a ſtick ſhould be run thro' the middle of the hive, in a direction directly a-croſs the bars, or at right angles with them. When the hives are made, a piece of wood ſhould be worked into the lower row of ſtraw, long enough to allow a door for the bees, of four inches in length, and half an inch in height.

" The proprietor of the bees ſhould provide himſelf with ſeveral flat covers of ſtraw, worked of the ſame thickneſs as the hives, and a foot in diameter, that ſo it may be of the ſame width as the outſide of the hives. Before the cover is applied to the hive, a piece of clean paper, of the ſize of the top of the hive, ſhould be laid over it; and a coat of cow-dung, which is the leaſt apt to crack of any cement eaſily to be obtained, ſhould be laid all round the circumference of the hive. Let the cover be laid upon this, and made faſt to the hive with a packing-needle and pack-thread, ſo that neither cold nor vermin may enter.

" Each hive ſhould ſtand ſingle on a piece of deal, or other wood, ſomewhat larger than the bottom of the hive: That part of the ſtand which is at the mouth of the hive ſhould project ſome inches, for the bees to reſt on when they return from the field. This ſtand ſhould be ſupported upon a ſingle poſt, two and a half feet high; to which it ſhould be ſcrewed very ſecurely, that high winds, or other accidents, may not blow down both ſtand and hive. A quantity of ſoot mixed with barley-chaff ſhould be ſtrewed on the ground round the poſt; which will effectually prevent ants, ſlugs, and other vermin, from riſing up to the hive. The ſoot and chaff ſhould, from time to time, be renewed as it is blown or waſhed away; though, as it is ſheltered by the ſtand, it remains a conſiderable time, eſpecially if care be taken that no weeds riſe through it. Weeds, indeed, ſhould not be permitted to riſe near the hive; for they may give ſhelter to vermin which may be hurtful to the bees.

" The ſtands for bees ſhould be four yards aſunder; or, if the apiary will not admit of ſo much, as far aſunder as may be, that the bees of one hive may not interfere with thoſe of another hive, as is ſometimes the caſe when the hives are near one another or on the ſame ſtand; for the bees, miſtaking there own hives, light ſometimes at the wrong door, and a fray enſues, in which one or more may loſe their lives.

20 Of the proper ſeaſon for purchaſing hives of bees.

" The perſon who intends to erect an apiary, ſhould purchaſe a proper number of hives at the latter part of the year, when they are cheapeſt. The hives ſhould be full of combs, and well ſtored with bees. The purchaſer ſhould examine the combs, in order to know the age of the hives. The combs of that ſeaſon are white, thoſe of the former year are of a darkiſh yellow; and where the combs are black, the hives ſhould be rejected, becauſe old hives are moſt liable to vermin, and other accidents.

" If the number of hives wanted were not purchaſed in the autumn, it will be neceſſary to remedy this neglect after the ſeverity of the cold is paſt in the ſpring. At this ſeaſon, bees which are in good condition will get into the fields early in the morning, return loaded, enter boldly, and do not come out of the hive in bad weather; for when they do, this indicates they are in great want of proviſions. They are alert on the leaſt diſturbance, and by the loudneſs of their humming we judge of their ſtrength. They preſerve their hives free from all filth, and are ready to defend it againſt every enemy that approaches.

" The ſummer is an improper time for buying bees, becauſe the heat of the weather ſoftens the wax, and thereby renders the combs liable to break, if they are not very well ſecured. The honey too, being then thinner than at other times, is more apt to run out of the cells; which is attended with a double diſadvantage, namely, the loſs of the honey, and the daubing of the bees, whereby many of them may be deſtroyed. A firſt and ſtrong ſwarm may indeed be purchaſed; and, if leave can be obtained, permitted to ſtand in the ſame garden till the autumn; but, if leave is not obtained, it may be carried away in the night after it has been hived.

" I ſuppoſe, that, in the ſtocks purchaſed, the bees are in hives of the old conſtruction. The only direction here neceſſary is, that the firſt ſwarm from theſe ſtocks ſhould be put into one of my hives; and that another of my hives ſhould in a few days be put under the old ſtock, in order to prevent its ſwarming again."

21 Of hivi the ſw

2. *Of Hiving.* Bees, as has been already obſerved, never ſwarm till the hive be too much crowded by the young brood. They firſt begin to ſwarm in May, or in the end of April, but earlier or later according to the warmth of the ſeaſon. They ſeldom ſwarm before ten in the morning, and ſeldom later than three in the afternoon. We may know when they are about to ſwarm, by cluſters of them hanging on the outſide of the hive, and by the drones appearing abroad more than uſual: But the moſt certain ſign is, when the bees refrain from flying into the fields, though the ſeaſon be inviting. Juſt before they take flight, there is an uncommon ſilence in the hive; after this, as ſoon as one takes flight, they all follow. Before the ſubſequent ſwarmings, there is a great noiſe in the hives, which is ſuppoſed to be occaſioned by a conteſt whether the young or the old queen ſhould go out. When the bees of a ſwarm fly too high, they are made to deſcend lower, by throwing handfuls of ſand or duſt among them, which they probably miſtake for rain. For the ſame purpoſe, it is uſual to beat on a kettle or frying-pan: This practice may have taken its riſe from obſerving that thunder or any great noiſe prompts ſuch bees as are in the fields to return home.

As ſoon as the ſwarm is ſettled, the bees which compoſe it ſhould be got into a hive with all convenient ſpeed, to prevent their taking wing again. If they ſettle on a ſmall branch of a tree, eaſy to come at, it may be cut off and laid upon a cloth; the hive being ready immediately to put over them. If the branch cannot be conveniently cut, the bees may be ſwept from off it into a hive. Lodge but the queen into the hive, and the reſt will ſoon follow. If the bees muſt be conſiderably diſturbed in order to get them into a hive, the moſt adviſable way is to let them remain in the place where they have pitched, till the evening, when there is leſs danger of their taking wing. If it be obſerved, that they ſtill hover about the place they firſt alighted upon, the branches there may be rubbed with rue, or elder-leaves, or any other thing diſtaſteful to them, to prevent their returning to it.

The hive employed on this occaſion ſhould be cleaned with the utmoſt care, and its inſide be rubbed very hard with a coarſe cloth, to get off the looſe ſtraws, or other impurities, which might coſt them a great deal of time and labour to gnaw away. It may then be rubbed with fragrant herbs or flowers, the ſmell of which is agreeable to the bees; or with honey.

The hive ſhould not be immediately ſet on the ſtool where it is to remain; but ſhould be kept near the place at which the bees ſettled, till the evening, leſt ſome ſtragglers ſhould be loſt. It ſhould be ſhaded, either with boughs, or with a cloth, that the too great heat of the ſun may not annoy the bees.

We ſometimes ſee a ſwarm of bees, after having left their hive, and even alighted upon a tree, return to their firſt abode. This never happens but when the young queen did not come forth with them, for want of ſtrength, or perhaps courage to truſt to her wings for the firſt time; or poſſibly from a conſciouſneſs of her not being impregnated.

22
f uniting
arms.

When a ſwarm is too few in number for a hive, another may be added. The uſual method of thus uniting ſwarms is very eaſy. Spread a cloth at night upon the ground cloſe to the hive in which the two caſts or ſwarms are to be united; lay a ſtick a-croſs this cloth; then fetch the hive with the new ſwarm, ſet it over the ſtick, give a ſmart ſtroke on the top of the hive, and all the bees will drop down upon the cloth, in a cluſter. This done, throw aſide the empty hive, take the other from off the ſtool, and ſet this laſt over the bees, who will ſoon aſcend into it, mix with thoſe already there, and become one and the ſame family. Others, inſtead of ſtriking the bees down upon the cloth, place with its bottom upmoſt the hive in which the united ſwarms are to live, and ſtrike the bees of the other hive down into it. The former of theſe hives is then reſtored to its natural ſituation, and the bees of both hives ſoon unite. If ſome bees ſtill adhere to the other hive, they may be bruſhed off on the cloth, and they will ſoon join their brethren. Or one may take the following method, which gives leſs diſturbance to the bees. Set with its mouth upmoſt the hive into which the young ſwarm has been put, and ſet upon it the other hive. The bees in the lower hive, finding themſelves in an inverted ſituation, will ſoon aſcend into the upper.

Though all writers acknowledge, that one of the queens is conſtantly ſlain on theſe occaſions, and generally a conſiderable number of the working bees; yet none of them, Columella excepted, has propoſed the eaſy remedy of killing the queen of the latter caſt or ſwarm before the union is made; a means by which the lives of the working bees may be preſerved. This may be done, either by intoxicating them, and then picking her out; or by ſearching her out when the bees are beaten down upon the cloth; for this being done in the night, to prevent the battle which might otherwiſe enſue, there will be no great difficulty in finding her.

A large ſwarm may weigh eight pounds, and ſo gradually leſs, to one pound: conſequently a very good one may weigh five or ſix pounds. All ſuch as weigh leſs than four pounds ſhould be ſtrengthened, by uniting to each of them a leſs numerous ſwarm. The ſize of the hive ſhould be proportioned to the number of the bees; and, as a general rule, it ſhould be rather under than over ſized, becauſe bees require to be kept warmer than a large hive will admit of.

23
Shifting the bees in ſearch of paſture.

3. *Of ſhifting the Abode of Bees.* Great improvements may certainly be made in the eſſential article of providing plenty of paſture for bees, whenever this ſubject ſhall be more carefully attended to than it has hitherto been. A rich corn country is well known to be a barren deſart to them during the moſt conſiderable part of the year; and therefore the practice of other nations, in ſhifting the places of abode of their bees, well deſerves our imitation.

Lib. ix. *c.* 14.

Columella informs us, that, as few places are ſo happily ſituated as to afford the bees proper paſture both in the beginning of the ſeaſon and alſo in the autumn, it was the advice of Celſus, that, after the vernal paſtures are conſumed, the bees ſhould be tranſported to places abounding with autumnal flowers; as was practiſed by conveying the bees from Achaia to Attica, from Eubœa and the Cyclad iſlands to Scyrus; and alſo in Sicily, where they were brought to Hybla from other parts of the iſland.

Lib. xxi. *c.* 12.

We find by Pliny, that this was likewiſe the practice of Italy in his time. "As ſoon," ſays he, "as the ſpring-food for bees has failed in the valleys near our towns, the hives of bees are put into boats, and carried up againſt the ſtream of the river, in the night, in ſearch of better paſture. The bees go out in the morning in queſt of proviſions, and return regularly to their hives in the boats, with the ſtores they have collected. This method is continued, till the ſinking of the boats to a certain depth in the water ſhews that the hives are ſufficiently full; and they are then carried back to their former homes, where their honey is taken out of them." And this is ſtill the practice of the Italians who live near the banks of the Po, (the river which Pliny inſtanced particularly in the above-quoted paſſage).

Vol. II. p. 24.

M. Maillet relates, in his curious deſcription of Egypt, that, "ſpite of the ignorance and ruſticity which have got poſſeſſion of that country, there yet remain in it ſeveral footſteps of the induſtry and ſkill of the ancient Egyptians. One of their moſt admirable contrivances is, their ſending their bees annually into diſtant countries, in order to procure them ſuſtenance there, at a time when they could not find any at home; and their afterwards bringing them back, like ſhepherds who ſhould travel with their flocks, and make them feed as they go. It was obſerved by the ancient inhabitants of lower Egypt, that all plants bloſſomed, and the fruits of the earth ripened, above ſix weeks earlier in upper Egypt, than with them. They applied this remark to their bees; and the means then made uſe of by them, to enable theſe uſefully induſtrious inſects to reap advantage from the more forward ſtate of nature there, were exactly the ſame as are now practiſed, for the like purpoſe, in that country. About the end of October, all ſuch inhabitants of the lower Egypt as have hives of bees, embark them on the Nile, and convey them upon that river quite into upper Egypt; obſerving to time it ſo that they arrive there juſt when the inundation is withdrawn, the lands have been ſown, and the flowers begin to bud. The hives thus ſent are marked and numbered by their reſpective owners, and placed pyramidically in boats prepared for the purpoſe. After they have remained ſome days at their fartheſt ſtation, and are ſuppoſed to have gathered all the wax and honey they could find in the fields within two or three leagues around; their conductors convey them, in the ſame boats, two or three leagues lower down, and there leave the laborious inſects ſo long time as is neceſſary for them to collect all the riches of this ſpot. Thus, the nearer they come to the place of their more permanent abode, they find the productions of the earth, and the plants which afford them food, forward in proportion. In fine, about the beginning of February, after having travelled through the whole length of Egypt, gathering all the rich produce of the delightful banks of the Nile, they arrive at the mouth of that river, towards the ocean; from whence they ſet out, and from whence they are now returned to their ſeveral homes: for care is taken to keep an exact regiſter of every diſtrict from whence the hives were ſent in the beginning of the ſeaſon, of their numbers, of the names of the perſons who ſent them, and likewiſe of the mark or number of the boat in which they were placed."

In many parts of France, floating bee-houſes are very common. They have on board one barge, threeſcore or an hundred bee-hives, well defended from the inclemency of an accidental ſtorm. With theſe the owners ſuffer themſelves to float gently down the river, the bees continually chooſing their flowery paſture along the banks of the ſtream; and thus a ſingle floating bee-houſe yields the proprietor a conſiderable income.

They have alſo a method of tranſporting their bees by land, well worth our imitation in many parts of this kingdom. Their firſt care is, to examine thoſe hives, ſome of whoſe honey-combs might be broken or ſeparated by the jolting of the vehicle; they are made faſt one to the other, and againſt the ſides of the hive, by means of ſmall ſticks, which may be diſpoſed differently as occaſion will point out. This being done, every hive is ſet upon a packing-cloth, or ſomething like it, the threads of which are very wide: the ſides of this cloth are then turned up, and laid on the outſide of each hive, in which ſtate they are tied together with a piece of ſmall pack-thread wound ſeveral times round the hive. As many hives as a cart built for that purpoſe will hold, are afterwards placed in this vehicle. The hives are ſet two and two, the whole length of the cart. Over theſe are placed others; which make, as it were, a ſecond ſtory or bed of hives. Thoſe which are ſtored with combs ſhould always be turned topſy-turvy. It is for the ſake of their combs, and to fix them the better, that they are diſpoſed in this manner; for ſuch as have but a ſmall quantity of combs in them, are placed in their natural ſituation. Care is taken in this ſtowage, not to let one hive ſtop up another; it being eſſentially neceſſary for the bees to have air; and it is for this reaſon they are wrapped up in a coarſe cloth, the threads of which were wove very wide, in order that the air may have a free paſſage, and leſſen the heat which theſe inſects raiſe in their hives; eſpecially when they move about very tumultuouſly, as often happens in theſe carts. Thoſe uſed for this purpoſe in Yevre, hold from 30 to 48 hives. As ſoon as all are thus ſtowed, the caravans ſet out. If the ſeaſon is ſultry, they travel only in the night; but a proper advantage is made of cool days. Theſe caravans do not go faſt. The horſes muſt not be permitted even to trot; they are led ſlowly, and through the ſmootheſt roads. When there are not combs in the hives ſufficient to ſupport the bees during their journey, the owner takes the earlieſt opportunity of reſting them wherever they can collect wax. The hives are taken out of the cart, then ſet upon the ground, and after removing the cloth from over them, the bees go forth in ſearch of food. The firſt field they come to ſerves them as an inn. In the evening, as ſoon as they are all returned, the hives are ſhut up; and being placed again in the cart, they proceed in their journey. When the caravan is arrived at the journey's end, the hives are diſtributed in the gardens, or in the fields adjacent to the houſes of different peaſants, who, for a very ſmall reward, undertake to look after them. Thus it is that, in ſuch ſpots as do not abound in flowers at all ſeaſons, means are found to ſupply the bees with food during the whole year.

Theſe inſtances of the great advantages which attend ſhifting of bees in ſearch of paſture, afford an excellent leſſon to many places in this kingdom: they direct particularly the inhabitants of the rich vales, where the harveſt for bees ends early, to remove their ſtocks to places which abound in heath, this plant continuing in bloom during a conſiderable part of autumn, and yielding great plenty of food to bees. Thoſe in the neighbourhood of hills and mountains will ſave the bees a great deal of labour, by taking alſo the advantage of ſhifting their places of abode.

23 Management of b in winter.

4. *Of feeding and defending Bees in Winter.* Providence has ordained, that inſects which feed on leaves, flowers, and green ſucculent plants, are in an inſenſible or torpid ſtate from the time that the winter's cold has deprived them of the means of ſubſiſtence. Thus the bees, during the winter, are in ſo lethargic a ſtate, that little food ſupports them: but as the weather is very changeable, and every warm or ſunny day revives them, and prompts them to return to exerciſe, food becomes neceſſary on theſe occaſions.

Many hives of bees, which are thought to die of cold in the winter, in truth die of famine; when a rainy ſummer has hindered the bees from laying in a ſufficient ſtore of proviſions. The hives ſhould therefore be carefully examined in the autumn, and ſhould then weigh at leaſt 18 pounds.

Columella deſcribes an annual diſtemper which ſeizes bees in the ſpring, when the ſpurge bloſſoms, and the elm diſcloſes its ſeeds; for that, being allured by the firſt flowers, they feed ſo greedily upon them, that they ſurfeit themſelves, and die of a looſeneſs, if they are not ſpeedily relieved.

The authors of the *Maiſon Ruſtique* impute this purging to the bees feeding on pure honey, which does not form a food ſufficiently ſubſtantial for them, unleſs they have bee-bread to eat at the ſame time; and adviſe giving them a honey-comb taken from another hive, the cells of which are filled with crude wax or bee-bread.

There is ſtill, however, a want of experiments to aſcertain both the time and the manner in which bees ſhould be fed. The common practice is to feed them in-

in the autumn, giving them as much honey as will bring the whole weight of the hive to near 20 pounds. To this end, the honey is diluted with water, and then put into an empty comb, ſplit reeds, or, as Columella directs, upon clean wool, which the bees will ſuck perfectly dry. But the dilution with water makes the honey apt to be candied, and honey in that ſtate is prejudicial to bees.

om. I. . 435.

The following directions given in the *Maiſon Ruſtique* ſeem to be very judicious. Repleniſh the weak hives, in September, with ſuch a portion of combs full of honey taken from other hives, as ſhall be judged to be a ſufficient ſupply for them. In order to do this, turn up the weak hive, after taking the precaution of defending yourſelf with the ſmoke of rags, cut out the empty combs, and put the full ones in their place; where ſecure them with pieces of wood run a-croſs, in ſuch manner that they may not fall down when the hive is returned to its place. The bees will ſoon fix them more effectually. If this method be thought too troubleſome, ſet under the hive a plate of liquid honey, unmixed with water, with ſtraws laid a-croſs it, and over theſe a paper pierced full of holes, through which the bees will ſuck the honey without daubing themſelves. This ſhould be done in cloudy or rainy weather, when the bees ſtir leaſt abroad; and the hive ſhould be covered, to protect the bees from robbers, who might be allured to it by the ſmell of the honey.

Another circumſtance which may render it very neceſſary to feed the bees, is, when ſeveral days of bad weather enſue immediately after they have ſwarmed; for then, being deſtitute of every ſupply beyond what they carried with them, they may be in great danger of ſtarving. In this caſe, honey ſhould be given them in proportion to the duration of the bad weather.

The degree of cold which bees can endure has not been aſcertained. We find that they live in the cold parts of Ruſſia, and often in hollow trees, without any care being taken of them. Their hives are frequently made of the bark of trees, which does not afford them much protection from cold. Mr White, therefore, judiciouſly obſerves, that bees which ſtand on the north ſide of a building whoſe height intercepts the ſun's beams all the winter, will waſte leſs of their proviſions (almoſt by half) than others which ſtand in the ſun: for coming ſeldom forth, they eat little; and yet, in the ſpring, are as forward to work and ſwarm, as thoſe which had twice as much honey in the autumn before. The owner ſhould, however, examine their ſtate in the winter; and if he finds, that, inſtead of being cluſtered between the combs, they fall down in numbers on the ſtool or bottom of the hive, the hive ſhould be carried to a warmer place, where they will ſoon recover. He muſt be cautious in returning them again to the cold, leſt the honey be candied.

Where the winters are extremely ſevere, the authors of the *Maiſon Ruſtique* adviſe, to lay on the bottom of an old caſk the depth of half a foot of very dry earth, powdered, and preſſed down hard, and to ſet on this the ſtool with the hive; then, to preſerve a communication with the air, which is abſolutely neceſſary, to cut a hole in the caſk, oppoſite to the mouth of the hive, and place a piece of reed, or of alder made hollow, from the mouth of the hive to the hole in the caſk; and after this to cover the hive with more of the ſame dry earth. If there be any room to fear that the bees will not have a ſufficiency of food, a plate with honey, covered as before directed, may be put under the hive. If the number of hives be great, boxes may be made of deals nailed together, deep enough to contain the hives when covered with dry earth. The bees will thus remain all the winter free from any danger from cold, hunger, or enemies.

24
Methods of taking the honey and the wax. Common method in this country.

5. *Of taking the Honey and Wax.* In this country it is uſual, in ſeizing the ſtores of theſe little animals, to rob them alſo of their lives. The common method is, That when thoſe which are doomed for ſlaughter have been marked out (which is generally done in September), a hole is dug near the hive, and a ſtick, at the end of which is a rag that has been dipped in melted brimſtone, being ſtuck in that hole, the rag is ſet on fire, the hive is immediately ſet over it, and the earth is inſtantly thrown up all around, ſo that none of the ſmoke can eſcape. In a quarter of an hour, all the bees are ſeemingly dead; and they will ſoon after be irrecoverably ſo, by being buried in the earth that is returned back into the hole. By this laſt means it is that they are abſolutely killed: for it has been found by experiment, that all the bees which have been affected only by the fume of the brimſtone, recover again, excepting ſuch as have been ſinged or hurt by the flame. Hence it is evident, that the fume of brimſtone might be uſed for intoxicating the bees, with ſome few precautions. The heavieſt and the lighteſt hives are alike treated in this manner; the former, becauſe they yield the moſt profit, with an immediate return; and the latter, becauſe they would not be able to ſurvive the winter. Thoſe hives which weigh from 15 to 20 pounds are thought to be the fitteſt for keeping.

25
Greek method of ſharing the honey with the bees. See *Wheeler's journey into Greece*, p. 411.

More humane and judicious methods were practiſed by the ancients†; and the following ſimple method is at this day practiſed in Greece, degenerate as it is. "Mount Hymethus is celebrated for the beſt honey in all Greece. This mountain was not leſs famous in times paſt for bees and admirable honey; the ancients believing that bees were firſt bred here, and that all other bees were but colonies from this mountain; which if ſo, we aſſured ourſelves that it muſt be from this part of the mountain that the colonies were ſent; both becauſe the honey here made is the beſt, and that here they never deſtroy the bees. It is of a good conſiſtence, of a fair gold-colour, and the ſame quantity ſweetens more water than the like quantity of any other doth. I no ſooner knew that they never deſtroy or impair the ſtock of bees in taking away their honey, but I was inquiſitive to underſtand their method of ordering the bees; which being an art ſo worthy the knowledge of the curious, I ſhall not think it beſide the purpoſe, to relate what I ſaw, and was informed of to that effect by ſuch as had ſkill in that place.

"The hives they keep their bees in are made of willows or oſiers, faſhioned like our common duſt-baſkets, wide at top and narrow at the bottom, and plaſtered with clay or loam within and without. They are ſet as in fig. 13. with the wide end uppermoſt. The tops are covered with broad flat ſticks, which are alſo plaſtered over with clay; and, to ſecure them from the weather, they cover them with a tuft of ſtraw, as we do. Along each of theſe ſticks, the bees faſten their combs; ſo that a comb may be taken out whole, with-

2d Pl. XXV.

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† Vide *Columella, lib.* ix. c. 15. and *Varro de Re Ruſtica, lib.* iii. c. 16.

out the leaſt bruiſing, and with the greateſt eaſe imaginable. To increaſe them in ſpring-time, that is in March or April, until the beginning of May, they divide them; firſt ſeparating the ſticks on which the combs and bees are faſtened, from one another, with a knife: ſo, taking out the firſt comb and bees together on each ſide, they put them into another baſket, in the ſame order as they were taken out, until they have equally divided them. After this, when they are both again accommodated with ſticks and plaſter, they ſet the new baſket in the place of the old one, and the old one in ſome new place. And all this they do in the middle of the day, at ſuch time as the greateſt part of the bees are abroad; who at their coming home, without much difficulty, by this means divide themſelves equally. This device hinders them from ſwarming and flying away. In Auguſt, they take out their honey. This they do in the day-time alſo, while they are abroad; the bees being thereby, ſay they, diſturbed leaſt: at which time they take out the combs laden with honey, as before; that is, beginning at each outſide, and ſo taking away, until they have left only ſuch a quantity of combs, in the middle, as they judge will be ſufficient to maintain the bees in winter; ſweeping thoſe bees that are on the combs into the baſket again, and then covering it with new ſticks and plaſter."

The Greek method above related was introduced into France in 1754, as we are informed by M. de Reaumur and Du Hamel, in the Memoirs of the Royal Academy for that year, p. 331.

Attempts have been made in our own country, to attain the deſirable end of getting the honey and wax without deſtroying the bees; the moſt approved of which we ſhall now relate as conciſely as poſſible.

26 Mr Thorley's obſervations, &c.

Mr Thorley, in his *Inquiry into the Nature, Order, and Government of Bees*, thinks colonies preferable to hives, for the following reaſons: *Firſt*, The more certain preſervation of very many thouſands of theſe uſeful creatures; *ſecondly*, Their greater ſtrength (which conſiſts in numbers), and conſequently their greater ſafety from robbers; *thirdly*, Their greater wealth, ariſing from the united labours of the greater number. He tells us, that he has in ſome ſummers taken two boxes filled with honey from one colony; and yet ſufficient ſtore has been left for their maintenance during the winter; each box weighing 40 pounds. Add to theſe advantages, the pleaſure of viewing them, with the greateſt ſafety, at all ſeaſons, even in their buſieſt time of gathering, and their requiring a much leſs attendance in ſwarming time. The bees thus managed are alſo more effectually ſecured from wet and cold, from mice and other vermin.

His boxes are made of deal, which, being ſpungy, ſucks up the breath of the bees ſooner than a more ſolid wood would do. Yellow dram-deal thoroughly ſeaſoned is the beſt.

An octagon, being nearer to a ſphere, is better than a ſquare form; for as the bees, in winter, lie in a round body near the centre of the hive, a due heat is then conveyed to all the out-parts, and the honey is kept from candying.

The dimenſions which Mr Thorley, after many years experience, recommends for the boxes, are ten inches depth, and 12 or 14 inches breadth in the inſide. He has tried boxes containing a buſhel or more, but found them not to anſwer the deſign like thoſe of a leſſer ſize. The larger are much longer in filling; ſo that it is later ere you come to reap the fruits of the labour of the bees: nor is the honey there ſo good and fine, the effluvia even of their own bodies tainting it.

The beſt and pureſt honey is that which is gathered in the firſt five or ſix weeks: and in boxes of leſs dimenſions you may take in a month or little more, provided the ſeaſon be favourable, a box full of the fineſt honey.

The top of the box ſhould be made of an entire board a full inch thick after it has been planed; and it ſhould project on all ſides at leaſt an inch beyond the dimenſions of the box. In the middle of this top there muſt be a hole five inches ſquare, for a communication between the boxes; and this hole ſhould be covered with a ſliding ſhutter, of deal or elm, running eaſily in a groove over the back window. The eight pannels, nine inches deep, and three quarters of an inch thick when planed, are to be let into the top ſo far as to keep them in their proper places; to be ſecured at the corners with plates of braſs, and to be cramped with wires at the bottom, to keep them firm: for the heat in ſummer will try their ſtrength. There ſhould be a glaſs-window behind, fixed in a frame, with a thin deal-cover, two ſmall braſs hinges, and a button to faſten it. This window will be ſufficient for inſpecting the progreſs of the bees. Two braſs handles, one on each ſide, are neceſſary to lift up the box: theſe ſhould be fixed in with two thin plates of iron, near three inches long, ſo as to turn up and down, and put three inches below the top-board, which is nailed cloſe down with ſprigs to the other parts of the box.

Thoſe who chuſe a frame within, to which the bees may faſten their combs, need only uſe a couple of deal ſticks of an inch ſquare, placed a-croſs the box, and ſupported by two pins of braſs; one an inch and half below the top, and the other two inches below it; by which means the combs will quickly find a reſt. One thing more, which perfects the work, is, a paſſage, four or five inches long, and leſs than half an inch deep, for the bees to go in and out at the bottom of the box.

27 Management of bee in colonies and method of taking their hone and wax.

1. In keeping bees in colonies, an houſe is neceſſary, or at leaſt a ſhade; without which the weather, eſpecially the heat of the ſun, would ſoon rend the boxes to pieces.

Your houſe may be made of any boards you pleaſe, but deal is the beſt. Of whatever ſort the materials are, the houſe muſt be painted, to ſecure it from the weather.

The length of this houſe, we will ſuppoſe for ſix colonies, ſhould be full 12 feet and an half, and each colony ſhould ſtand a foot diſtance from the other. It ſhould be three feet and an half high, to admit four boxes one upon another; but if only three boxes are employed, two feet eight inches will be ſufficient. Its breadth in the inſide ſhould be two feet. The four corner-poſts ſhould be made of oak, and well fixed in the ground, that no ſtormy winds may overturn it; and all the rails ſhould be of oak, ſupported by ſeveral uprights of the ſame, before and behind, that they may not yield or ſink under 6, 7, or 800 weight, or upwards. The floor of the houſe (about two feet from the ground) ſhould be ſtrong and ſmooth, that the loweſt box may ſtand cloſe to it.

This floor may be made with boards or planks of deal the full length of the bee-houſe; or, which is preferable, with a board or plank to each colony, of two feet four inches long, and fixed down to the rails; and that part which appears at the front of the houſe may be cut into a ſemicircle, as a proper alighting place for the bees. Plane it to a ſlope, that the wet may fall off. When this floor to a ſingle colony wants to be repaired, it may eaſily be removed, and another be placed in its room, without diſturbing the other colonies, or touching any other part of the floor.

Upon this floor, at equal diſtances, all your colonies muſt be placed, againſt a door or paſſage cut in the front of the houſe.

Only obſerve farther, to prevent any falſe ſtep, that as the top-board of the box (being a full inch broader than the other part) will not permit the two mouths to come together, you muſt cut a third in a piece of deal of a ſufficient breadth, and place it between the other two, ſo cloſe, that not a bee may get that way into the houſe. And fixing the ſaid piece of deal down to the floor with two lath-nails, you will find afterwards to be of ſervice, when you have occaſion either to raiſe a colony, or take a box of honey, and may prove a means of preventing a great deal of trouble and miſchief.

The houſe being in this forwardneſs, you may cover it to your own mind, with boards, fine ſlates, or tiles. But contrive their poſition ſo as to carry off the wet, and keep out the cold, rain, ſnow, or whatever might any way hurt and prejudice them.

The back-doors may be made of half-inch deal, two of them to ſhut cloſe in a rabbet, cut in an upright pillar, which may be ſo contrived, as to take in and out, by a mortiſe in the bottom rail, and a notch in the inſide of the upper rail, and faſtened with a ſtrong haſp. Place theſe pillars in the ſpaces between the colonies.

Concluding your houſe made after this model, without front doors, a weather-board will be very neceſſary to carry the water off from the places where the bees ſettle and reſt.

Good painting will be a great preſervative. Forget not to paint the mouths of your colonies with different colours, as red, white, blue, yellow, &c. in form of a half-moon, or ſquare, that the bees may the better know their own home. Such diverſity will be a direction to them.

Thus your bees are kept warm in the coldeſt winter; and in the hotteſt ſummer greatly refreſhed by the cool air, the back-doors being ſet open, without any air-holes made in the boxes.

Dr Warder obſerves, that in June, July, and Auguſt, when the colonies come to be very full, and the weather proves very hot, the appearance of a ſhower drives the bees home in ſuch crowds, that preſſing to get in, they ſtop the paſſage ſo cloſe, that thoſe within are almoſt ſuffocated for want of air; which makes theſe laſt ſo uneaſy, that they are like mad things. In this extremity, he has lifted the whole colony up a little on one ſide; and by thus giving them air, has ſoon quieted them. He has known them, he ſays, come pouring out, on ſuch an occaſion, in number ſufficient to have filled at once two or three quarts; as if they had been going to ſwarm. To prevent this inconvenience, he adviſes cutting a hole two inches ſquare in about the middle of one of the hinder pannels of each box. Over this hole, nail, in the inſide of the box, a piece of tin-plate punched full of holes ſo ſmall that a bee cannot creep through them; and have over it, on the outſide, a very thin ſlider, made to run in grooves; ſo that, when it is thruſt home, all may be cloſe and warm; and when it is opened, in very hot weather, the air may paſs through the holes, and prevent the ſuffocating heat. Or holes may be bored in the pannels themſelves, on ſuch an emergency, in a colony already ſettled.

Such a thorough paſſage for the air may be convenient in extreme heat, which is ſometimes ſo great as to make the honey run out of the combs. The Memoirs of the truly laudable Berne Society, for the year 1764, give us a particular inſtance of this, when they ſay, that, in 1761, many in Swiſſerland were obliged to ſmother their bees, when they ſaw the honey and wax trickling down; not knowing any other remedy for the loſſes they daily ſuſtained. Some ſhaded their hives from the ſun, or covered them with clothes wet ſeveral times a-day, and watered the ground all around.

The beſt time to plant the colonies is, either in ſpring with new ſtocks full of bees, or in ſummer with ſwarms. If ſwarms are uſed, procure, if poſſible, two of the ſame day: hive them either in two boxes, or in a hive and a box: at night, place them in the bee-houſe, one over the other; and, with a knife and a little lime and hair, ſtop cloſe the mouth of the hive, or upper box, ſo that not a bee may be able to go in or out, but at the front-door. This done, you will, in a week or ten days, with pleaſure ſee the combs appear in the boxes; but if it be an hive, nothing can be ſeen till the bees have wrought down into the box. Never plant a colony with a ſingle ſwarm, as Mr Thorley ſays he has ſometimes done, but with little ſucceſs.

When the ſecond box, or the box under the hive, appears full of bees and combs, it is time to raiſe your colony. This ſhould be done in the duſk of the evening, and in the following manner.

Place your empty box, with the ſliding ſhutter drawn back, behind the houſe, near the colony that is to be raiſed, and at nearly the height of the floor: then, lifting up the colony with what expedition you can, let the empty box be put in the place where it is to ſtand, and the colony upon it; and ſhut up the mouth of the then upper box with lime and hair, as before directed.

When, by the help of the windows in the back of the boxes, you find the middle box full of combs, and a quantity of honey ſealed up in it, the loweſt box half full of combs, and few bees in the uppermoſt box, proceed thus.

About five o'clock in the afternoon, drive cloſe, with a mallet, the ſliding ſhutter under the hive or box that is to be taken from the colony. If the combs are new, the ſhutter may be forced home without a mallet; but be ſure it be cloſe, that no bees may aſcend into the hive or box to be removed. After this, ſhut cloſe the doors of your houſe, and leave the bees thus cut off from the reſt of their companions, for the ſpace of half an hour or more. In this ſpace of time, having loſt their queen, they will fill themſelves with honey, and be impatient to be ſet at liberty.

If, in this interval, you examine the box or boxes beneath, and obſerve all to be quiet in them, you may be confident that the queen is there, and in ſafety. Hereupon raiſe the back part of the hive or box ſo far, by a piece of wood ſlipped under it, as to give the priſoners room to come out, and they will return to their fellows: then lifting the box from off the colony, and turning its bottom upmoſt, cover it with a cloth all night; and the next morning, when this cloth is removed, the bees that have remained in it will return to the colony. Thus you have a hive or box of honey, and all your bees ſafe.

If the bees do not all come out in this manner, Dr Warder's method may be followed, eſpecially if it be with a hive. It is, to place the hive with the ſmall end downward in a pail, peck, or flower-pot, ſo as to make it ſtand firm: then to take an empty hive, and ſet it upon the former, and to draw a cloth tight round the joining of the two hives, ſo that none of the bees may be able to get out: after this, to ſtrike the full hive ſo ſmartly as to diſturb the bees that are in it, but with ſuch pauſes between the ſtrokes as to allow them time to aſcend into the empty hive, which muſt be held faſt whilſt this is doing, leſt it fall off by the ſhaking of the other. When you perceive by the noiſe of the bees in the upper hive, that they are got into this laſt, carry it to a cloth ſpread for this purpoſe before the colony, with one end faſtened to the landing-place, and knock them out upon it: they will ſoon crawl up the cloth, and join their fellows, who will gladly receive them.

Mr Thorley next gives an account of his narcotic, and of the manner of uſing it.

The method which he has purſued with great ſucceſs, for many years, and which he recommends to the public, as the moſt effectual for preſerving bees in common hives, is incorporation, or uniting two ſtocks into one, by the help of a peculiar fume or opiate, which will put them entirely in your power for a time, to divide and diſpoſe of at pleaſure. But as that dominion over them will be of ſhort duration, you muſt be expeditious in this buſineſs.

The queen is immediately to be ſearched for, and killed. Hives which have ſwarmed twice, and are conſequently reduced in their numbers, are the fitteſt to be joined together, as this will greatly ſtrengthen and improve them. If a hive which you would take is both rich in honey, and full of bees, it is but dividing the bees into two parts, and putting them into two boxes, inſtead of one. Examine whether the ſtock to which you intend to join the bees of another, have honey enough in it to maintain the bees of both: it ſhould weigh full 20 pounds.

The narcotic, or ſtupifying fume, is made with the *fungus maximus* or *pulverulentus*, the large muſhroom, commonly known by the name of *bunt*, *puckfiſt*, or *frog-cheeſe*. It is as big as a man's head, or bigger: when ripe, it is of a brown colour, turns to powder, and is exceeding light. Put one of theſe pucks into a large paper, preſs it therein to two-thirds or near half the bulk of its former ſize, and tie it up very cloſe; then put it into an oven ſome time after the houſehold bread has been drawn, and let it remain there all night: when it is dry enough to hold fire, it is fit for uſe. The manner of uſing it is thus:

Cut off a piece of the puck, as large as a hen's egg, and fix it in the end of a ſmall ſtick ſlit for that purpoſe, and ſharpened at the other end; which place ſo that the puck may hang near the middle of an empty hive. This hive muſt be ſet with the mouth upward, in a pail or bucket which ſhould hold it ſteady, near the ſtock you intend to take. This done, ſet fire to the puck, and immediately place the ſtock of bees over it, tying a cloth round the hives, that no ſmoke may come forth. In a minute's time, or little more, you will hear the bees fall like drops of hail into the empty hive. You may then beat the top of the full hive gently with your hand, to get out as many of them as you can: after this, looſing the cloth, lift the hive off to a table, knock it ſeveral times againſt the table, ſeveral more bees will tumble out, and perhaps the queen among them. She often is one of the laſt that falls. If ſhe is not there, ſearch for her among the main body in the empty hive, ſpreading them for this purpoſe on a table.

You muſt proceed in the ſame manner with the other hive, with the bees of which theſe are to be united. One of the queens being ſecured, you muſt put the bees of both hives together, mingle them thoroughly, and drop them among the combs of the hive which they are intended to inhabit. When they are all in, cover it with a packing or other coarſe cloth which will admit air, and let them remain ſhut up all that night and the next day. You will ſoon be ſenſible that they are awaked from this ſleep.

The ſecond night after their union, in the duſk of the evening, gently remove the cloth from off the mouth of the hive, (taking care of yourſelf), and the bees will immediately ſally forth with a great noiſe; but being too late, they will ſoon return: then, inſerting two pieces of tobacco-pipes to let in air, keep them confined for three or four days, after which the door may be left open.

The beſt time for uniting bees is, after their young brood are all out, and before they begin to lodge in the empty cells. As to the hour of the day, he adviſes young practitioners to do it early in the afternoon, in order that, having the longer light, they may the more eaſily find out the queen. He never knew ſuch combined ſtocks conquered by robbers. They will either ſwarm in the next ſummer, or yield an hive full of honey.

Mr N. Thorley, ſon of the above-mentioned clergyman, has added to the edition which he has given of his father's book, a poſtſcript, purporting, that perſons who chuſe to keep bees in glaſs-hives may, after uncovering the hole at the top of a flat-topped ſtraw-hive, or box, place the glaſs over it ſo cloſe, that no bee can go in or out but at the bottom of the hive or box. The glaſs-hive muſt be covered with an empty hive, or with a cloth, that too much light may not prevent the bees from working. As ſoon as they have filled the ſtraw-hive or box, they will begin to work up into the glaſs-hive. He tells us, that he himſelf has had one of theſe glaſs-hives filled by the bees in 30 days, in a fine ſeaſon; and that it contained 38 pounds of fine honey. When the glaſs is completely filled, ſlide a tin-plate between it and the hive or box, ſo as to cover the paſſage, and in half an hour the glaſs may be taken off with ſafety. What few bees remain in it, will readily go to their companions. He has added a glaſs window to his ſtraw-hives, in order to ſee what progreſs bees make; which is of ſome importance, eſpecially if one hive is to be taken away whilſt the ſeaſon ſtill continues favourable for their collecting of honey: for when the combs are filled with honey, the cells are ſealed up, and the bees forſake them, and reſide moſtly in the hive in which their works are chiefly carried on. Obſerving alſo that the bees were apt to extend their combs thro' the paſſage of communication in the upper hive, whether glaſs or other, which rendered it neceſſary to divide the comb when the upper hive was taken away, he now puts in that paſſage a wire ſcreen, or netting, the meſhes of which are large enough for a loaded bee to go eaſily through them. This prevents the joining of the combs from one box to the other, and conſequently obviates the neceſſity of cutting them, and of ſpilling ſome of the honey, which, running down among a crowd of bees, uſed before to incommode them much, it being difficult for them to clear their wings of it. 2d Pl.XXV. Fig. 14. is a drawing of one of his colonies.

19 Of bees in boxes, and method of taking their honey and wax.

2. The reverend Mr White informs us, that his fondneſs for theſe little animals ſoon put him upon endeavouring, if poſſible, to ſave them from *fire* and *brimſtone*; that he thought he had reaſon to be content to ſhare their labours for the preſent, and great reaſon to rejoice if he could at any time preſerve their lives, to work for him another year; and that the main drift of his obſervations and experiments has therefore been, to diſcover an eaſy and cheap method, ſuited to the abilities of the common people, of taking away ſo much honey as can be ſpared, without deſtroying or ſtarving the bees; and by the ſame means to encourage ſeaſonable ſwarms.

In his directions how to make the bee-boxes of his inventing, he tells us, ſpeaking of the manner of conſtructing a ſingle one, that it may be made of deal or any other well-ſeaſoned boards which are not apt to warp or ſplit. The boards ſhould be near an inch thick; the figure of the box ſquare, and its height and breadth nine inches and five eighths, every way meaſuring within. With theſe dimenſions it will contain near a peck and an half. The front-part muſt have a door cut in the middle of the bottom-edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy the mouſe to enter. In the back-part you muſt cut a hole with a rabbet in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length and three in breadth, and faſten it with putty: let the top of the glaſs be placed as high as the roof within-ſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will, by this means, be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang by a ſtring, or turn upon a nail, or ſlide ſideways between two mouldings. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit without weakening it too much; or they may add a pane of glaſs on the top, which muſt likewiſe be covered with a ſhutter, faſtened down with pegs, to prevent accidents.

The ſide of the box which is to be joined to another box of the ſame form and dimenſions, as it will not be expoſed to the internal air, may be made of a piece of ſlit deal not half an inch thick. This he calls the ſide of communication, becauſe it is not to be wholly incloſed: a ſpace is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height; and a hole or paſſage is to be made at top, three inches long, and more than half an inch wide. Through theſe the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burdens, may readily and eaſily aſcend into either of the boxes. The upper communication is only intended as a paſſage between the boxes, reſembling the little holes, or narrow paſſes, which may be obſerved in the combs formed by our ſagacious architects, to ſave time and ſhorten the way when they have occaſion to paſs from one comb to another; juſt as, in populous cities, there are narrow lanes and alleys paſſing tranſverſely from one large ſtreet to another.

In the next place you are to provide a looſe board, half an inch thick, and large enough to cover the ſide where you have made the communications. You are likewiſe to have in readineſs ſeveral little iron ſtaples, an inch and half long, with the two points or ends bended down more than half an inch. The uſe of theſe will be ſeen preſently.

You have now only to fix two ſticks croſſing the box from ſide to ſide, and croſſing each other, to be a ſtay to the combs; one about three inches from the bottom, the other the ſame diſtance from the top; and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box now deſcribed is as plain as is poſſible for it to be. It is little more than five ſquare pieces of board nailed together; ſo that a poor cottager, who has but ingenuity enough to ſaw a board into the given dimenſions, and to drive a nail, may make his own boxes well enough, without the help or expenſe of a carpenter.

No directions are neceſſary for making the other box, which muſt be of the ſame form and dimenſions. The two boxes differ from each other only in this, that the ſide of communication of the one muſt be on your right hand; of the other, on your left. Fig. 15. represents two of theſe boxes, with their openings of communication, ready to join to each other. 2d Pl.XXV.

Mr White's manner of hiving a ſwarm into one or both of theſe boxes, is thus:

You are to take the looſe board, and faſten it to one of the boxes, ſo as to ſtop the communications. This may be done by three of the ſtaples before mentioned; one on the top of the box near the front; the two others on the back, near the top and near the bottom. Let one end of the ſtaple be thruſt into a gimlet-hole made in the box, ſo that the other end may go as tight as can be over the looſe board, to keep it from ſlipping when it is handled. The next morning, after the bees have been hived in this box, the other box ſhould be added, and the looſe board ſhould be taken away. This will prevent a great deal of labour to the bees, and ſome to the proprietor.

Be careful to faſten the ſhutter ſo cloſe to the glaſs, that no light may enter through it; for the bees ſeem to look upon ſuch light as a hole or breach in their houſe, and on that account may not ſo well like their new habitation. But the principal thing to be obſerved at this time, is to cover the box, as ſoon as the bees are hived, with a linen cloth thrown looſely over it, or with green boughs, to protect it from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot for them, they will be wiſe enough to leave it. If the ſwarm be larger than uſual, inſtead of faſtening the looſe board to one box, you may join two boxes together with three ſtaples, leaving the communication open from one to the other, and then hive your bees into both. In all other reſpects, they are to be hived in boxes after the ſame manner as in common hives.

The door of the ſecond box ſhould be carefully ſtopped up, and be kept conſtantly cloſed, in order that the bees may not have an entrance but thro' the firſt box.

When the boxes are ſet in the places where they are to remain, they muſt be ſcreened from the ſummer's ſun, becauſe the wood will otherwiſe be heated to a greater degree than either the bees or their works can bear; and they ſhould likewiſe be ſcreened from the winter's ſun, becauſe the warmth of this will draw the bees from that lethargic ſtate which is natural to them, as well as many other inſects, in the winter-ſeaſon. For this purpoſe, and alſo to ſhelter the boxes from rain, our ingenious clergyman has contrived the following frame.

2d Pl.XXV.

Fig. 12. repreſents the front of a frame for twelve colonies. *a*, *a*, are two cells of oak, lying flat on the ground, more than four feet long. In theſe cells you are to fix four oaken poſts, about the thickneſs of ſuch as are uſed for drying linen.

The two poſts *b*, *b*, in the front, are about ſix feet two inches above the cells: the other two, ſtanding backward, five feet eight inches.

You are next to nail ſome boards of ſlit deal horizontally from one of the fore-poſts to the other, to ſcreen the bees from the ſun. Let theſe boards be ſeven feet ſeven inches in length, and nailed to the inſide of the poſts; and be well ſeaſoned, that they may not ſhrink or gape in the joints.

c, *c*, Are two ſplines of deal, to keep the boards even, and ſtrengthen them.

Fig. 17. repreſents the back of the frame. *d*, *d*, *d*, *d*, Are four ſtrong boards of the ſame length with the frame, on which you are to place the boxes. Let the upper ſide of them be very ſmooth and even, that the boxes may ſtand true upon them: or it may be ſtill more adviſable, to place under every pair of boxes a ſmooth thin board, as long as the boxes, and about a quarter of an inch wider. The bees will ſoon faſten the boxes to this board, in ſuch manner, that you may move or weigh the boxes and board together, without breaking the wax or reſin, which for many reaſons ought to be avoided. Theſe floors muſt be ſupported by pieces of wood, or bearers, *e*, *e*, &c. which are nailed from poſt to poſt at each end. They are likewiſe to be well nailed to the frame, to keep them from ſinking with the weight of the boxes.

f Repreſents the roof, which projects backward about ſeven or eight inches beyond the boxes, to ſhelter them from rain.

You have now only to cut niches or holes in the frame, over againſt each mouth or entrance into the boxes, at *b*, *b*, *b*, in fig. 16. Let theſe niches be near four inches long; and under each you muſt nail a ſmall piece of wood for the bees to alight upon.

The morning or evening ſun will ſhine upon one or both ends of the frame, let its aſpect be what it will: but you may prevent its over-heating the boxes, by a looſe board ſet up between the poſts, and kept in by two or three pegs.

The ſame gentleman, with great humanity, obſerves, that no true lover of bees ever lighted the fatal match without much concern; and that it is evidently more to our advantage, to ſpare the lives of our bees, and be content with part of their ſtores, than to kill and take poſſeſſion of the whole.

About the latter end of Auguſt, ſays he, by a little inſpection through your glaſſes, you may eaſily diſcover which of your colonies you may lay under contribution. Such as have filled a box and an half with their works, will pretty readily yield you the half box. But you are not to depend upon the quantity of combs without examining how they are ſtored with honey. The bees ſhould, according to him, have eight or nine pounds left them, by way of wages for their ſummer's work.

The moſt proper time for this buſineſs is the middle of the day; and as you ſtand behind the frame, you will need no armour, except a pair of gloves. The operation itſelf is very ſimple, and eaſily performed, thus: Open the mouth of the box you intend to take; then, with a thin knife, cut through the reſin with which the bees have joined the boxes to each other, till you find that you have ſeparated them; and after this, thruſt a ſheet of tin gently in between the boxes. The communication being hereby ſtopped, the bees in the fulleſt box, where it is moſt likely the queen is, will be a little diſturbed at the operation; but thoſe in the other box where we ſuppoſe the queen is not, will run to and fro in the utmoſt hurry and confuſion, and ſend forth a mournful cry, eaſily diſtinguiſhed from their other notes. They will iſſue out at the newly opened door; not in a body as when they ſwarm, nor with ſuch calm and cheerful activity as when they go forth to their labours; but by one or two at a time, with a wild flutter, and viſible rage and diſorder. This, however, is ſoon over: for as ſoon as they get abroad and ſpy their fellows, they fly to them inſtantly and join them at the mouth of the other box. By this means, in an hour or two, for they go out ſlowly, you will have a box of pure honey, without leaving a bee in it to moleſt you; and likewiſe without dead bees, which, when you burn them, are often mixed with your honey, and both waſte and damage it.

Mr White acknowledges, that he has ſometimes found this method fail, when the mouth of the box to be taken away has not been conſtantly and carefully cloſed: the bees will, in this caſe, get acquainted with it as an entrance; and when you open the mouth in order to their leaving this box, many of them will be apt to return, and, the communication being ſtopped, will, in a ſhort time, carry away all the honey from this to the other box; ſo much do they abhor a ſeparation. When this happens, he has recourſe to the following expedient, which he thinks infallible. He takes a piece of deal, a little larger than will cover the mouth of the box, and cuts in it a ſquare nich ſomewhat more than half an inch wide. In this nich he hangs a little trap-door, made of a thin piece of tin, turning upon a pin, with another pin croſſing the nich a little lower, ſo as to prevent the hanging door from opening both ways. This being placed cloſe to the mouth, the bees which want to get out will eaſily thruſt open the door outwards, but cannot open it the other way, to get in again; ſo muſt, and will readily, make to the other box, leaving this in about the ſpace of two hours, with all its ſtore, juſtly due to the tender hearted bee-maſter, as a ranſom for their lives.

What led Mr White to prefer collateral boxes to thoſe before in uſe, was, to uſe his own words, his "compaſſion for the poor bees, who, after traverſing the fields, return home weary and heavy laden, and muſt perhaps depoſit their burden up two pair of ſtairs, or in the garret. The lower room, it is likely, is not yet furniſhed with ſtairs: for, as is well known, our little architects lay the foundation of their ſtructures at the top, and build downward. In this caſe, the weary little labourer is to drag her load up the ſides of the walls: and when ſhe has done this, ſhe will travel many times backward and forward, as I have frequently ſeen, along the roof, before ſhe finds the door or paſſage into the ſecond ſtory; and here again ſhe is perplexed with a like puzzling labyrinth, before ſhe gets into the third. What a waſte is here of that precious time which our bees value ſo much, and which they employ ſo well! and what an expence of ſtrength and ſpirits, on which their ſupport and ſuſtenance depend! In the collateral boxes, the rooms are all on the ground-floor; and becauſe I know my bees are wiſe enough to value convenience more than ſtate, I have made them of ſuch a moderate, though decent, height, that the bees have much leſs way to climb to the top of them, than they have to the crown of a common hive."

30 Of the management of Bees in Mr Wildman's hives.

Mr Wildman's hives have been already deſcribed, (n° 19, 20.) A good ſwarm will ſoon fill one of theſe hives, and therefore another hive may be put under it the next morning. The larger ſpace allowed the bees, will excite their induſtry in filling them with combs. The queen will lay ſome eggs in the upper hive; but ſo ſoon as the lower hive is filled with combs, ſhe will lay moſt of them in it. In little more than three weeks, all the eggs laid in the upper hive will be turned into bees; and if the ſeaſon is favourable, their cells will be ſoon filled with honey.

So ſoon as they want room, a third hive ſhould be placed under the two former; and in a few days after the end of three weeks from the time the ſwarm was put into the hive, the top hive may be taken away at noon of a fair day; and if any bees remain in it, carry it to a little diſtance from the ſtand, and, turning its bottom up, and ſtriking it on the ſides, the bees will be alarmed, take wing, and join their companions in the ſecond and third hives. If it is found that the bees are very unwilling to quit it, it is probable that the queen remains among them. In this caſe, the bees muſt be treated in the manner that ſhall be directed, when we deſcribe Mr Wildman's method of taking the honey and the wax, (n° 31.) The upper hive now taken away ſhould be put in a cool place, in which no vermin, mice, &c. can come at the combs, or other damage can happen to them, and be thus preſerved in reſerve.

So ſoon as the hives ſeem to be again crowded, and the upper hive is well ſtored, or filled with honey, a fourth hive ſhould be placed under the third, and the upper hive be taken off the next fair day at noon, and treated as already directed. As the honey made during the ſummer is the beſt, and as it is needleſs to keep many full hives in ſtore, the honey may be taken out of the combs of this ſecond hive for uſe.

If the ſeaſon is very favourable, the bees may ſtill fill a third hive. In this caſe, a fifth hive muſt be put under the fourth, and the third taken away as before. The bees will then fill the fourth for their winter-ſtore.

As the honey of the firſt hive is better than the honey collected ſo late as that in the third, the honey may be taken out of the combs of the firſt, and the third may be preſerved with the ſame care as directed for that.

In the month of September, the top hive ſhould be examined: if full, it will be a ſufficient proviſion for the winter; but if light, that is, not containing 20 pounds of honey, the more the better, then, in the month of October, the fifth hive ſhould be taken away, and the hive kept in reſerve ſhould be put upon the remaining one, to ſupply the bees with abundant proviſions for the winter. Nor need the owner grudge them this ample ſtore; for they are faithful ſtewards, and will be proportionally richer, and more forward in the ſpring and ſummer, when he will reap an abundant profit. The fifth hive which was taken away ſhould be carefully preſerved during the winter, that it may be reſtored to the ſame ſtock of bees, when an additional hive is wanted next ſummer; or the firſt ſwarm that comes off may be put into it. The combs in it, if kept free from filth and vermin, will ſave much labour, and they will at once go to the collecting of honey.

It is almoſt needleſs to obſerve, that when the hives are changed, a cover, as already directed (ſee n° 19.) ſhould be put upon every upper hive; and that when a lower hive becomes an upper hive, the door of it ſhould be ſhut up, that ſo their only paſſage out ſhall be by the lower hive; for otherwiſe the queen would be apt to lay eggs in both indiſcriminately. The whole of the above detail of the management of one hive, may be extended to any number; it may be proper to keep a regiſter to each ſet, becauſe, in reſtoring hives to the bees, they may be better pleaſed at receiving their own labours, than that of other ſtocks.

If in the autumn the owner has ſome weak hives, which have neither proviſion nor numbers ſufficient for the winter, it is adviſable to join the bees to richer hives: for the greater number of bees will be a mutual advantage to one another during the winter, and accelerate their labours much in the ſpring. For this purpoſe, carry a poor and a richer hive into a room, a little before night: then force the bees out of both hives into two ſeparate empty hives, in a manner that ſhall be hereafter directed: ſhake upon a cloth the bees out of the hive which contains the feweſt; ſearch for the queen; and as ſoon as you have ſecured her with a ſufficient retinue, bring the other hive which contains the greater number, and place it on the cloth on which the other bees are, with a ſupport under one ſide, and with a ſpoon ſhovel the bees under it. They will ſoon aſcend; and, while under this impreſſion of fear, will unite peaceably with the other bees; whereas, had they been added to the bees of the richer hive, while in poſſeſſion of their caſtle, many of the new-comers muſt have paid with their lives for their intruſion.

It appears from the account of the management of bees in Mr Wildman's hives, that there is very little art wanting to cauſe the bees to quit the hives which are taken away, unleſs a queen happens by chance to be among them. In that caſe, the ſame means may be uſed as are neceſſary when we would rob one of the common hives of part of their wealth. The method is as follows:

31 His method of taking the honey and wax.

Remove the hive, from which you would take the wax and honey, into a room, into which admit but little light, that it may at firſt appear to the bees as if it was late in the evening. Gently invert the hive, placing it between the frames of a chair, or other ſteady ſupport, and cover it with an empty hive, keeping that ſide of the empty hive raiſed a little, which is next the window, to give the bees ſufficient light to get up into it. While you hold the empty hive ſteadily ſupported on the edge of the full hive, between your ſide and your left arm, keep ſtriking with the other hand all round the full hive from top to bottom, in the manner of beating a drum, ſo that the bees may be frightened by the continued noiſe from all quarters; and they will in conſequence mount out of the full hive into the empty one. Repeat the ſtrokes rather quick than ſtrong round the hive, till all the bees are got out of it, which in general will be in about five minutes. It is to be obſerved, that the fuller the hive is of bees, the ſooner they will have left it. As ſoon as a number of them have got into the empty hive, it ſhould be raiſed a little from the full one, that the bees may not continue to run from the one to the other, but rather keep aſcending upon one another.

So ſoon as all the bees are out of the full hive, the hive in which the bees are muſt be placed on the ſtand from which the other hive was taken, in order to receive the abſent bees as they return from the fields.

If this is done early in the ſeaſon, the operator ſhould examine the royal cells, that any of them that have young in them may be ſaved, as well as the combs which have young bees in them, which ſhould on no account be touched, though by ſparing them a good deal of honey be left behind. Then take out the other combs, with a long, broad, and pliable knife, ſuch as the apothecaries make uſe of. The combs ſhould be cut from the ſides and crown as clean as poſſible, to ſave the future labour of the bees, who muſt lick up the honey ſpilt, and remove every remains of wax; and then the ſides of the hive ſhould be ſcraped with a table-ſpoon, to clear away what was left by the knife. During the whole of this operation, the hive ſhould be placed inclined to the ſide from which the combs are taken, that the honey which is ſpilt may not daub the remaining combs. If ſome combs were unavoidably taken away, in which there are young bees, the parts of the combs in which they are ſhould be returned into the hive, and ſecured by ſticks in the beſt manner poſſible. Place the hive then for ſome time upright, that any remaining honey may drain out. If the combs are built in a direction oppoſite to the entrance, or at right angles with it, the combs which are the furtheſt from the entrance are to be preferred; becauſe there they are beſt ſtored with honey, and have the feweſt young bees in them.

Having thus finiſhed taking the wax and honey, the next buſineſs is to return the bees to their old hive; and for this purpoſe place a table covered with a clean cloth, near the ſtand, and giving the hive in which the bees are a ſudden ſhake, at the ſame time ſtriking it pretty forcibly, the bees will be ſhaken on the cloth. Put their own hive over them immediately, raiſed a little on one ſide, that the bees may the more eaſily enter; and when all are entered, place it on the ſtand as before. If the hive, in which the bees are, be turned bottom uppermoſt, and their own hive be placed over it, the bees will immediately aſcend into it, eſpecially if the lower hive is ſtruck on the ſides to alarm them.

As the chief object of the bees, during the ſpring, and beginning of the ſummer, is the propagation of their kind, honey, during that time, is not collected in ſuch quantity as it is afterwards: and on this account it is ſcarcely worth while to rob a hive before the latter end of June; nor is it ſafe to do it after the middle of July, leſt rainy weather may prevent their reſtoring the combs they have loſt, and laying in a ſtock of honey ſufficient for the winter, unleſs there is a chance of carrying them to a rich paſture.

EXPLANATION *of the* PLATES.

PLATE XXV. Fig. 1. is the queen-bee. 2. Is the drone. 3. Is the working bee. 4. Repreſents the bees hanging to each other by the feet, which is the method of taking their repoſe. 5. The proboſcis or trunk, which is one of the principal organs of the bees, wherewith they gather the honey and take their nouriſhment. 6. One of the hind-legs of a working-bee, loaded with wax. 7. A comb, in which the working bees are bred. The cells are the ſmalleſt of any. Two of them have the young bees incloſed. A royal cell is ſuſpended on one ſide. 8. A comb in which the drones are bred, being larger than the former; the young drones being included in ſeveral of them; with two royal cells ſuſpended on the ſide. 9. A ſimilar comb, in which the royal cell is fixed in the middle of the comb; and ſeveral common cells are ſacrificed to ſerve as a baſis and ſupport to it. In general, the royal cells are ſuſpended on the ſide of a comb, as in fig. 7, 8. To the ſide of fig. 9. two royal cells are begun, when they reſemble pretty much the cup in which an acorn lies. The other royal cells have the young queens included in them.

2d PLATE XXV. Fig. 1. exhibits the ſting and all its parts. The ſting is compoſed of a ſheath or caſe, and two ſhanks, united to each other, and terminating in a ſharp point, ſo as to look like a ſingle part. *b*, The poiſonous bag. *c*, The tube that ſerves to convey the poiſon from its bag to the thickeſt part of the ſting's ſheath. *d d*, The two ſhanks of the ſting, mutually conveying to each other. *e e*, The ſheath of the ſting. *f f*, The thickeſt end of the ſheath, where the tube opens into it, by which it receives the inſect's poiſon. *g*, The extreme point of the ſting, formed by the two ſhanks of that organ, that are in this place cloſely united. *h h*, The beards with which the ſhanks of the ſting are armed at their extremities. e, The tube that ſerves to ſecrete the poiſon, which it diſcharges into the

Plate. XXV.

Fig. 1.

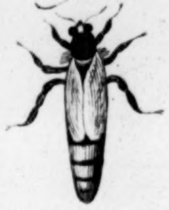


Fig. 2.

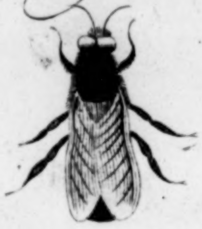


Fig. 3.

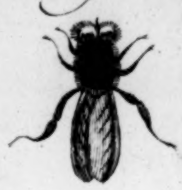


Fig. 4.

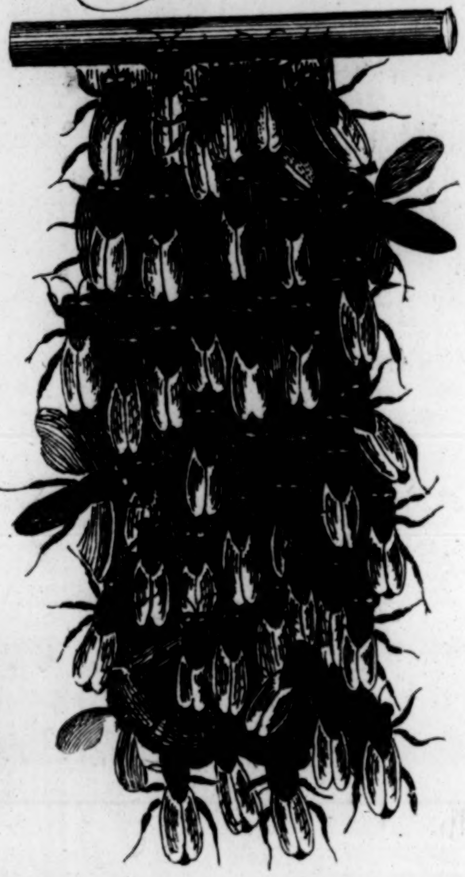


Fig 10
ARANEA TARANTULA

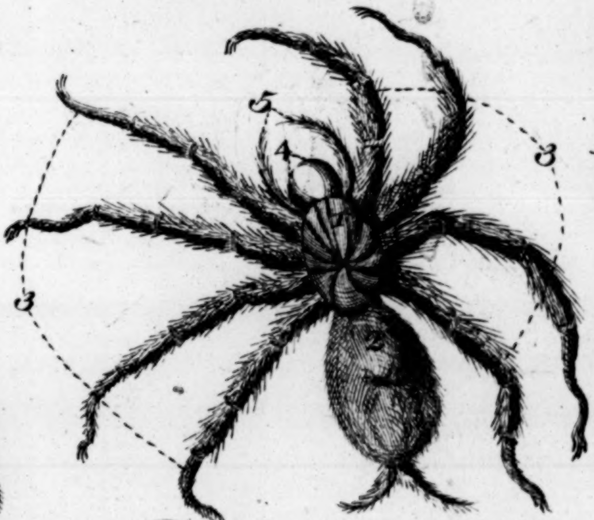


Fig. 5.

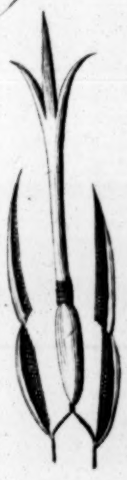


Fig 6

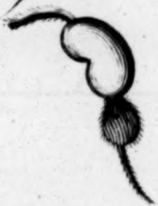


Fig. 8.

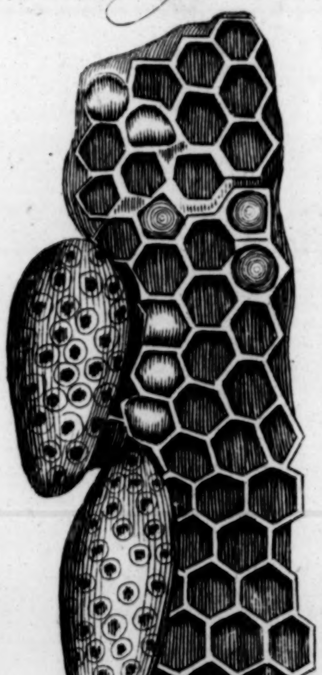


Fig. 7.

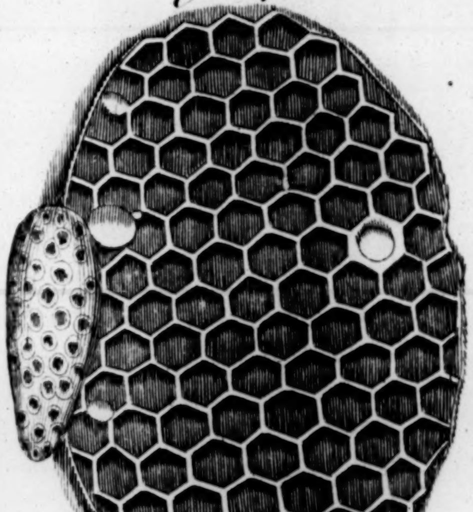
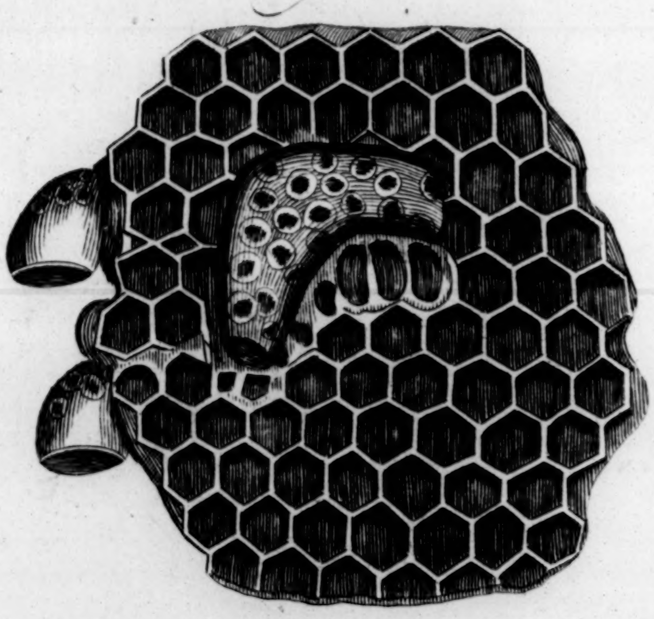


Fig. 9.



A. Bell Sculpt.

3 MA 53

3 MA 53

Plate XXV. (A)

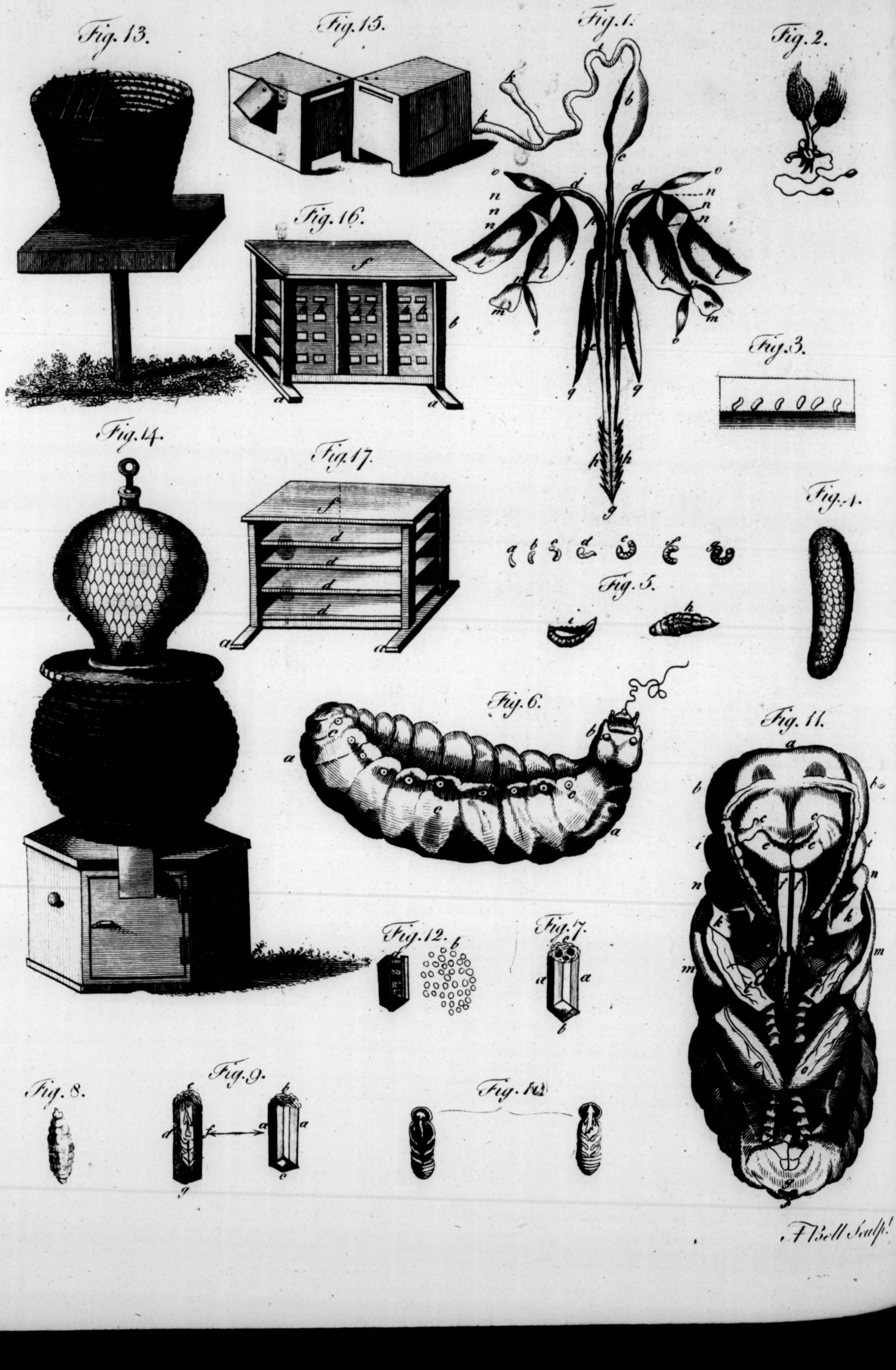


Fig. 13.
Fig. 15.
Fig. 1.
Fig. 2.
Fig. 16.
Fig. 3.
Fig. 14.
Fig. 17.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 11.
Fig. 12.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.

F. Bell Sculp!

the poiſon-bag. *k k*, The two blind extremities of ſaid tube. *l l l l*, Two pair of cartilages, of different forms, which are for the moſt part of a deep black, and articulated among themſelves and with the ſhanks of the ſting. *m m*, Two other cartilages leſs conſpicuous than the former, with one pair of which they are articulated. Theſe two cartilages *m m*, are almoſt entirely of a membranaceous ſubſtance. *n n n n n n n n*, Eight places in which the foregoing cartilages are articulated among themſelves, and with the ſhanks of the ſting *d d*. *o o o o*, Four muſcles ſerving to move the ſting different ways, by the aſſiſtance of the ſame cartilages. *p p*, Two muſcles which draw the ſhanks of the ſting into its ſheath. *q q*, Two appendages of the ſting which are moved along with it, and ſeem to anſwer no other purpoſe but that of ornament.—Fig. 2. The ovary.—Fig. 3. Six eggs drawn after nature, and placed on their ends: Theſe eggs are oblong, very ſlender, but ſomewhat thicker on their upper parts.—Fig. 4. An egg viewed with a microſcope: it reſembles the ſkin of a fiſh, diveſted of its ſcale, but ſtill retaining the marks of their inſertion.—Fig. 5. Worms of bees of different ſizes, drawn after nature. *a*, A worm newly hatched. *b c d e*, Four worms that received more nouriſhment, and are more grown. *f*, *g*, Two worms ſtill bigger than the former, having had more time to make uſe of the nouriſhment provided for them. They are here repreſented as they lie doubled in their cells. *h*, A worm placed on its belly, ſo as to ſhew on its back a black line, inclining to a light blue or grey. This line denotes the ſtomach, which appears in this place through the tranſparent parts that lie over it. *i*, A worm lying on its back, and beginning to draw in the hinder part of its body, and move its head.—Fig. 6. A full-grown worm viewed with a microſcope. *a a*, Its 14 annular inciſions or diviſions. *b*, The head and eyes, &c. *c c c*, Ten breathing holes.—Fig. 7. The worm forming its web. *a a*, The ſides of the cell that contain it. *b*, The bottom of the cell. *c*, The entrance or door of the cell. The worm is here repreſented as making its web in the propereſt manner to ſhut up this entrance.—Fig. 8. Worm taken out of the web in which it had incloſed itſelf, and juſt ready to caſt its ſkin.—Fig. 9. A cell containing the worm changed into a nymph, and perfectly lined with the ſaid worm's web. Likewiſe the ſaid web entire, with the nymph contained in it, as they appear on opening the cell. *a a*, The ſides of the cell, lined with the worm's web. *b*, The mouth of the cell, perfectly cloſed by the web. *c*, The bottom of the cell. *d*, The web entire, as it appears on opening the cell, which it greatly reſembles in form. *e*, The upper part of the web, of a convex form. This part ſhews its filaments pretty diſtinctly. *f*, The incloſed nymph appearing through the tranſparent ſides of the web. *g*, The bottom of the web, anſwering to that of the wax-cell.—Fig. 10. Worm changed to a nymph, of its natural ſize and form, yet ſo as to exhibit its limbs, which are folded up in a moſt wonderful manner.—Fig. 11. The nymph of the bee viewed with the microſcope, diſplaying in a diſtinct manner all the parts of the incloſed inſect, and the beautiful manner in which they are laid up. *a*, The head, bloated with humours. *b b*, The eyes, projecting conſiderably. *c c*, The horns, or antennæ. *d*, The lip. *e e*, The teeth, or jaw-bones. *f f*, The firſt pair of joints belonging to the proboſcis. *h*, The proboſcis itſelf. *i i*, The firſt pair of legs. *k k*, Two tranſparent ſtiff little parts, lying againſt the loweſt joints of the firſt pair of legs. Theſe little parts are not to be found as they remain in the ſkin it ſheds on quitting the nymph ſtate. *l l*, The ſecond pair of legs. *m m*, The wings. *n n*, The bladebones. *o o*, The laſt pair of legs. *p p*, The abdominal rings. *q*, *(g)* The hinder part of the body. The ſting projects a little in this place. *r*, Two little parts accompanying the ſting. *s*, The anus.—Fig. 12. *a*, A cell full of bees-bread, placed in layers. *b*, Little grains, of which the ſaid ſubſtance, viewed with the microſcope, appears to conſiſt.—The other figures have been already deſcribed.

Other Species of Apis.

The moſt remarkable are, 2. The centuncularis, or black bee, having its belly covered with yellow down. The neſts of this ſpecies are made of roſe-leaves curiouſly plaited in the form of a matt or quilt. 3. The floriſomnis, or black bee with a cylindrical incurvated belly, having two tooth-like protuberances at the anus, and a kind of prickles on the hind-legs. This bee ſleeps in flowers. 4. The dentata, or ſhining green bee, with black wings, and a kind of teeth on the hind thighs. The tongue of this bee is almoſt as long as its body. 5. The variegata: the breaſt and belly are variegated with white and black ſpots; the legs are of an iron colour. It is a native of Europe. This ſpecies ſleeps in the geranium phæum, or ſpotted crane's-bill. 6. The roſtrata is diſtinguiſhed by the upper lip being inflected and of a conical ſhape, and by the belly being inveſted with bluiſh belts. They build their neſts in high ſandy grounds, and there is but one young in each neſt. 7. The ferruginea, or ſmooth black bee, with the feelers, mouth, belly, and feet, of an iron colour. This is a ſmall bee, and ſuppoſed to be of an intermediate kind between the bee and waſp. It is a native of Europe. 8. The carioſa is a yellowiſh hairy bee; and the feet and front are of a bright yellow colour. It builds in the rotten trees of Europe. 9. The violacea is a red bee, and very hairy, with bluiſh wings. It is a native of Europe. The violacea is ſaid to perforate trees, and hollow them out in a longitudinal direction; they begin to build their cells at the bottom of theſe holes, and depoſit an egg in each cell, which is compoſed of the farina of plants and honey, or a kind of gluten. 10. The terreſtris is black and hairy, with a white belt round the breaſt, and a white anus: it builds its neſt very deep in the earth. 11. The lapidaria, or red hairy bee, with a yellow anus, builds in holes of rocks. 12. The muſcorum, or yellow hairy bee, with a white belly, builds in moſſy grounds. 13. The hypnorum, or yellow hairy bee, with a black belt on the belly. The laſt three ſpecies are alſo natives of Europe. 14. The braſilianorum, or pale-red hairy bee, with the baſis of the thighs black. This is a very large bee, every where covered with a teſtaceous ſkin. It is a native of America.

APIUM, Parsley, a genus of the digynia order, belonging to the pentandria claſs of plants.

Species. Of this genus Dr Linnæus reckons only two ſpecies, the petroſelinum and graveolens; but Mr

Miller mentions the ſeven following. 1. The petroſelinum, or common parſley, which is generally cultivated for common uſe, and is what the phyſicians have diſtinguiſhed by the name of *petroſelinum*, the graveolens or ſmallage being conſtantly mentioned under that of Apium. 2. The criſpum, or curled parſley, has been generally ſuppoſed to be only a variety of the firſt; but, according to Mr Miller, this is a miſtake ariſing from the ſeeds of the two ſorts being uſually mixed in the ſhops. 3. The latifolium, or large rooted parſley, is cultivated on account of its roots, which are as large as common carrots, as well as very tender and ſweet. This kind was known in Holland long before the Engliſh gardeners could be prevailed upon to raiſe it. Mr Miller received the ſeeds from thence in 1727. 4. The graveolens, or ſmallage, is by Linnæus joined to the celery; but in this he is greatly miſtaken. Mr Miller aſſures us that he cultivated this plant for forty years together, to try if it could be brought to the ſame goodneſs as celery; but without ſucceſs. It does not grow ſo tall as celery, nor will it riſe with a ſtraight ſtem; but ſends out many ſuckers near the root, and, when blanched, retains its ſtrong rank taſte, which no culture can alter. 5. The dulce, or upright celery. 6. The rapaceum, or turnep-rooted celery. The laſt of theſe was ſuppoſed to be a degenerate ſpecies from the former; but this is likewiſe denied by Mr Miller. The leaves of the rapaceum are ſhort when compared with thoſe of the dulce, and ſpread open horizontally; the roots grow as large as common turnips. The only difference obſerved from culture was, that on rich ground, and where the plants were carefully cultivated, the roots were much larger than on poorer land; but the leaves and outward appearance of the plant never vary. 7. The luſitanicum, the ſeeds of which were received from the royal garden at Paris, and has ſince been cultivated in ſome Engliſh gardens, and ſtill ſhews itſelf to be ſpecifically diſtinct, but has no remarkable property.

Culture. The common parſley muſt be ſown early in the ſpring, as the ſeeds remain a long time in the ground, the plants ſeldom appearing in leſs than ſix weeks after ſowing. It is generally ſown in drills by the edges of borders; it being much eaſier to keep clear from weeds, by following this method, than if the ſeeds are ſown promiſcuouſly on a border. When it is deſigned for medicinal uſe, the ſeeds muſt be ſown thin; and when the plants come up, they ſhould be hoed out ſingle, as is practiſed for carrots, onions, &c. obſerving alſo to cut up the weeds. If this is obſerved, the roots will become fit for uſe in July or Auguſt, and continue till the ſpring. As there is danger of having the leaves of the leſſer hemlock mixed with parſley, from their near reſemblance, it would be proper to cultivate only the curled ſort, which will be readily known on account of the peculiar form of its leaves. The beſt time for ſowing this ſpecies is in the middle or latter end of February. One buſhel of ſeed will ſow an acre of land. The large rooted parſley may be ſown about the ſame time; and in April, when the plants are up, they muſt be cut out with a hoe, to five or ſix inches ſquare, and kept conſtantly free from weeds. In July, the roots will be fit to draw for uſe; but if they are cut out ſo as to allow them more room to grow, the roots will grow, in a good ſoil, to the ſize of a middling parſnep, by September.—Smallage is a common weed by the ſides of ditches and brooks in many parts of England, ſo that it is ſeldom cultivated in gardens: but if any perſon is willing to cultivate it, the ſeeds ſhould be ſown ſoon after they are ripe, on a moiſt ſpot of ground; and when the plants are come up, they may be either tranſplanted on a moiſt ſoil, or hoed out, and left ſix or eight inches aſunder where they are to remain.—The ſeeds of the two ſorts of celery ſhould be ſown at two or three different times, the better to continue it for uſe through the whole ſeaſon, and prevent its running up to ſeed. The firſt ſowing ſhould be in the beginning of March, on a gentle hot-bed: the ſecond may be a fortnight or three weeks after, which ought to be in an open ſpot of light earth, where it may enjoy the benefit of the ſun: the third time of ſowing ſhould be in the end of April or beginning of May, which ought to be in a moiſt ſoil; and if expoſed to the morning ſun only, ſo much the better, but it ſhould not be under the drip of trees. The ſeeds which were ſown on the hot-bed will come up in about three weeks or a month after ſowing, when the plants ſhould be carefully cleared from weeds; and if the ſeaſon prove dry, they muſt be carefully watered. In about a month or five weeks after it is up, the plants may be removed to ſome beds of moiſt rich earth, in a warm ſituation, in which they are to be placed at about the diſtance of three inches from one another. If the ſeaſon proves cold, they muſt be covered with mats to ſcreen them from the morning froſts; and, in caſe of drought, they muſt be watered till they have taken root.

Medicinal Uſes, &c. The roots and ſeeds of the *petroſelinum* are uſed in medicine. The root of parſley is one of the five aperient roots, and in this intention is ſometimes made an ingredient in apozems and diet-drinks: if liberally uſed, it is apt to occaſion flatulencies; and thus, by diſtending the viſcera, produces a contrary effect to that intended by it: the taſte of this root is ſomewhat ſweetiſh, with a light degree of warmth and aromatic flavour. The ſeeds are an ingredient in the electuary of bay-berries. The roots of *ſmallage* are alſo in the number of aperient roots, and have been ſometimes preſcribed as an ingredient in aperient apozems and diet-drinks, but are at preſent diſregarded. The ſeeds of the plant are moderately aromatic, and were formerly uſed as carminatives; in which intention they are, doubtleſs, capable of doing ſervice, though the other warm ſeeds, which the ſhops are furniſhed with, render theſe unneceſſary; and accordingly the Edinburgh college, which retains the roots, has expunged the ſeeds.

Beſides its medicinal virtues abovementioned, the common parſley is reckoned an effectual cure for the rot in ſheep, provided they are fed with it twice a week for two or three hours each time: but hares and rabbits are ſo fond of this herb, that they will come from a great diſtance to feed upon it; and in the countries where theſe animals abound, they will deſtroy it if not very ſecurely fenced againſt them; ſo that whoever has a mind to have plenty of hares in their fields, may draw them from all parts of the country by cultivating parſley.

APIUM ANISUM dictum. See PIMPINELLA.

APIUM MACEDONICUM. See BUBON.

APIVORUS, in ornithology, a ſynonime of a ſpecies of falco. See Falco.

APLUDA, a genus of the monœcia order, belonging to the polygamia claſs of plants. The calix is a bivalved gluma; the floſcules of the female are ſeſſile, and the male floſcules are furniſhed with pedunculi; the famale has no calix; the corolla has a double valve; there is but one ſtylus, and one covered ſeed. The male has three ſtamina. There are three ſpecies of apluda, *viz.* the mutica, ariſtata, and zeugites, all natives of the Indies.

APOBATANA, the metropolis of Media, and where the kings kept their treaſure, (Iſidorus Characenus); ſuppoſed to be the ſame with *Ecbatana*.

APOBATERION, in antiquity, a valedictory ſpeech or poem made by a perſon on departing out of his own country, and addreſſed to his friends or relations.

APOBATHRA, a place near Seſtos, (Strabo); the landing place where Xerxes's ſhips were frozen, and ſtuck in the ice, (Euſtathius).

APOCALYPSE, Revelation, the name of one the ſacred books of the New Teſtament, containing revelations concerning ſeveral important doctrines of Chriſtianity.

The word is Greek, and derived from αποκαλυπτω, to *reveal*, or *diſcover*.

This book, according to Irenæus, was written about the year 96 of Chriſt, in the iſland of Patmos, whither St John had been baniſhed by the emperor Domitian. But Sir Iſaac Newton places the writing of it earlier, *viz.* in the time of Nero. Some attribute this book to the arch-heretic Cerinthus: but the ancients unanimouſly aſcribed it to John, the ſon of Zebedee, and brother of James; whom the Greek fathers call the *Divine*, by way of eminence, to diſtinguiſh him from the other evangeliſts. This book has not, at all times, been eſteemed canonical. There were many churches in Greece, as St Jerome informs us, which did not receive it; neither is it in the catalogue of canonical books prepared by the council of Laodicea, nor in that of St Cyril of Jeruſalem: but Juſtin, Irenæus, Origen, Cyprian, Clemens of Alexandria, Tertullian, and all the fathers of the fourth, fifth, and the following centuries, quote the Revelations as a book then acknowledged to be canonical. The Alogians, Marcionites, Cerdonians, and Luther himſelf, rejected this book: but the Proteſtants have forſaken Luther in this particular; and Beza has ſtrongly maintained againſt his objections, that the Apocalypſe is authentic and canonical.

The Apocalypſe conſiſts of twenty-two chapters. The three firſt are an inſtruction to the biſhops of the ſeven churches of Aſia Minor. The fifteen following chapters contain the perſecutions which the church was to ſuffer from the Jews, heretics, and Roman emperors. Next, St John propheſies of the vengeance of God, which he will exerciſe againſt thoſe perſecutors, againſt the Roman empire, and the city of Rome, which, as the Proteſtants ſuppoſe, he deſcribes under the name of Babylon, the great whore, ſeated upon ſeven hills. In the laſt place, the 19th, 20th, 21st, and 22d chapters, deſcribe the triumph of the church over its enemies, the marriage of the Lamb, and the happineſs of the church triumphant.

"It is a part of this prophecy (ſays Sir Iſaac Newton), that it ſhould not be underſtood before the laſt age of the world; and therefore it makes for the credit of the prophecy, that it is not yet underſtood. The folly of interpreters has been to foretel times and things by this prophecy, as if God deſigned to make them prophets. By this raſhneſs they have not only expoſed themſelves, but brought the prophecy alſo into contempt. The deſign of God was much otherwiſe: he gave this and the prophecies of the Old Teſtament, not to gratify mens curioſities, by enabling them to foreknow things; but that, after they were fulfilled, they might be interpreted by the events, and his own providence, not the interpreters, be then manifeſted thereby to the world. And there is already ſo much of the prophecy fulfilled, that as many as will take pains in this ſtudy, may ſee ſufficient inſtances of God's providence."

There have been ſeveral other works publiſhed under the title of *Apocalypſes*. Sozomen mentions a book uſed in the churches of Paleſtine, called the *Apocalypſe*, or *Revelation of St Peter*. He alſo mentions an Apocalypſe of St Paul; which the Cophtæ retain to this day. Euſebius alſo ſpeaks of both theſe Apocalypſes. St Epiphanius mentions an Apocalypſe of Adam; Nicephorus, an Apocalypſe of Eſdras; Gratian and Cedrenus, an Apocalypſe of Moſes, another of St Thomas, and another of St Stephen; St Jerom, an Apocalypſe of Elias. Porphyry, in his life of Plotin, makes mention of the Apocalypſe or Revelations of Zoroaſter, Zoſtrian, Nicothæus, Allogenes, &c.

APOCOPE, among grammarians, a figure which cuts off a letter or ſyllable from the end of a word; as *ingenî* for *ingenii*.

APOCRISARIUS, in eccleſiaſtical antiquity, a ſort of reſident in an imperial city, in the name of a foreign church or biſhop, whoſe office was to negotiate, as proctor, at the emperor's court, in all eccleſiaſtical cauſes in which his principals might be concerned. The inſtitution of the office ſeems to have been in the time of Conſtantine, or not long after, when, the emperors being become Chriſtians, foreign churches had more occaſions to promote their ſuits at court than formerly. However, we find it eſtabliſhed by law in the time of Juſtinian. In imitation of this officer, almoſt every monaſtery had its Apocriſarius, or reſident, in the imperial city.

The title and quality of Apocriſary became at length appropriated to the Pope's agent, or *Nuncio*, as he is now called; who reſided at Conſtantinople, to receive the Pope's diſpatches, and the emperor's anſwers. The word is formed from Αποκρινειν, *to anſwer*.

APOCRUSTICS, in medicine, the ſame with repellents. See Repellents.

APOCRYPHA, or apocryphal books, ſuch books as are not admitted into the canon of ſcripture, being either not acknowledged as divine, or ſpurious.

The word is Greek; and derived from αϖο, and κρυϖτω to *hide* or *conceal*.

When the Jews publiſhed their ſacred books, they gave the appellations of *canonical* and *divine* only to ſuch as they then made public: ſuch as were ſtill retained in their archives they called *apocryphal*, for no other reaſon but becauſe they were not public; ſo that they might be really ſacred and divine, though not promulged as ſuch.

Thus, in reſpect of the Bible, all books were called *apocryphal* which were not inſerted in the Jewiſh canon of ſcripture. Voſſius obſerves, that, with regard to the ſacred books, none are to be accounted apocryphal, except ſuch as had neither been admitted into the ſynagogue nor the church, ſo as to be added to the canon, and read in public.

The Proteſtants do not only reckon thoſe books to be apocryphal which are eſteemed ſuch in the church of Rome, as the prayer of Manaſſeh king of Judah, the third and fourth books of Eſdras, St Barnabas's epiſtle, the book of Hermos, the addition at the end of Job, and the 151st pſalm; but alſo Tobit, Judith, Eſther, the book of Wiſdom, Jeſus the ſon of Sirach, Baruch the prophet, the Song of the Three Children, the hiſtory of Suſannah, the hiſtory of Bell and the Dragon, and the firſt and ſecond books of Maccabees.

It is now pretended that theſe books were not received by the Jews, or ſo much as known to them. None of the writers of the New Teſtament cite or mention them: neither Philo nor Joſephus ſpeak of them. The Chriſtian church was for ſome ages an utter ſtranger to theſe books. Origen, Athanaſius, Hilary, Cyril of Jeruſalem, and all the orthodox writers, who have given catalogues of the canonical books of ſcripture, unanimouſly concur in rejecting theſe out of the canon. And for the New Teſtament, they are divided in their opinions, whether the epiſtle to the Hebrews, the epiſtle of St James, and the ſecond epiſtle of St Peter, the ſecond and third epiſtles of St John, the epiſtle of St Jude, and the Revelations, are to be acknowledged as canonical or not.

The Proteſtants acknowledge ſuch books of ſcripture only to be canonical as were ſo eſteemed to be in the firſt ages of the church; ſuch as are cited by the earlieſt writers among the Chriſtians as of divine authority, and after the moſt diligent inquiry were received and ſo judged to be by the council of Laodicea. The ſeveral epiſtles abovementioned, and the book of Revelations, whatever the ſentiments of ſome particular perſons are or may have been of them, are allowed by all the reformed churches to be parts of the canon of the New Teſtament.

The apocryphal books, however, according to the ſixth article of the church of England, are to be read for example of life and inſtruction of manners; but it doth not apply them to eſtabliſh any doctrine.

APOCYNUM, (Αποκυνον, of απο and κυνος a dog, becauſe the ancients believed this plant would kill dogs,) DOGSBANE; a genus of the digynia order, belonging to the pentandria claſs of plants.

Species. Of this genus botanical writers enumerate 11 ſpecies; of which the following are the moſt remarkable: 1. The venetum, with an upright herbaceous ſtalk, grows on a ſmall iſland in the ſea near Venice, but is ſuppoſed to have been originally brought from ſome other country. There are two varieties of this; one with a purple, and the other with a white flower. The roots creep very much, and by them only it is propagated; for it ſeldom produces any ſeeds either in the gardens where it is cultivated, or in thoſe places where it grows naturally. Mr Miller tells us, that he had been aſſured by a very curious botaniſt, who reſided many years at Venice, and conſtantly went to the ſpot ſeveral times in the ſeaſon to procure the ſeeds, had any been produced, that he never could find any pods formed on the plants. The ſtalks riſe about two feet high, and are garniſhed with ſmooth oval leaves placed oppoſite; the flowers grow at the top of the ſtalks, in ſmall umbels, and make a very pretty appearance. The flowers appear in July and Auguſt. 2. The ſpecioſiſſimum, with large flowers, is a native of Jamaica in the Savannahs, whence it has the name of *Savannah-flower*, by which it is generally known in that iſland. This ſort riſes three or four feet high, having woody ſtalks, which ſend out a few lateral branches, garniſhed with ſmooth oval leaves placed by pairs oppoſite, of a ſhining green colour on their upper ſides, but pale and veined underneath. The flowers are produced from the ſides of the branches, upon long footſtalks: there are commonly four or five buds at the end of each; but there is ſeldom more than one of them which comes to the flower. The flower is very large, having a long tube which ſpreads open wide at the top, of a bright yellow, and makes a fine appearance, eſpecially in thoſe places where the plants grow naturally, being moſt part of the year in flower. 3. Cordatum, with a climbing ſtalk. 4. The villoſum, with hairy flowers and a climbing ſtalk. Theſe were diſcovered at La Vera Cruz in New Spain, by Dr William Houſton, who ſent their ſeeds to England. They are both climbers, and mount to the tops of the talleſt trees. In England they have climbed over the plants in the ſtoves, and riſen to upwards of 20 feet high. The third ſort has produced flowers ſeveral times: but the fourth never ſhewed an appearance of any.

Culture. The firſt ſort is hardy enough to live in England in the open air, provided it is planted in a warm ſituation and dry ſoil. It is propagated, as we have already obſerved, by its creeping roots; the beſt time for removing and planting which is in the ſpring, juſt before they begin to puſh out new ſtalks. The other ſorts are propagated by ſeeds, but are ſo tender as to require being kept conſtantly in a ſtove.

Properties. All the ſpecies of this plant abound with a milky juice, which flows out from any part of their ſtalks and leaves when they are broken: this is generally ſuppoſed to be hurtful if taken inwardly, but doth not bliſter the ſkin when applied to it as the juice of ſpurge and other acrid plants. The pods of all the ſorts are filled with ſeeds, which are for the moſt part compreſſed and lie over one another *imbricatim*, like the tiles of a houſe; theſe have each a long plume of a cottony down faſtened to their crowns, by which, when the pods are ripe and open, the ſeeds are wafted by the wind to a conſiderable diſtance, ſo that the plants become very troubleſome weeds. This down is in great eſteem in France, for ſtuffing of eaſy chairs, making quilts, &c. for it is exceedingly light and elaſtic. It is called by the French *delawad*; and might probably become a vendible commodity in England, were people attentive to the collecting of it in Jamaica where the plants are found in plenty.

APODECTÆ, in antiquity, a denomination given to ten general receivers appointed by the Athenians to receive the public revenues, taxes, debts, and the like. The apodectæ had alſo a power to decide controverſies ariſing in relation to money and taxes, all but thoſe of the moſt difficult nature and higheſt concern, which were reſerved to the courts of judicature.

APODECTÆI, in the Athenian government, officers appointed to ſee that the meaſures of corn were juſt.

APODES, in a general ſenſe, denotes things without feet. Zoologiſts apply the name to a fabulous ſort of birds, ſaid to be found in ſome of the iſlands of the new world, which, being entirely without feet, ſupport themſelves on the branches of trees by their crooked bills.

Apodes, in the Linnæan ſyſtem, the name of the *firſt order* of fiſhes, or thoſe which have no belly-fins. See Zoology, n° 10.

APODICTICAL, among philoſophers, a term importing a demonſtrative proof, or ſyſtematical method of teaching.

APODOSIS, in rhetoric, makes the third part of a complete exordium, being properly the application, or reſtriction of the *protaſis*. The apodoſis is the ſame with what is otherwiſe called *axioſis*; and ſtands oppoſed to *protaſis*: e. gr. *protaſis*, all branches of hiſtory are neceſſary for a ſtudent; *cataſceue*, ſo that, without theſe, he can never make any conſiderable figure; *apodoſis*, but literary hiſtory is of a more eſpecial uſe, which recommends it, *&c.*

APODYTERIUM, in the ancient baths, the apartments where perſons dreſſed and undreſſed.

APOGEE, in aſtronomy, that point in the orbit of a planet, which is at the greateſt diſtance from the earth. The apogee of the ſun is that part of the earth's orbit which is at the greateſt diſtance from the ſun; and conſequently the ſun's apogee, and the earth's aphelion, are one and the ſame point.

APOLIDES, in antiquity, thoſe condemned for life to the public works, or exiled into ſome iſland, and thus diveſted of the privileges of Roman citizens.

APOLLINARIAN games, in Roman antiquity, were inſtituted in the year of Rome 542. The occaſion was a kind of oracle delivered by the prophet Marcus after the fatal battle at Cannæ, declaring, that to expel the enemy, and cure the people of an infectious diſeaſe which then prevailed, ſacred games were to be annually performed in honour of Apollo; the prætor to have the direction of them, and the decemviri to offer ſacrifices after the Grecian rite. The ſenate ordered that this oracle ſhould be obſerved the rather, becauſe another of the ſame Marcus, wherein he had foretold the overthrow at Cannæ, had come true; for this reaſon they gave the prætor 12000 aſes out of the public caſh to defray the ſolemnity. There were ſacrificed an ox to Apollo, as alſo two white goats, and a cow to Latona: all with their horns gilt. Apollo had alſo a collection made for him, beſides what the people who were ſpectators gave voluntarily. The firſt prætor by whom they were held was P. Cornelius Sylla. For ſome time they were moveable or indictive; but at length were fixed, under P. Licinius Varus, to the fifth of July, and made perpetual. The men, who were ſpectators at theſe games, wore garlands on their heads; the women performed their devotions in the temples at the ſame time, and at laſt they carouſed together in the veſtibles of their houſes, the doors ſtanding open. The Apollinarian games were merely ſcenical; and at firſt only obſerved with ſinging, piping, and other ſorts of muſic; but afterwards there were alſo introduced all manner of mountebank-tricks, dances, and the like; yet ſo as that they ſtill remained ſcenical, no chariot races, wreſtling, or the like laborious exerciſes of the body, being ever practiſed at them.

APOLLINARIANS, or Apollinarists, in church-hiſtory, a ſect of heretics who maintained, that Jeſus Chriſt had neither a rational human ſoul, nor a true body.—Apollinaris of Loadicea, their leader, inveſted Chriſt with a fanciful kind of fleſh, which he ſuppoſed to have exiſted with the Son from all eternity.—He alſo diſtinguiſhed between the ſoul of Chriſt, and what the Greeks call νυς, *mind* or *underſtanding*; and from this diſtinction took occaſion to aſſert, that Chriſt aſſumed a ſoul without its underſtanding, and that this defect was ſupplied by the Word: tho' ſome of his followers held that Chriſt had no human ſoul at all.—Apollinaris further taught, that the ſouls of men were propagated by other ſouls, as well as their bodies.—Theodoret charges him with confounding the perſons of the Godhead, and with giving into the errors of Sabellius; and Baſil accuſes him of abandoning the literal ſenſe of ſcripture, and taking up wholly with the allegorical ſenſe. The hereſy was very ſubtile, and overſpread moſt of the churches of the eaſt; it was condemned in a ſynod of Alexandria, under St Athanaſius, in the year 362. It was ſubdivided into ſeveral different hereſies, the chief whereof were the Dimoerites.

APOLLINARIS (Caius Sulpicius), a very learned grammarian, born at Carthage, lived in the 2d century, under the Antonines; he is ſuppoſed to be the author of the verſes which are prefixed to the comedies of Terence, and contain the arguments of them. He had for his ſucceſſor in the profeſſion of grammar Helvius Pertinax, who had been his ſcholar, and was at laſt emperor.

Apollinaris Sidonius (Caius Sollius), an eminent Chriſtian writer and biſhop in the 5th century, was born of a noble family in France. He was educated under the beſt maſters, and made a prodigious progreſs in the ſeveral arts and ſciences, but particularly in poetry and polite literature. After he had left the ſchools, he applied himſelf to the profeſſion of war. He married Papianilla, the daughter of Avitus, who was conſul, and afterwards emperor, by whom he had three children. But Majorianus in the year 457 having deprived Avitus of the empire, and taken the city of Lyons, in which our author reſided, Apollinaris fell into the hands of the enemy. However, the reputation of his learning ſoftened Majorianus's reſentments, ſo that he treated him with the utmoſt civility, in return for which Apollinaris compoſed a panegyric in his honour; which was ſo highly applauded, that he had a ſtatue erected to him at Rome, and was honoured with the title of *Count*. In the year 467 the emperor Anthemius rewarded him for the panegyric, which he had written in honour of him, by raiſing him to the poſt of governor of Rome, and afterwards to the dignity of a patrician and ſenator, and erecting a ſtatue to him. But he ſoon quitted theſe ſecular employments for the ſervice of the church. The biſhoprick of Clermont being vacant in 472 by the death of Eparchius, Apollinaris, who was then only a laymen, was choſen to ſucceed him without any intereſt or ſolicitation on his part, in which ſee he acted with the greateſt integrity. Clermont being beſieged by the Goths, he animated the people to the defence of that city, and would never conſent to the ſurrender of it; ſo that, when it was taken about the year 480, he was obliged to retire; but he was ſoon reſtored by Evariges king of the Goths, and continued to govern the church as he had done before. He died in peace the 21st of Auguſt 487; and his feſtival is ſtill obſerved in the church of Clermont, where his memory is had in great veneration. He is eſteemed the moſt elegant writer of his age, both in proſe and verſe. He wrote a great many little pieces; but preſerved none but thoſe which he thought were worthy of being continued down to poſterity. He collected himſelf the nine books which we have remaining of his letters. His chief pieces in poetry are the three panegyrics upon the emperors Avitus, Majorianus, and Anthemius. The reſt of them are a collection of poems addreſſed to his friends upon particular ſubjects. His letters contain a variety of particulars relating to polite literature and profane hiſtory.

APOLLINARIUS (Claudius), a learned biſhop of Hierapolis, who, about the year 170, preſented to Marcus Aurelius an excellent Apology for the Chriſtians.

APOLLINARIUS THE YOUNGER, thus called to diſtinguiſh him from his father, called *Apollinarius the Elder*, was at firſt lector or reader of Loadicea, and afterwards biſhop of that city. He was univerſally eſteemed the greateſt man of his age, both for learning and piety, and a moſt accurate and nervous defender of the faith againſt all its enemies: but notwithſtanding this, on his advancing ſome opinions that were not approved, he was anathematized as an heretic by the ſecond general council of Conſtantinople in 381.

APOLLO. Of all the divinities of Paganiſm, there was no one by whom the polite arts were ſaid to have been in ſo particular a manner cheriſhed and protected, as by Apollo. Cicero mentions four of his name: the moſt ancient of whom was the ſon of Vulcan; the ſecond a ſon of Corybas, and born in Crete; the third an Arcadian, called *Nomian*, from his being a great legiſlator; and the laſt, to whom the greateſt honour is aſcribed, the ſon of Jupiter and Latona.

Apollo had a variety of other names, either derived from his principal attributes, or the chief places where he was worſhipped. He was called the *Healer*, from his enlivening warmth and cheering influence; *Pæan*, from the peſtilential heats: to ſignify the former, the ancients placed the graces in his right hand; and for the latter, a bow and arrows in his left: *Nomius*, or the ſhepherd, from his fertilizing the earth, and thence ſuſtaining the animal creation; *Delius*, from his rendering all things manifeſt; *Pythius*, from his victory over Python; *Lycias*, *Phœbus*, and *Phaneta*, from his purity and ſplendor. As Apollo is almoſt always confounded by the Greeks with the ſun, it is no wonder that he ſhould be dignified with ſo many attributes. It was natural for the moſt glorious object in nature, whoſe influence is felt by all creation, and ſeen by every animated part of it, to be adored as the fountain of light, heat, and life.

The power of healing diſeaſes being chiefly given by the ancients to medicinal plants and vegetable productions, it was natural to exalt into a divinity the viſible cauſe of their growth. Hence he was ſtyled the *God of Phyſic*; and that external heat which cheers and invigorates all nature, being transferred from the human body to the mind, gave riſe to the idea of all mental efferveſcence coming from this god; hence, likewiſe, poets, prophets, and muſicians, are ſaid to be *Numine afflati*, inſpired by Apollo.

Whether Apollo was ever a real perſonage, or only the great luminary, many have doubted. Indeed, Voſſius has taken great pains to prove this god to be only a metaphorical being, and that there never was any other Apollo than the ſun. "He was ſtyled the *ſon of Jupiter*, (ſays this author), becauſe that god was reckoned by the ancients the author of the world. His mother was called *Latona*, a name which ſignifies *hidden;* becauſe, before the ſun was created, all things were wrapped up in the obſcurity of chaos. He is always repreſented as beardleſs and youthful, becauſe the ſun never grows old or decays. And what elſe can his bow and arrows imply, but his piercing beams?" And adds, "that all the ceremonies which were performed to his honour, had a manifeſt relation to the great ſource of light, which he repreſented. Whence (he concludes) it is in vain to ſeek for any other divinity than the ſun, which was adored under the name of Apollo."

However, though this is in general true, yet it does appear, from many paſſages in ancient authors, that there was ſome illuſtrious perſonage named *Apollo*, who, after his apotheoſis, was taken for the ſun; as Oſiris and Orus in Egypt, whoſe exiſtence cannot be called in queſtion, were, after their death, confounded with the ſun, of which they became the ſymbols, either from the glory and ſplendor of their reigns, or from a belief that their ſouls had taken up their reſidence in that luminary.

Of the four Apollo's mentioned by Cicero, it appears that the three laſt were Greeks, and the firſt an Egyptian; who, according to Herodotus, was the ſon of Oſiris and Iſis, and called *Orus*. Pauſanias is of the ſame opinion as Herodotus, and ranks Apollo among the Egyptian divinities. The teſtimony of Diodorus Siculus is ſtill more expreſs; for in ſpeaking of Iſis, after ſaying that ſhe had invented the practice of medicine, he adds, that ſhe taught this art to her ſon Orus, named *Apollo*, who was the laſt of the gods that reigned in Egypt.

It is eaſy to trace almoſt all the Grecian fables and mythologies from Egypt. If the Apollo of the Greeks was ſaid to be the ſon of Jupiter, it was becauſe Orus the Apollo of the Egyptians had Oſiris for his father, whom the Greeks confounded with Jupiter. If the Greek Apollo was reckoned the god of eloquence, muſic, medicine, and poetry, the reaſon was, that Oſiris, who was the ſymbol of the ſun among the Egyptians, as well as his ſon Orus, had there taught thoſe liberal arts. If the Greek Apollo was the god and conductor of the muſes, it was becauſe Oſiris carried with him in his expedition to the Indies ſinging women and muſicians. This parallel might be carried on ſtill further; but enough has been ſaid to prove that the true Apollo was that of Egypt.

To the other perfections of this divinity the poets have added beauty, grace, and the art of captivating the ear and the heart, no leſs by the ſweetneſs of his eloquence, than by the melodious ſounds of his lyre. However, with all theſe accompliſhments, he had not the talent of captivating the fair, with whoſe charms he was enamoured. But the amours and other adventures related of this god during his reſidence on earth, are too numerous, and too well known, to be inſerted here. His muſical conteſts, however, being more connected with the nature of this work, muſt not be wholly unnoticed.

To begin, therefore, with the diſpute which he had with Pan, that was left to the arbitration of Midas.

Pan, who thought he excelled in playing the flute, offered to prove that it was an inſtrument ſuperior to the lyre of Apollo. The challenge was accepted; and Midas, who was appointed the umpire in this conteſt, deciding in favour of Pan, was rewarded by Apollo, according to the poets, with the ears of an aſs, for his ſtupidity.—This fiction ſeems founded upon hiſtory. Midas, according to Pauſanias, was the ſon of Gordius and Cybele; and reigned in the Greater Phrygia, as we learn from Strabo. He was poſſeſſed of ſuch great riches, and ſuch an inordinate deſire of increaſing them by the moſt contemptible parſimony, that, according to the poets, he converted whatever he touched into gold. However, his talent for accumulation did not extend to the acquirement of taſte and knowledge in the fine arts; and, perhaps, his dulneſs and inattention to theſe provoked ſome muſical poet to invent the fable of his deciſion in favour of Pan againſt Apollo. The ſcholiaſt upon Ariſtophanes, to explain the fiction of his long ears, ſays, that it was deſigned to intimate that he kept ſpies in all parts of his dominions.

Marſyas, another player on the flute, was ſtill more unfortunate than either Pan or his admirer Midas. This Marſyas *, having engaged in a muſical diſpute with Apollo, choſe the people of Nyſa for judges. Apollo played at firſt a ſimple air upon his inſtrument; but Marſyas, taking up his pipe, ſtruck the audience ſo much by the novelty of its tone, and the art of his performance, that he ſeemed to be heard with more pleaſure than his rival. Having agreed upon a ſecond trial of ſkill, it is ſaid that the performance of Apollo, by accompanying the lyre with his voice, was allowed greatly to excel that of Marſyas upon the flute alone. Marſyas, with indignation, proteſted againſt the deciſion of his judges; urging that he had not been fairly vanquiſhed according to the rules ſtipulated, becauſe the diſpute was concerning the excellence of their ſeveral inſtruments, not their voices; and that it was wholly unjuſt to employ two arts againſt one.

* See the article *Marſyas*.

Apollo denied that he had taken any unfair advantage of his antagoniſt, ſince Marſyas had employed both his mouth and fingers in performing upon his inſtrument; ſo that, if he was denied the uſe of his mouth, he would be ſtill more diſqualified for the contention. The judges aprov'd of Apollo's reaſoning, and ordered a third trial. Marſyas was again vanquiſhed; and Apollo, inflamed by the violence of the diſpute, flea'd him alive for his preſumption.

Pauſanias relates a circumſtance concerning this conteſt, that had been omitted by Diodorus, which is, that Apollo accepted the challenge from Marſyas, upon condition that the victor ſhould uſe the vanquiſhed as he pleaſed.

Diodorus informs us, that Apollo, ſoon repenting of the cruelty with which he had treated Marſyas, broke the ſtrings of the lyre, and by that means put a ſtop, for a time, to any further progreſs in the practice of that new inſtrument.

The next incident to be mentioned in the hiſtory of Apollo is his defeat of the ſerpent Python.

The waters of Deucalion's deluge, ſays Ovid, which had overflowed the earth, left a ſlime, from whence ſprung innumerable monſters; and among others the ſerpent Python, which made great havock in the country about Parnaſſus. Apollo, armed with his darts, put him to death; which, phyſically explained, implies, that the heat of the ſun having diſſipated the noxious ſteams, thoſe monſters ſoon diſappeared: or, if this fable be referred to hiſtory, the ſerpent was a robber, who haunting the country about Delphos, and very much infeſting thoſe who came thither to ſacrifice; a prince, who bore the name of Apollo, or one of the prieſts of that god, put him to death.

This event gave riſe to the inſtitution of the Pythian games, ſo frequently mentioned in the Grecian hiſtory; and it was from the legend of Apollo's victory over the Python that the god himſelf acquired the name of *Pythius*, and his prieſteſs that of *Pythia* *. The city of Delphos, where the famous oracles were ſo long delivered, was likewiſe frequently ſtyled *Pytho*.

* See the article *Pythia*.

As Apollo was the god of the fine arts, thoſe who cultivated them were called *his ſons*. Of this number was Philammon of Delphos, whom the poets and mythologiſts make the twin-brother of Autolychus, by the nymph Chione, and Apollo and Mercury. It is pretended that both theſe divinities were favoured by the nymph on the ſame day, and that their ſires were known from their different talents. Philammon, a great poet and muſician, was reported to be the offspring of the god who preſides over thoſe arts; and Autolychus, from the craftineſs and ſubtilty of his diſpoſition, was ſaid to have ſprung from Mercury, god of theft and fraud. Philammon is one of the firſt, after Apollo, upon fabulous record, as a vocal performer, who accompanied himſelf with the ſound of the lyre: his ſon was the celebrated Thamyris *.

* See *Thamyris*.

There can be no doubt but that Apollo was more generally revered in the Pagan world than any other deity; having, in almoſt every region of it, temples, oracles, and feſtivals, as innumerable as his attributes: the wolf and hawk were conſecrated to him, as ſymbols of his piercing eyes; the crow and the raven, becauſe theſe birds were ſuppoſed to have by inſtinct the faculty of prediction; the laurel, from a perſuaſion that thoſe who ſlept with ſome branches of that tree under their heads received certain vapours, which enabled them to propheſy. The cock was conſecrated to him, becauſe by his crowing he announces the riſing of the ſun; and the graſshopper on account of his ſinging faculty, which was ſuppoſed to do honour to the god of muſic. Moſt of the ancient poets have celebrated this tuneful inſect, but none better than Anacreon, Ode 43.

Plato ſays that the graſshopper ſings all ſummer without food, like thoſe men who, dedicating themſelves to the muſes, forget the common concerns of life.

The ſwan was regarded by the ancients as a bird ſacred to Apollo in two capacities; firſt, as being, like the crow and raven, gifted with the ſpirit of prediction; and

and, ſecondly, for his extraordinary vocal powers. The ſweetneſs of his ſong, eſpecially at the approach of death, was not only extolled by all the poets of antiquity, but by hiſtorians, philoſophers, and ſages; and to call a great writer the *ſwan* of his age and nation, was a full acknowledgement of his ſovereignty *. Thus Horace calls Pindar *the Theban ſwan.*

Plutarch, who was himſelf a prieſt of Apollo, impreſſed with the higheſt reſpect and veneration for him and for muſic, in his dialogue upon that art, makes one of his interlocutors ſay, that an invention ſo uſeful and charming could never have been the work of man, but muſt have originated from ſome god, ſuch as Apollo, the inventor of the flute and lyre, improperly attributed to Hyagnis, Marſyas, Olympus, and others; and the proofs he urges in ſupport of this aſſertion, ſhew, if not its truth, at leaſt that it was the common and received opinion.

All dances and ſacrifices, ſays he, uſed in honour of Apollo, are performed to the ſound of flutes: the ſtatue of this god at Delos, erected in the time of Hercules, had in its right-hand a bow; and on the left ſtood the three graces, who were furniſhed with three kinds of inſtruments; the lyre, the flute, and the ſyrinx. The youth alſo, who carries the laurel of Tempe to Delphos, is accompanied by one playing on the flute; and the ſacred preſents formerly ſent to Delos by the Hyperboreans, were conducted thither to the ſound of lyres, flutes, and ſhepherd's pipes. He ſupports theſe facts by the teſtimonies of the poets Alcæus, Alcmon, and Corinna.

It ſeems as if the account of Apollo could not be concluded by any thing that is left to offer on the ſubject, ſo properly, as by part of the celebrated hymn of Callimachus, which during many ages was performed and heard by the moſt poliſhed people on the globe, with the utmoſt religious zeal, at the feſtivals inſtituted to this god.

Hah! how the laurel, great APOLLO's tree,
And all the cavern, ſhakes! Far off, far off,
The man that is unhallow'd: for the god
Approaches. Hark! he knocks: the gates
Feel the glad impulſe; and the ſever'd bars
Submiſſive clink againſt their brazen portals.
Why do the Delian palms incline their boughs,
Self-mov'd; and hov'ring ſwans, their throats releas'd
From native ſilence, carol ſounds harmonious?
  Begin, young men, the hymn: let all your harps
Break their inglorious ſilence; and the dance,
In myſtic numbers trod, explain the muſic.
But firſt by ardent pray'r, and clear luſtration,
Purge the contagious ſpots of human weakneſs:
Impure no mortal can behold Apollo.
So may you flouriſh, favour'd by the god,
In youth with happy nuptials, and in age
With ſilver hairs, and fair deſcent of children;
So lay foundations for aſpiring cities,
And bleſs your ſpreading colonies' increaſe.
  Pay ſacred rev'rence to Apollo's ſong;
Leſt watchful the far-ſhooting god emit
His fatal arrows. Silent, Nature ſtands;
And ſeas ſubſide, obedient to the ſound
Of Io! Io Pæan! nor dares Thetis
Longer bewail her lov'd Achilles' death;
For Phœbus was his foe. Nor muſt ſad Niobe
In fruitleſs ſorrow perſevere, or weep
Even thro' the Phrygian marble. Hapleſs mother!
Whoſe fondneſs could compare her mortal offspring
To thoſe which fair Latona bore to Jove.
Io! again repeat ye, Io! Pæan!

Recite Apollo's praiſe till night draws on,
The ditty ſtill unfiniſh'd; and the day
Unequal to the godhead's attributes
Various, and matter copious of your ſongs.
  Sublime at Jove's right-hand Apollo ſits,
And thence diſtributes honour, gracious king,
And theme of verſe perpetual. From his robe
Flows light ineffable! his harp, his quiver,
And Lactian bow, are gold: with golden ſandals
His feet are ſhod. How rich! how beautiful!
Beneath his ſteps the yellow min'ral riſes;
And earth reveals her treaſures. Youth and beauty
Eternal deck his cheek: from his fair head
Perfumes diſtil their ſweets; and cheerful Health,
His duteous hand-maid, through the air improv'd
With laviſh hand diffuſes ſcents ambroſial.
  The ſpearman's arm by thee, great god, directed,
Sends forth a certain wound. The laurel'd bard
Inſpir'd by thee, compoſes verſe immortal.
Taught by thy art divine, the ſage phyſician
Eludes the urn, and chains or exiles death.

Perpetual fires ſhine hallow'd on thy altars,
When annual the Carnean feaſt is held:
The warlike Libyans, clad in armour, lead
The dance, with clanging ſwords and ſhields they beat
The dreadful meaſure: in the chorus join
Their women, brown but beautiful; ſuch rites
To thee well pleaſing.————
———— The monſtrous Python
Durſt tempt thy wrath in vain; for dead he fell,
To thy great ſtrength and golden arms unequal.
  Io! while thy unerring hand elanc'd
Another and another dart, the people
Joyfully repeated *Io! Io Pæan!*
Elance the dart, Apollo: for the ſafety
And health of man, gracious thy mother bore thee!
PRIOR.

APOLLODORUS, born at Damaſcus, a famous architect under Trajan and Hadrian: he had the direction of the bridge of ſtone which Trajan ordered to be built over the Danube in the year 104, which was eſteemed the moſt magnificent of all the works of that emperor. Hadrian, one day as Trajan was diſcourſing with this architect upon the buildings he had raiſed at Rome, would needs give his judgment, and ſhewed he underſtood nothing of the matter. Apollodorus turned upon him bluntly, and ſaid to him, Go paint citruls, for you are very ignorant of the ſubject we are talking upon. Hadrian at this time boaſted of his painting citruls well. This inſult coſt Apollodorus his life.

APOLLODORUS, a celebrated painter of Athens, about 408 years before the birth of Chriſt, was the firſt who invented the art of mingling the colours, and of expreſſing the lights and ſhadows. He was admired alſo for his judicious choice of ſubjects, and for the beauty and ſtrength of colouring ſurpaſſed all the maſters that went before him. He excelled likewiſe in ſtatuary.

APOLLODORUS the Athenian, a famous grammarian, the ſon of Aſclepiades and diſciple of Ariſtarchus. He wrote many works not now extant; but his moſt famous production was his *Bibliotheca*, concerning the origin of the gods: this work conſiſted of 24 books, but only three are now in being. Several other pieces of his are to be found in Fabricius's *Bibliotheca Græca*. There were various other perſons of this name: Scipio Teſti, a Neapolitan, has written a treatiſe of the Apollodoruſes, which was printed at Rome in 1555; and Dr Thomas Gale publiſhed a work of the ſame kind in 1675.

APOLLONIA, the name of ſeveral ancient cities, particularly of a colony of the Mileſians in Thrace, from which Lucullus took away a coloſſus of Apollo, and placed it in the capitol. The greateſt part of the town was ſituated in a ſmall iſland on the Euxine, in which was a temple of Apollo, (Strabo). Pliny ſays the coloſſus was 30 cubits high, and coſt 500 talents. There was alſo an Apollonia at mount Parnaſſus, near Delphi, (Stephanus). Troezen was formerly called *Apollonia.*

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* See the article *Anas*.

Apollonia, feaſts ſacred to Apollo, inſtituted upon the following occaſion. Apollo, having vanquiſhed Python, went with his ſiſter Diana to Ægialea; but, being driven from thence, he removed to the iſland Crete. The Ægialeans were ſoon after viſited with a plague; upon which, conſulting the ſoothſayers, they were ordered to ſend ſeven young men, and as many virgins, to appeaſe thoſe deities and bring them back into their country. Apollo and Diana being thus appeaſed, returned to Ægialea: in memory of which, they dedicated a temple to Pitho, the *goddeſs of perſuaſion;* whence a cuſtom aroſe of chuſing every year ſeven young men, and as many virgins, to go as it were in ſearch of Apollo and Diana.

Apollonia, in geography, a promontory of Africa, upon the coaſt of Guinea, near the mouth of the river Mancu.

APOLLONIUS, the author of the *Argonautics*, was born at Alexandria in Egypt: he taught rhetoric at Rhodes, and hence was called *Rhodius*. He flouriſhed about the 137th Olympiad, and was keeper of the Alexandrian library. Longinus, in his treatiſe *Of the Sublime*, commends this poet. The ancient Scholia upon his *Argonautics*, ſtill extant, are extremely uſeful, and full of learning.

Apollonius of Perga, a city of Pamphylia, was a great geometrician, under the reign of Ptolemy Euergetes, which reaches from the 2d year of the 133d Olymp. to the 3d year of the 139th. He ſtudied a long time at Alexandria, under the diſciples of Euclid; and compoſed ſeveral works, of which that only of the Conics remains.

Apollonius, a Pythagorean philoſopher, born at Tyana in Cappadocia, about the beginning of the firſt century. At 16 years of age he became a ſtrict obſerver of Pythagoras's rules, renouncing wine, women, and all ſorts of fleſh; not wearing ſhoes, letting his hair grow, and wearing nothing but linen. He ſoon after ſet up for a reformer of mankind, and choſe his habitation in a temple of Æſculapius, where he is ſaid to have performed many wonderful cures. Philoſtratus has wrote the Life of Apollonius, in which there are numberleſs fabulous ſtories recounted of him. We are told that he went five years without ſpeaking; and yet, during this time, that he ſtopped many ſeditions in Cilicia and Pamphylia: that he travelled, and ſet up for a legiſlator; and that he gave out he underſtood all languages, without having ever learned them; that he could tell the thoughts of men, and underſtood the oracles which birds gave by their ſinging. The heathens were fond of oppoſing the pretended miracles of this man to thoſe of our Saviour: and by a treatiſe which Euſebius wrote againſt one Hierocles, we find that the drift of the latter, in the treatiſe which Euſebius refutes, ſeems to have been to draw a parallel betwixt Jeſus Chriſt and Apollonius, in which he gives the preference to this philoſopher. Mr Du Pin has wrote a confutation of Philoſtratus's Life of Apollonius.

Apollonius wrote ſome works, *viz.* four books of judicial aſtrology; a treatiſe upon the ſacrifices, ſhewing what was proper to be offered to each deity; and a great number of letters, all of which are now loſt.

APOLOGUE, in matters of literature, an ingenious method of conveying inſtruction by means of a feigned relation called a *moral fable.*

The only difference between a parable and an apologue is, that the former, being drawn from what paſſes among mankind, requires probability in the narration; whereas the apologue, being taken from the ſuppoſed actions of brutes, or even of things inanimate, is not tied down to the ſtrict rules of probability. Æſop's fables are a model of this kind of writing.

APOLOGY, a Greek term, literally importing an excuſe or defence of ſome perſon or action.

APOMELI, among ancient phyſicians, a decoction of honey and vinegar, much uſed as a detergent, promoter of ſtool, urine, *&c.*

APONEUROSIS, among phyſicians, a term ſometimes uſed to denote the expanſion of a nerve or tendon in the manner of a membrane; ſometimes for the cutting off a nerve; and, finally, for the tendon itſelf.

APONO (Peter d'), one of the moſt famous philoſophers and phyſicians of his age, born in the year 1250, in a village about four miles from Padua. He ſtudied ſome time at Paris, and was there promoted to the degree of doctor in philoſophy and phyſic. When he came to practiſe as a phyſician, he is ſaid to have inſiſted on very large ſums for his viſits: we are not told what he demanded for the viſits he made in the place of his reſidence; but it is affirmed, that he would not attend the ſick in any other place under 150 florins a-day; and when he was ſent for by pope Honorius IV. he demanded 400 ducats for each day's attendance. He was ſuſpected of magic, and proſecuted by the inquiſition on that account. "The common opinion of almoſt all authors (ſays Naude) is, that he was the greateſt magician of his age; that he had acquired the knowledge of the ſeven liberal arts, by means of the ſeven familiar ſpirits, which he kept incloſed in a cryſtal; and that he had the dexterity to make the money he had ſpent, come back into his purſe." The ſame author adds, that he died before the proceſs againſt him was finiſhed, being then in the 80th year of his age; and that, after his death, they ordered him to be burnt in effigy, in the public place of the city of Padua; deſigning thereby to ſtrike a fear into others, of incurring the like puniſhment; and to ſuppreſs the reading three books which he had wrote; the firſt being the Heptameron, which is printed at the end of the firſt volume of Agrippa's work; the ſecond, that which is called by Trithemius, *Elucidarium necromanticum Petri de Albano;* and the laſt, that which is intitled by the ſame author, *Liber experimentorum mirabilium de annulis ſecundum xxviii. manſiones lunæ.* His body being ſecretly taken up by his friends, eſcaped the vigilance of the inquiſitors, who would have burnt it. It was removed ſeveral times, and was at laſt placed in the church of St Auguſtin, without an epitaph or any mark of honour. The moſt remarkable book which Apono wrote, was that which procured him the ſirname of *Conciliator;* he wrote alſo a piece intitled *De medicina omnimoda.* There is a ſtory told of him, that, having no well in his houſe, he cauſed his neighbour's to be carried into the ſtreet by devils, when he heard they had forbidden his maid fetching water there. He had much better (ſays Mr Bayle) have employed the devils to make a well in his own houſe, and have ſtopped up his neighbour's; or, at leaſt, tranſported it into his houſe, rather than into the ſtreet.

APONOGETON, in botany. See ZANNICHELLIA.

APONUS, a hamlet near Patavium, with warm baths. It was the birth-place of Livy, (Martial); and is now called *Albano.* E. Long. 10. Lat. 45. 15.

APOPEMPTIC, in the ancient poetry, a hymn addreſſed to a ſtranger on his departure from a place to his own country. The ancients had certain holidays, wherein they took leave of the gods with *apopemptic* ſongs, as ſuppoſing them returning each to his own country. The deities having the patronage of divers places, it was but juſt to divide their preſence, and allow ſome time to each. Hence it was, that among the Delians and Mileſians we find feaſts of Apollo, and among the Argians feaſts of Diana, called *Epidemiæ,* as ſuppoſing theſe deities then more peculiarly reſident among them. On the laſt day of the feaſt they diſmiſſed them, following them to the altars with *apopemptic* hymns.

APOPHASIS, a figure in rhetoric, by which the orator, ſpeaking ironically, ſeems to wave what he would plainly inſinuate: as, *Neither will I mention thoſe things, which if I ſhould, you notwithſtanding could neither confute nor ſpeak againſt them.*

APOPHLEGMATIZANTS, in pharmacy, medicines proper to clear the head from ſuperfluous phlegm, whether by ſpitting, or by the noſe.

APOPHTHEGM, a ſhort, ſententious, and inſtructive remark, pronounced by a perſon of diſtinguiſhed character. Such are the apophthegms of Plutarch, and thoſe of the ancients collected by Lycoſthenes.

APOPHYGE, in architecture, a concave part or ring of a column, lying above or below the flat member. The French call it *le conge d'en bas,* or *d'en haut;* the Italians, *cavo di baſſo,* or *di ſopra;* and alſo, *il vivo di baſſo.* The apophyge originally was no more than the ring, or ferril, at firſt fixed on the extremities of wooden pillars, to keep them from ſplitting; which afterwards was imitated in ſtone.

APOPHYSIS, in anatomy, a proceſs or protuberance of a bone. See ANATOMY, Chap. I. e.

APOPLEXY, a diſtemper in which the patient is ſuddenly deprived of all his ſenſes, and of voluntary motion. See the Index ſubjoined to MEDICINE.

APORIA, is a figure in rhetoric, by which the ſpeaker ſhews, that he doubts where to begin for the multitude of matter, or what to ſay in ſome ſtrange and ambiguous thing; and doth, as it were, argue the caſe with himſelf. Thus Cicero ſays, *Whether he took them from his fellows more impudently, gave them to a harlot more laſciviouſly, removed them from the Roman people more wickedly, or altered them more preſumptuouſly, I cannot well declare.*

APOSIOPESIS, a form of ſpeech, by which the ſpeaker, through ſome affection, as ſorrow, baſhfulneſs, fear, anger, or vehemency, breaks off his ſpeech before it be all ended. A figure, when, ſpeaking of a thing, we yet ſeem to conceal it, though indeed we aggravate it: or when the courſe of the ſentence begun is ſo ſtayed, as thereby ſome part of the ſentence, not being uttered, may be underſtood; as, *I might ſay much more, but modeſty commands ſilence.*

APOSTACY, the abandoning the true religion. The primitive Chriſtian church diſtinguiſhed ſeveral kinds of apoſtacy. The firſt, of thoſe who went over entirely from Chriſtianity to Judaiſm; the ſecond, of thoſe who mingled Judaiſm and Chriſtianity together; and the third, of thoſe who complied ſo far with the Jews as to communicate with them in many of their unlawful practices, without making a formal profeſſion of their religion. But the fourth ſort was of thoſe who, after having been ſome time Chriſtians, voluntarily relapſed into Paganiſm.

The perverſion of a Chriſtian to Judaiſm, Paganiſm, or other falſe religion, was puniſhed by the emperors Conſtantius and Julian with confiſcation of goods; to which the emperors Theodoſius and Valentinian added capital puniſhment, in caſe the apoſtate endeavoured to pervert others to the ſame iniquity. A puniſhment too ſevere for any temporal laws to inflict: and yet the zeal of our anceſtors imported it into this country; for we find by Bracton, that in his time apoſtates were to be burnt to death. Doubtleſs the preſervation of Chriſtianity, as a national religion, is, abſtracted from its own intrinſic truth, of the utmoſt conſequence to the civil ſtate: which a ſingle inſtance will ſufficiently demonſtrate. The belief of a future ſtate of rewards and puniſhments, the entertaining juſt ideas of the moral attributes of the ſupreme Being, and a firm perſuaſion that he ſuperintends and will finally compenſate every action in human life (all which are clearly revealed in the doctrines, and forcibly inculcated by the precepts, of our ſaviour Chriſt), theſe are the grand foundation of all judicial oaths; which call God to witneſs the truth of thoſe facts, which perhaps may be only known to him and the party atteſting: all moral evidence therefore, all confidence in human veracity, muſt be weakened by apoſtacy, and overthrown by total infidelity. Wherefore all affronts to Chriſtianity, or endeavours to depreciate its efficacy, in thoſe who have once profeſſed it, are highly deſerving of cenſure. But yet the loſs of life is a heavier penalty than the offence, taken in a civil light, deſerves; and, taken in a ſpiritual light, our laws have no juriſdiction over it. This puniſhment, therefore, has long ago become obſolete; and the offence of apoſtacy was for a long time the object only of the eccleſiaſtical courts, which corrected the offender *pro ſalute animæ.* But about the cloſe of the laſt century, the civil liberties to which we were then reſtored being uſed as a cloke of maliciouſneſs, and the moſt horrid doctrines ſubverſive of all religion being publicly avowed both in diſcourſe and writings, it was thought neceſſary again for the civil power to interpoſe, by not admitting thoſe miſcreants to the privileges of ſociety, who maintained ſuch principles as deſtroyed all moral obligation. To this end it was enacted by ſtatute 9 & 10 W. III. c. 32. That if any perſon educated in, or having made profeſſion of, the Chriſtian religion, ſhall by writing, printing, teaching, or adviſed ſpeaking, deny the Chriſtian religion to be true, or the holy Scriptures to be of divine authority, he ſhall upon the firſt offence be rendered incapable to hold any office or place of truſt; and, for the ſecond, be rendered incapable of bringing any action, or of being guardian, executor, legatee, or purchaſer of lands, and ſhall ſuffer three years impriſonment without bail. To give room however for repentance, if, within four months after the firſt conviction, the delinquent will in open court publicly renounce his error, he is diſcharged for that once from all diſabilities.

APOSTASIS, in medicine, the ſame with abſceſs.

APOSTATE, one who deſerts his religion. Among the Romaniſts, it ſignifies a man who, without a legal diſpenſation, forſakes a religious order of which he had made profeſſion. Hence,

APOSTATA CAPIENDO, in the Engliſh law, a writ that formerly lay againſt a perſon who, having entered into ſome order of religion, broke out again, and wandered up and down the country.

A POSTERIORI, or demonſtration *à poſteriori*. See DEMONSTRATION.

APOSTIL, in matters of literature, the ſame with a marginal note.

APOSTLE properly ſignifies a meſſenger or perſon ſent by another upon ſome buſineſs; and hence, by way of eminence, denotes one of the diſciples commiſſioned by Jeſus Chriſt to preach the goſpel.

Our bleſſed Lord ſelected twelve out of the number of his diſciples to be inveſted with the apoſtleſhip. Their names were Simon Peter, Andrew, James the greater, John, Philip, Bartholomew, Thomas, Matthew, James the leſs, Jude ſirnamed Lebbeus or Thaddeus, Simon the Canaanite, and Judas Iſcariot. Of theſe Simon, Andrew, James the greater, and John, were fiſhermen; and Matthew a publican, or receiver of the public revenues: of what profeſſion the reſt were, we are not told in Scripture; though it is probable they were fiſhermen.

There are various conjectures as to the reaſon of our Saviour's making choice of *twelve* apoſtles. The moſt probable is, that it might be in alluſion to the twelve patriarchs, as the founders of their ſeveral tribes; or to the twelve chief heads or rulers of thoſe tribes, of which the body of the Jewiſh nation conſiſted. This opinion ſeems to be countenanced by what our Saviour tells his apoſtles, that, "when the Son of man ſhall ſit in the throne of his glory, *they* alſo ſhall ſit upon twelve thrones judging the twelve tribes of Iſrael."

Our Lord's firſt commiſſion to his apoſtles was in the third year of his public miniſtry, about eight months after their ſolemn election; at which time he ſent them out by two and two. They were to make no proviſion of money for their ſubſiſtence in their journey, but to expect it from thoſe to whom they preached. They were to declare, that the kingdom of heaven, or the Meſſiah, was at hand; and to confirm their doctrine by miracles. They were to avoid going either to the Gentiles or to the Samaritans, and to confine their preaching to the people of Iſrael. In obedience to their Maſter, the apoſtles went into all the parts of Paleſtine inhabited by the Jews, preaching the goſpel, and working miracles. The evangelical hiſtory is ſilent as to the particular circumſtances attending this firſt preaching of the apoſtles; and only informs us, that they returned, and told their Maſter of all that they had done.

Their ſecond commiſſion, juſt before our Lord's aſcenſion into heaven, was of a more extenſive and particular nature. They were now not to confine their preaching to the Jews, but to "go and teach ALL nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghoſt." Accordingly they began publicly, after our Lord's aſcenſion, to exerciſe the office of their miniſtry, working miracles daily in proof of their miſſion, and making great numbers of converts to the Chriſtian faith. This alarmed the Jewiſh Sanhedrim; whereupon the apoſtles were apprehended, and, being examined before the high-prieſt and elders, were commanded not to preach any more in the name of Chriſt. But this injunction did not terrify them from perſiſting in the duty of their calling; for they continued daily, in the temple, and in private houſes, teaching and preaching the goſpel.

After the apoſtles had exerciſed their miniſtry for twelve years in Paleſtine, they reſolved to diſperſe themſelves in different parts of the world, and agreed to determine by lot what parts each ſhould take. According to this diviſion, St Peter went into Pontus, Galatia, and thoſe other provinces of the Leſſer Aſia. St Andrew had the vaſt northern countries of Scythia and Sogdiana allotted to his portion. St John's was partly the ſame with Peter's, namely the Leſſer Aſia. St Philip had the Upper Aſia aſſigned to him, with ſome parts of Scythia and Colchis. Arabia Felix fell to St Bartholomew's ſhare. St Matthew preached in Chaldæa, Perſia, and Parthia. St Thomas preached likewiſe in Parthia; as alſo to the Hyrcanians, Bactrians, and Indians. St James the Leſs continued in Jeruſalem, of which church he was biſhop. St Simon had for his portion Egypt, Cyrene, Libya, and Mauritania; St Jude Syria and Meſopotamia; and St Matthias, who was choſen in the room of the traitor Judas, Cappadocia and Colchis. Thus, by the diſperſion of the apoſtles, Chriſtianity was very early planted in a great many parts of the world. We have but very ſhort and imperfect accounts of their travels and actions.

In order to qualify the apoſtles for the arduous taſk of converting the world to the Chriſtian religion, they were, in the firſt place, miraculouſly enabled to ſpeak the languages of the ſeveral nations to whom they were to preach; and, in the ſecond place, were endowed with the power of working miracles, in confirmation of the doctrines they taught; gifts which were unneceſſary, and therefore ceaſed, in the after ages of the church, when Chriſtianity came to be eſtabliſhed by the civil power.

The ſeveral apoſtles are uſually repreſented with their reſpective badges or attributes; St Peter with the keys; St Paul with a ſword; St Andrew with a croſs; St James the Leſs with a fuller's pale; St John with a cup, and a winged ſerpent flying out of it; St Bartholomew with a knife; St Philip with a long ſtaff, whoſe upper end is formed into a croſs; St Thomas with a lance; St Matthew with a hatchet; St Matthias with a battle-ax; St James the Greater with a pilgrim's ſtaff, and a gourd-bottle; St Simon with a ſaw; and St Jude with a club.

The Jews alſo had their *apoſtles*, by which they meant officers, ſent into ſeveral parts, by way of viſitors or commiſſaries, to receive the moneys collected for the reparation of the temple, and the tribute payable to the Romans. The name was likewiſe given, in the primitive church, to biſhops; and a biſhop's ſee was called *apoſtolica ſedes*.

Apostles *Creed:* A *formula*, or ſummary, of the Chriſtian faith, drawn up, according to Ruffinus, by the apoſtles themſelves; who, during their ſtay at Jeruſalem, ſoon after our Lord's aſcenſion, agreed upon this *creed*, as a rule of faith, and as a *word of diſtinction* by which they were to know friends from foes. Baronius, and ſome other authors, conjecture, that they did not compoſe it till the ſecond year of the reign of Claudius, a little before their diſperſion. As to their manner of compoſing it, ſome fancy, that each apoſtle pronounced his article, which is the reaſon of its being called *ſymbolum apoſtolicum*, it being made up of ſentences jointly contributed, after the manner of perſons paying each their club *(ſymbolum)* or ſhare of a reckoning.

But there are reaſons which may induce us to queſtion whether the apoſtles compoſed any ſuch creed as this. For, firſt, neither St Luke in the Acts, nor any other eccleſiaſtical writer before the 5th century, make any mention of an aſſembly of the apoſtles in order to the compoſing of a creed. Secondly, the fathers of the three firſt centuries, in diſputing againſt the heretics, endeavour to prove that the doctrine contained in this creed was the ſame which the apoſtles taught; but they never pretend, that the apoſtles compoſed it. Thirdly, if the apoſtles had made this creed, it would have been the ſame in all churches, and in all ages; and all authors would have cited it after the ſame manner. But the caſe is quite otherwiſe. In the ſecond and third ages of the church, there were as many creeds as authors, and one and the ſame author ſets down the creed after a different manner in ſeveral places of his works; which is an evidence, that there was not at that time any creed which was reputed to be the apoſtles. In the 4th century, Ruffinus compares together the three ancient creeds of the churches of Aquileia, Rome, and the Eaſt, which differ very conſiderably in the terms. Beſides, theſe creeds differed not only in the terms and expreſſions, but even in the articles, ſome of which were omitted in one or other of them, ſuch as thoſe of the *deſcent into hell*, the *communion of the ſaints*, and the *life everlaſting*. From theſe reaſons it may be gathered, that tho' this creed may be ſaid to be that of the apoſtles in regard to the doctrines contained therein, yet it is not to be referred to them as the authors and firſt compoſers of it. Who was the true author of it, is not ſo eaſy to determine; tho' its great antiquity may be inferred from hence, that the whole form, as it now ſtands in the Engliſh liturgy, is to be found in the works of St Ambroſe and Ruffinus, the former of whom flouriſhed in the 3d century, and latter in the 4th century.

The primitive Chriſtians, in regard they always concealed this and their other myſteries, did not publicly recite the creed, except at the times of baptiſm; which, unleſs in caſes of neceſſity, were only at Eaſter and Whitſuntide. The conſtant repeating it was not introduced into the church till the end of the 5th century; about which time Petrus Gnapheus, biſhop of Antioch, preſcribed the recital of it every time divine ſervice was performed.

APOSTOLICAL, an epithet, or name, given to things that have a relation to the apoſtles; as *apoſtolical age, apoſtolical doctrine*, &c. The Romaniſts call their church, by way of eminence, *catholic* and *apoſtolical*. In the primitive times, the appellation was given to ſuch churches as had been founded by the apoſtles themſelves; of which the four principal were thoſe of Rome, Alexandria, Antioch, and Jeruſalem. In progreſs of time, the biſhop of Rome growing in power above the reſt, and the three patriarchates of Alexandria, Antioch, and Jeruſalem, falling into the hands of the Saracens, the title *apoſtolical* became reſtrained to the Pope and ſee of Rome. Hence we meet with *apoſtolical ſee, apoſtolical nuncio, apoſtolical notary, apoſtolical brief, apoſtolical chamber*, &c.

Apostolical *Canons*, rules, or laws, for the government of the Chriſtian church, ſuppoſed by ſome to have been drawn up by the apoſtles themſelves. Baronius and Bellarmin rejected the laſt 35 as apocryphal, but admitted the firſt 50 as genuine. Dr Beveridge is of opinion, with others, that, though theſe canons were not written by the apoſtles, yet that they were very ancient, and were properly a collection of the canons of ſeveral councils held before that of Nice.

Indeed, that the *apoſtolical canons* are of great antiquity, is plain from hence, that the council of Nice frequently cites them under the names of *ancient laws, canons of the fathers, eccleſiaſtical* and even *apoſtolical canons*. We cannot certainly ſay when, or by whom, they were compiled. However, it is very probable the collection was made at different times, becauſe there is no connection or order obſerved in them. The Greek church always acknowledged them as of great authority. They are cited by Juſtinian in his ſixth novel.

APOSTOLICS, an early ſect of Chriſtians, who called themſelves ſo, upon a pretence of being the only men who led their lives in imitation and after the example of the apoſtles: they likewiſe called themſelves *apotactics*, from a ſhew of renouncing the world more than other men. They condemned marriage.

APOSTROPHE, in rhetoric, a figure by which the orator, in a vehement commotion, turns himſelf on all ſides, and applies to the living and dead, to angels and to men, to rocks, groves, &c. Thus Adam, in Milton's Paradiſe Loſt:

> O Woods, O fountains, hillocks, dales, and bowers,
> With other echo, *&c.*

Apostrophe, in grammar, the contraction of a word by the uſe of a comma: as *call'd* for *called, tho'* for *though*.

APOTEICHISMUS, in the ancient military art, a kind of line of circumvallation drawn round a place in order to beſiege it. The firſt thing the ancients went about, when they deſigned to lay cloſe ſiege to a place, was the Apoteichiſmus; which ſometimes conſiſted of a double wall, or rampart, raiſed of earth; the innermoſt to prevent ſudden ſallies from the town, the outermoſt to keep off foreign enemies from coming to the relief of the beſieged. This anſwered to what is called *lines of contravallation* and *circumvallation* among the moderns.

APOTACTITES, in church hiſtory, a name given to the Apoſtolics, from the ſhew they made of renouncing the world more than other men *.

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* See Ap lics.

APOTHECARY, one who practiſes the art of pharmacy. In London, the apothecaries are one of the city-companies. They were incorporated by a charter from king James I. procured at the ſolicitation of Dr Mayerne and Dr Aitkins: till that time they only made a part of the grocers company; plums, ſugar, ſpice, Venice treacle, mithridate, *&c.* were ſold in the ſame ſhop and by the ſame perſon. The reaſon of ſeparating them was, that medicines might be better prepared, and in oppoſition to divers perſons who impoſed unwholeſome remedies on the people. By an act which was made perpetual in the ninth year of George I. they are exempted from ſerving upon juries, or in ward and pariſh offices. They are obliged to make up their medicines according to the formulas preſcribed in the college diſpenſatory; and are liable to have their ſhops viſited by the cenſors of the college, who are empowered to deſtroy ſuch medicines as they think not good.

APOTHEOSIS, in antiquity, a ceremony by which the ancient Romans complimented their emperors and great men, after their death, with a place among the gods. It is deſcribed as follows. After the body of the deceaſed had been burnt with the uſual ſolemnities, an image of wax, exactly reſembling him, was placed on an ivory couch, where it lay for ſeven days, attended by the ſenate and ladies of the higheſt quality in mourning; and then the young ſenators and knights bore the bed of ſtate through the via ſacra to the old forum, and from thence to the campus martius, where it was depoſited upon an edifice built in form of a pyramid. The bed being thus placed amidſt a quantity of ſpices and other combuſtibles, and the knights having made a ſolemn proceſſion round the pile, the new emperor, with a torch in his hand, ſet fire to it, whilſt an eagle, let fly from the top of the building, and mounting in the air with a firebrand, was ſuppoſed to convey the ſoul of the deceaſed to heaven; and thenceforward he was ranked among the gods.

We often meet with the conſecration or Apotheoſis of emperors repreſented on medals; where we ſee the pyramids of ſeveral ſtories, each growing leſs and leſs, we ſee alſo the eagles flying away with the ſouls of the deceaſed emperors. A gem in the muſæum of Brandenburg, repreſents the apotheoſis of Julius Cæſar, mounted upon the celeſtial globe, and holding an helm in his hand, as if he were now the governor of Heaven, as before of the earth. See Deification.

APOTOME, in geometry, the difference between two incommenſurable lines.

Apotome, in muſic, the difference between a greater and leſſer ſemi-tone; expreſſed by the ratio, 128; 125.

APOZEM, in medicine, the ſame with decoction*.

* See Decoction.

APPARATUS, a term uſed to denote a complete ſet of inſtruments, or other utenſils, belonging to any artiſt or machine.

APPARENT, in a general ſenſe, ſomething that is viſible to the eyes, or obvious to the underſtanding.

Apparent, among mathematicians and aſtronomers, denotes things as they appear to us, in contradiſtinction from real or true; thus we ſay, the apparent diameter, diſtance, magnitude, place, figure, *&c.* of bodies.

Apparent *Heir*, in law. No inheritance can veſt, nor can any perſon be the actual complete heir of another, till the anceſtor is previouſly dead. *Nemo eſt hæres viventis.* Before that time the perſon who is next in the line of ſucceſſion is called an *heir apparent*, or *heir preſumptive*. Heirs *apparent* are ſuch, whoſe right of inheritance is indefeaſible, provided they outlive the anceſtor; as the eldeſt ſon or his iſſue, who muſt by the courſe of the common law be heirs to the father whenever he happens to die. Heirs *preſumptive* are ſuch, who, if the anceſtor ſhould die immediately, would in the preſent circumſtances of things be his heirs: but whoſe right of inheritance may be defeated by the contingency of ſome nearer heir being born; as a brother or nephew, whoſe preſumptive ſucceſſion may be deſtroyed by the birth of a child; or daughter, whoſe preſent hopes may be hereafter cut off by the birth of a ſon. Nay, even if the eſtate hath deſcended, by the death of the owner, to ſuch brother, or nephew, or daughter; in the former caſes, the eſtate ſhall be diveſted and taken away by the birth of a poſthumous child; and, in the latter, it ſhall alſo be totally diveſted by the birth of a poſthumous ſon.

APPARITION, in a general ſenſe, denotes ſimply the appearance of a thing. In a more limited ſenſe, it is uſed for a ſpectre or ghoſt.—Several inſtances of apparitions occur in the Bible; that of Samuel, raiſed by the witch of Endor, has occaſioned great diſputes. We find great controverſies among authors, in relation to the reality, the exiſtence or non-exiſtence, the poſſibility or impoſſibility, of apparitions. The Chaldeans, the Jews, and other nations, have been the ſteady aſſerters of the belief of apparitions. The denial of ſpirits and apparitions is by ſome made one of the marks of infidelity, if not of atheiſm. Many of the apparitions we are told of in writers, are doubtleſs mere deluſions of the ſenſe; many others were ſeen but in dreams or deliquiums; many others are fictitious, contrived merely to amuſe, or anſwer ſome purpoſe. Apparitions, it is certain, are machines that on occaſion have been of good ſervice both to generals, to miniſters of ſtate, to prieſts, and others.

APPARITOR, among the Romans, a general term to comprehend all attendants of judges and magiſtrates appointed to receive and execute their orders. *Apparitor*, in England, is a meſſenger that ſerves the proceſs of a ſpiritual court, or a beadle in an univerſity who carries the mace.

APPAUMEE, in heraldry, denotes one hand extended, with the full palm appearing, and the thumb and fingers at full length.

APPEAL, in law, the removal of a cauſe from an inferior to a ſuperior court or judge, when a perſon thinks himſelf aggrieved by the ſentence of the inferior judge. Appeals lie from all the ordinary courts of juſtice to the Houſe of Lords. In eccleſiaſtical caſes, if an appeal is brought before a biſhop, it may be removed to the archbiſhop; if before an archdeacon, to the court of arches, and thence to the archbiſhop; and from the archbiſhop's court to the king in chancery.

Appeal, in common law, denotes an accuſation by a private ſubject againſt another, for ſome heinous crime; demanding puniſhment on account of the particular injury ſuffered, rather than for the offence againſt the public.

This private proceſs, for the puniſhment of public crimes, had probably its original in thoſe times, when a private pecuniary ſatisfaction, called a *weregild*, was conſtantly paid to the party injured, or his relations, to expiate enormous offences. This was a cuſtom derived to the Engliſh, in common with other northern nations, from their anceſtors the ancient Germans; among whom, according to Tacitus, *luitur homicidium certo armentorum ac pecorum numero; recipitque ſatisfactionem univerſa domus*. In the ſame manner, by the Iriſh Brehon law, in caſe of murder, the brehon or judge was uſed to compound between the murderer, and the friends of the deceaſed who proſecuted him, by cauſing the malefactor to give unto them, or to the child or wife of him that was ſlain, a recompence which they called an *eriach*. And thus we find in the Anglo-Saxon laws (particularly thoſe of king Athelſtan) the ſeveral weregilds for homicide eſtabliſhed in progreſſive order, from the death of the ceorl or peaſant, up to that of the king himſelf. And in the laws of Henry I. we have an account of what other offences were redeemable by weregild, and what were not ſo. As therefore, during the continuance of this cuſtom, a proceſs was certainly given, for recovering the weregild by the party to whom it was due; it ſeems, that, when theſe offences by degrees grew no longer redeemable, the private proceſs was ſtill continued, in order to inſure the infliction of puniſhment upon the offender, though the party injured was allowed no pecuniary compenſation for the offence.

But, though appeals were thus in the nature of proſecutions for ſome atrocious injury committed more immediately againſt an individual, yet it alſo was anciently permitted, that any ſubject might appeal another ſubject of high-treaſon, either in the courts of common law, or in parliament, or (for treaſons committed beyond the ſeas) in the court of the high conſtable and marſhal. The cognizance of appeals in the latter ſtill continues in force; and ſo late as 1631, there was a trial by battel awarded in the court of chivalry, on ſuch an appeal of treaſon: but that in the firſt was *virtually* aboliſhed by the ſtatutes 5 Edw. III. c. 9. and 2 Edw. III. c. 24. and in the ſecond *expreſsly* by ſtatute 1 Hen. IV. c. 14. So that the only appeals now in force, for things done within the realm, are appeals of felony and mayhem.

An appeal of felony may be brought for crimes committed either againſt the parties themſelves, or their relations. The crimes againſt the parties themſelves are *larceny*, *rape*, and *arſon*. And for theſe, as well as for mayhem, the perſons robbed, raviſhed, maimed, or whoſe houſes are burnt, may inſtitute this private proceſs. The only crime againſt one's relation, for which an appeal can be brought, is that of *killing* him, by either murder or manſlaughter. But this cannot be brought by every relation; but only by the wife for the death of her huſband, or by the heir-male for the death of his anceſtor; which heirſhip was alſo confined by an ordinance of Henry I. to the four neareſt degrees of blood. It is given to the wife, on account of the loſs of her huſband: therefore, if ſhe marries again, before or pending her appeal, it is loſt and gone; or, if ſhe marries after judgment, ſhe ſhall not demand execution. The heir, as was ſaid, muſt alſo be heir-male, and ſuch a one as was the next heir by the courſe of the common law at the time of the killing of the anceſtor. But this rule has three exceptions: 1. If the perſon killed leaves an innocent wife, ſhe only, and not the heir, ſhall have the appeal: 2. If there be no wife, and the heir be accuſed of the murder, the perſon, who next to him would have been heir-male, ſhall bring the appeal: 3. If the wife kills her huſband, the heir may appeal her of the death. And, by the ſtatute of Glouceſter, 6 Ed. I. c. 9. all appeals of death muſt be ſued within a year and a day after the completion of the felony by the death of the party: which ſeems to be only declaratory of the old common law; for in the Gothic conſtitutions we find the ſame "*præſcriptio annalis, quæ currit adverſus actorem, ſi de homicida ei non conſtat intra annum a cæde facta, nec quenquam interea arguat et accuſet*."

Theſe appeals may be brought previous to any indictment; and, if the appellee be acquitted thereon, he cannot be afterwards indicted for the ſame offence. In like manner as by the old Gothic conſtitution, if any offender gained a verdict in his favour, when proſecuted by the party injured, he was alſo underſtood to be acquitted of any crown-proſecution for the ſame offence: but, on the contrary, if he made his peace with the king, ſtill he might be proſecuted at the ſuit of the party. And ſo, in England, if a man be acquitted on an indictment of murder, or found guilty, and pardoned by the king, ſtill he ought not (in ſtrictneſs) to go at large, but be impriſoned or let to bail till the year and day be paſt, by virtue of the ſtatute 3 Hen. VII. c. 1. in order to be forthcoming to anſwer any appeal for the ſame felony, not having as yet been puniſhed for it: though, if he hath been found guilty of manſlaughter on an indictment, and hath had the benefit of clergy, and ſuffered the judgment of the law, he cannot afterwards be appealed; for it is a maxim in law, "that *nemo bis punitur pro eodem delicto*." Before this ſtatute was made, it was not uſual to indict a man for homicide within the time limited for appeals; which produced very great inconvenience.

If the appellee be acquitted, the appellor (by virtue of the ſtatute of Weſtm. 2. 13 Edw. I. c. 12.) ſhall ſuffer one year's impriſonment, and pay a fine to the king, beſides reſtitution of damages to the party for the impriſonment and infamy which he has ſuſtained: and, if the appellor be incapable to make reſtitution, his abettors ſhall do it for him, and alſo be liable to impriſonment. This proviſion, as was foreſeen by the author of Fleta, proved a great diſcouragement to appeals; ſo that thenceforward they ceaſed to be in common uſe.

If the appellee be found guilty, he ſhall ſuffer the ſame judgment, as if he had been convicted by indictment: but with this remarkable difference, that on an indicment, which is at the ſuit of the king, the king may pardon and remit the execution; on an appeal, which is at the ſuit of a private ſubject, to make an atonement for the private wrong, the king can no more pardon it, than he can remit the damages recovered on an action of battery. In like manner as, while the weregild continued to be paid as a fine for homicide, it could not be remitted by the king's authority. And the ancient uſage was, ſo late as Henry IV.'s time, that all the relations of the ſlain ſhould drag the appellee to the place of execution: a cuſtom, founded upon that ſavage ſpirit of family-reſentment which prevailed univerſally through Europe after the irruption of the northern nations, and is peculiarly attended to in their ſeveral codes of law; and which prevails even now among the wild and untutored inhabitants of America: as if the finger of nature had pointed it out to mankind, in their rude and uncultivated ſtate. However, the puniſhment of the offender may be remitted and diſcharged by the concurrence of all parties intereſted; and as the king by his pardon may fruſtrate an indictment, ſo the appellant by his releaſe may diſcharge an appeal: "*nam quilibet poteſt renunciare juri pro ſe introducto.*"

APPEARANCE, in a general ſenſe, the exterior ſurface of a thing, or that which immediately ſtrikes the ſenſes.

Appearance, in law, ſignifies a defendant's filing a common or ſpecial bail, on any proceſs iſſued out of a court of judicature.

APPELLANT, in a general ſenſe, one who appeals. See Appeal.

Appellants, in church hiſtory, an appellation given to ſuch of the catholic clergy as appeal from the conſtitution unigenitus to a general council.

APPELLATIVE. Words and names are either common or proper. Common names are ſuch as ſtand for univerſal ideas, or a whole rank of beings, whether general or ſpecial. Theſe are called *appellatives.* So fiſh, bird, man, city, river, are common names; and ſo are trout, eel, lobſter; for they all agree to many individuals, and ſome to many ſpecies.

APPELLEE, among lawyers, the perſon againſt whom an appeal is brought. See Appeal.

APPENDIX, in literature, a treatiſe added at the end of a work, to render it more complete.

APPERCEPTION, or Adperception, a term uſed by Leibnitz and his followers for conſciouſneſs.

APPETITE, in a general ſenſe, the deſire of enjoying ſome object, ſuppoſed to be conducive to our happineſs. When this inclination is guided by reaſon, and proportioned to the intrinſic value of the object, it is called *rational appetite;* as, on the other hand, it is denominated *ſenſitive appetite,* when we have only a blind propenſity to a thing, without determinate ideas of the good qualities for which we deſire it.

Appetite, in medicine, a certain painful or uneaſy ſenſation, always accompanied with a deſire to eat or drink.—An exceſſive appetite is called by phyſicians *bulimy*, or *fames canina;* a defect or loſs of it, *anorexy;* and that after things improper for food, *pica.*

APPIA via, a way reaching from Rome through Capua to Brunduſium, between 330 and 350 miles long. Appius Claudius, ſurnamed *Cæcus,* in the year of the city 441, carried it from the Porta Capena to Capua, (Livy, Frontinus). It was afterwards carried on to Brunduſium; but by whom, or when, is uncertain. It was laid with very hard ſtone, brought from a great diſtance, large, and ſquared, (Diodorus); and it was ſo wide, that ſeveral waggons could go abreaſt. Statius calls it *the queen of roads.* Its courſe is deſcribed by Horace, Strabo, and Antonine.

APPIAN, an eminent writer of the Roman hiſtory in Greek, under the reigns of Trajan and Hadrian. He was of a good family in Alexandria in Egypt; whence he went to Rome, and there diſtinguiſhed himſelf ſo well as an advocate, that he was choſen one of the procurators of the empire, and the government of a province was committed to him. He did not complete the Roman hiſtory in a continued ſeries; but wrote diſtinct hiſtories of all nations that had been conquered by the Romans, in which he placed every thing relating to thoſe nations in the proper order of time. His ſtyle is plain and ſimple: in the opinion of Photius, he has ſhown the greateſt knowledge of military affairs, and the happieſt talent at deſcribing them, of any of the hiſtorians; for while we read him, we in a manner ſee the battles which he deſcribes. Of all this voluminous work there remains only what treats of the Punic, Syrian, Parthian, Mithridatic, and Spaniſh wars, with thoſe againſt Hannibal, the civil wars, and the wars in Illyricum, and ſome fragments of the Celtic or Gallic wars.

APPIUS CLAUDIUS, a Sabine by birth, one of the principal inhabitants of Regillum: his ſhining merit having drawn the envy of his fellow-citizens upon him, he retired to Rome with all his family. Appius was admitted into the ſenate, and was made conſul, with Publius Servilius Priſcus, in 258 from the building of Rome: but he was hated by the plebeians, being an auſtere oppoſer of their clamours and ſeditions. The Claudian family continued long one of the moſt illuſtrious of the patrician families in Rome; and ſeveral in ſucceſſion of the name of Appius ſupported the ſame ſtern character that diſtinguiſhed their firſt founder.

Appius Claudius, the decemvir. See Virginia.

APPLAUSE, an approbation of ſomething, ſignified by clapping the hands, ſtill practiſed in theatres. —Applauſe, in antiquity, differed from acclamation *, as the latter was articulate and performed with the voice, the former with the hands. Among the Romans, applauſe was an artificial muſical kind of noiſe, made by the audience or ſpectators to expreſs their ſatisfaction. There were three ſpecies of applauſe, denominated from the different noiſes made in them, *viz. Bombus, Imbrices,* and *Teſtæ;* the firſt a confuſed din, made either by the hands or the mouth; the ſecond and third, by beating on a ſort of ſounding veſſels placed in the theatres for this purpoſe. Perſons were inſtructed to give applauſe with ſkill; and there were even maſters who profeſſed to teach the art. The proficients in this way let themſelves out for hire to the vain-glorious among the poets, actors, &c. and were properly diſpoſed to ſupport a loud applauſe. Theſe they called *Laudicœni,* and Σοφοκλεις. At the end of the play, a loud peal of applauſe was expected, and even aſked of the audience, either by the chorus, or the perſon who ſpoke laſt. The formula was, *Spectatores plaudite,* or *Valete et plaudite.* The *plauſores,* or applauders, were divided into chori, and diſpoſed in theatres oppoſite to each other like the choriſters in cathedrals, ſo that there was a kind of concert of applauſes.

APPLE, the fruit of the malus, or apple-tree *.

Apple *of the eye,* a name not unfrequently given to the pupil. See Anatomy, n° 406, m.

Apples *of Love.* See Lycopersicon.

Mad Apples. See Melongena.

APPLEBY, the county-town of Weſtmoreland, where the aſſizes are held, is ſeated on the banks of the river Eden, which almoſt ſurrounds it. It was formerly a very conſiderable town, and had great privileges; but it is long ago gone to decay, and now only conſiſts of mean houſes in one broad ſtreet, which runs with an eaſy aſcent from north to ſouth; at the head of which is the caſtle, almoſt entirely ſurrounded by the river. It has two churches; a town-hall, in which the aſſizes are held; a county jail; and an hoſpital for a governeſs and twelve widows, founded in 1651 by a daughter of lord Clifford. It is governed by a mayor, twelve aldermen, a common-council, and two ſerjeants at mace, &c. Here is ſaid to be the beſt corn-market in theſe northern parts. W. Long. 3. 52. N. Lat. 54. 30. *

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* See *Acclamation.*

* See *Malus.*

APPLICATION, in a general ſenſe, is the laying two things together, in order to diſcover their agreement or diſagreement.

Application, in geometry, is uſed either for diviſion, for applying one quantity to another, whoſe areas, but not figures, ſhall be the ſame; or, for tranſferring a given line into a circle, or other figure, ſo that its ends ſhall be in the perimeter of the figure.

Application, among divines, a term uſed to ſignify the ſame as imputation. See Imputation.

APPOGIATURA, in muſic, a ſmall note inſerted by the practical muſician, between two others, at ſome diſtance.

APPOINTEE, a foot ſoldier or officer in the French army who receives a greater pay than others of the ſame rank, in conſideration of his valour or long ſervice.

Appointe'e, in heraldry, the ſame as *aguiſée:* Thus we ſay, a croſs appointée, to ſignify that with two angles at the end cut off, ſo as to terminate in points.

APPOINTMENT, in a general ſenſe, the ſame as aſſignation: See Assignation. In a more reſtrained ſenſe, it ſignifies a penſion given by princes and noblemen to retain certain perſons in their ſervice.

APPOSITION, in grammar, the placing two or more ſubſtantives together in the ſame caſe, without any copulative conjunction between them; as, *Ardebat Alexim, delicias domini.*

APPRAISING, the act of rating, valuing, or ſetting a price on goods, by a perſon who is a competent judge, and is authoriſed thereto.

APPREHENSION, in logic, the firſt or moſt ſimple act of the mind, whereby it perceives, or is conſcious of ſome idea.

APPRISING, in Scots law, the name of that action by which a creditor formerly carried off the eſtate of his debtor for payment. It is now aboliſhed, and adjudications are appointed in place of it.

APPROACH, or Approaching, in a general ſenſe, the acceding or coming together of two or more things.

Approaches, in fortification, the works thrown up by the beſiegers, in order to get nearer a fortreſs, without being expoſed to the enemy's cannon.

APPROACHING, in fowling, a term uſed to expreſs ſuch devices as are contrived for the getting within ſhot of ſhy birds. It is principally uſed in marſhy low places. The beſt method of approaching is by means of three hoops tied together at proper diſtances according to the height of the man that is to uſe it, and having boughs of trees tied all round it, with cords to hang it over his ſhoulders; a man getting into this, conceals himſelf, and approaches by degrees towards his game in the form of a moving buſh. Geeſe, ducks, and teal, quit the waters in the evening, and paſs the night in the fields; but at the approach of morning they return to the water again, and even when on the water they will retire to great diſtances, on the approach even of a horſe or cow, ſo that the buſineſs of the ſtalking-horſe is of little uſe; but this device of approaching by the moving buſh ſucceeds tolerably well with them.

Approaching, in gardening, the inoculating or ingrafting the ſprig of one tree into another, without cutting it off the parent-tree.

APPROBATION, a ſtate or diſpoſition of the mind wherein we put a value upon, or become pleaſed with, ſome perſon or thing. Moraliſts are divided on the principle of approbation, or the motive which determines us to approve and diſapprove. The Epicureans will have it to be only ſelf-intereſt: according to them, that which determines any agent to approve his own action, is its apparent tendency to his private happineſs; and even the approbation of another's action flows from no other cauſe but an opinion of its tendency to the happineſs of the approver, either immediately or remotely. Others reſolve approbation into a moral ſenſe, or a principle of benevolence by which we are determined to approve every kind affection either in ourſelves or others, and all publicly uſeful actions, which we imagine to flow from ſuch affection, without any view therein to our own private happineſs.

APPROPRIATION, in the canon law, a ſevering of a benefice eccleſiaſtical to the proper and perpetual uſe of ſome religious houſe *.

The contrivance of appropriations ſeems to have ſprung from the policy of the monaſtic orders, who have never been deficient in ſubtile inventions for the increaſe of their own power and emoluments. At the firſt eſtabliſhment of parochial clergy, the tithes of the pariſh were diſtributed in a fourfold diviſion; one for the uſe of the biſhop, another for maintaining the fabric of the church, a third for the poor, and the fourth to provide for the incumbent. When the ſees of the biſhops became otherwiſe amply endowed, they were prohibited from demanding their uſual ſhare of theſe tithes, and the diviſion was into three parts only. And hence it was inferred by the monaſteries, that a ſmall part was ſufficient for the officiating prieſt; and that the remainder might well be applied to the uſe of their own fraternities, (the endowment of which was conſtrued to be a work of the moſt exalted piety), ſubject to the burthen of repairing the church and providing for its conſtant ſupply. And therefore they begged and bought, for maſſes and obits, and ſometimes even for money, all the advowſons within their reach, and then appropriated the benefices to the uſe of their own corporation. But, in order to complete ſuch appropriation effectually, the king's licence, and conſent of the biſhop, muſt firſt be obtained; becauſe both the king and the biſhop may ſome time or other have an intereſt, by lapſe, in the preſentation to the benifice; which can never happen if it be appropriated to the uſe of a corporation, which never dies: and alſo becauſe the law repoſes a confidence in them, that they will not conſent to any thing that ſhall be to the prejudice of the church. The conſent of the patron alſo is neceſſarily implied, becauſe the appropriation can be originally made to none but to ſuch ſpiritual corporation as is alſo the patron of the church; the whole being indeed nothing elſe but an allowance for the patrons to retain the tithes and glebe in their own hands, without preſenting any clerk, they themſelves undertaking to provide for the ſervice of the church. When the appropriation is thus made, the appropriators and their ſucceſſors are perpetual parſons of the church; and muſt ſue and be ſued, in all matters concerning the rights of the church, by the name of *parſons*.

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* See *Abalaba.*

* See the ar ticle *Parſo*

This appropriation may be ſevered, and the church become diſappropriate, two ways; as, firſt, if the patron or appropriator preſents a clerk, who is inſtituted and inducted to the parſonage: for the incumbent ſo inſtituted and inducted is to all intents and purpoſes complete parſon; and the appropriation being once ſevered, can never be re-united again, unleſs by a repetition of the ſame ſolemnities. And, when the clerk ſo preſented is diſtinct from the vicar, the rectory thus veſted in him becomes what is called a *ſine-cure*; becauſe he hath no cure of ſouls, having a vicar under him to whom that cure is committed. Alſo, if the corporation which has the appropriation is diſſolved, the parſonage becomes diſappropriate at common law: becauſe the perpetuity of perſon is gone, which is neceſſary to ſupport the appropriation.

In this manner, and ſubject to theſe conditions, may appropriations be made at this day: and thus were moſt if not all of the appropriations at preſent exiſting originally made; being annexed to biſhopricks, prebends, religious houſes, nay, even to nunneries, and certain military orders, all of which were ſpiritual corporations. At the diſſolution of monaſteries, by ſtatutes 27 Hen. VIII. c. 28. and 31 Hen. VIII. c. 13. the appropriations of ſeveral parſonages, which belonged to thoſe reſpective religious houſes, (amounting to more than one third of all the pariſhes in England), would have been by the rules of the common law diſappropriated; had not a clauſe in thoſe ſtatutes intervened, to give them to the king in as ample a manner as the abbots, &c. formerly held the ſame at the time of their diſſolution. This, though perhaps ſcarcely defenſible, was not without example: for the ſame was done in former reigns, when the alien priories (that is, ſuch as were filled by foreigners only) were diſſolved and given to the crown. And from theſe two roots have ſprung all the lay-appropriations or ſecular parſonages which we now ſee in the kingdom; they having been afterwards granted out from time to time by the crown. See the article PARSON *and Vicar*.

APPROXIMATION, in arithmetic and algebra, the coming nearer and nearer to a root, or other quantity ſought, without expecting to be ever able to find it exactly.

APPUI, in the manage, (*q. d.* reſt or ſtay upon the hand), is the reciprocal effort between the horſe's mouth and the bridle-hand, or the ſenſe of the action of the bridle on the hand of the horſeman.

A juſt appui of the hand, is the nice bearing up or ſtay of the bridle, ſo that the horſe, being awed by the ſenſibility and tenderneſs of his mouth, dares not reſt too much upon the bit-mouth, nor check or beat upon the hand to withſtand it. A horſe is ſaid to have no appui, when he is too apprehenſive of the hand, and cannot bear the bit. He is ſaid to have too much appui, when he reſts or throws himſelf too much upon the bit. Horſes deſigned for the army ought to have a full appui upon the hand. To give a horſe a good appui, he ſhould be galloped, and put often back.

APPULSE, in aſtronomy, the approach of a planet towards a conjunction with the ſun or any of the fixed ſtars.

APRICOT, in botany. See ARMENIACA.

APRIES, ſon of Pſammis, king of Egypt; the ſame with Pharaoh Hophrah in Jeremiah and Ezekiel. He ruined Sidon, and ſome ſay he put Jeremiah to death. He thought neither God nor man could dethrone him; which yet was eaſily done by Amaſis, and he himſelf was ſtrangled by the Egyptians.

APRIL, in chronology, the fourth month of the year, containing only 30 days.

A PRIORI, a kind of demonſtration *.

APRON, in gunnery, the piece of lead which covers the touch-hole of a cannon.

APSIS, in aſtronomy, a term uſed indifferently for either of the two points of a planet's orbit, where it is at greateſt or leaſt diſtance from the ſun or earth; and hence the line connecting thoſe points is called the line of the *apſides*. The word is Greek, and derived from απτω, to *connect*. The apſis at the greateſt diſtance from the ſun is called the *aphelion*, and at the greateſt diſtance from the earth the *apogee*; while that at the leaſt diſtance from the ſun is termed the *perihelion*, and at the leaſt diſtance from the earth the *perigee*.

APSIS, among eccleſiaſtical writers, denotes the inner part of the ancient churches, anſwering to the modern choir. It is alſo uſed for the biſhop's throne, and ſometimes for the ambo. See AMBO.

APTA, or APTA JULIA, (Pliny); now *Apte*, in Provence, on the river Calavon, ſeven leagues to the north of Aix, and nine to the north of Avignon. In the Notitiæ it is called *Civitas Aptenſium*: Pliny reckons it among the Latin towns. That it was a colony, appears from an inſcription on a ſtone found at Arles, (Sirmond). E. Long. 5. 56. Lat. 43. 23.

APTERA, (Strabo, Stephanus); APTERON, (Pliny); APTERIA, (Ptolemy): an inland town of Crete, whoſe port was Ciſamus, on the weſt ſide of the iſland, (Strabo); 12 miles to the ſouth of Cydonia, towards the Montes Leuci, and as many from the Sinus Amphimales. So called from the Sirens, who, being there vanquiſhed in ſong by the Muſes, ſtript themſelves of their wings, and out of grief leaped into the ſea, (Stephanus). There was a town of Lycia of the ſame name. E. Long. 25. Lat. 35. 50.

APTERA, a term uſed by Linnæus for his ſeventh order of inſects, comprehending ſuch as have no wings.

APTHANE, a title anciently given to the higheſt degrees of nobility in Scotland. See THANE.

APTOTE, among grammarians, an indeclinable noun, or one which has no variation of caſes.

APULEIUS (Lucius), a Platonic philoſopher, univerſally known by his performance of the Golden Aſs. He lived in the ſecond century, under the Antonines; and was born at Madaura, a Roman colony in Africa. He ſtudied firſt at Carthage, then at Athens, and afterwards at Rome, where he learned the Latin tongue without the help of a maſter. He was a man of a curious and inquiſitive diſpoſition, eſpecially in religious matters: this prompted him to take ſeveral journeys, and to enter into ſeveral ſocieties of religion. He ſpent his whole fortune almoſt in travelling; ſo that, at his return to Rome, when he was about to dedicate himſelf to the ſervice of Oſiris, he had not money enough to defray the expence attending the ceremonies of the reception, and was obliged to pawn his clothes to raiſe the neceſſary ſum. He ſupported himſelf afterwards by pleading cauſes; and as he was a great maſter of eloquence, and of a ſubtle genius, many conſiderable cauſes were truſted to him. But he availed himſelf more by a good marriage than by his pleadings: a widow, named *Pudentilla*, who was neither young nor handſome, but wanted a huſband, and was very rich, took a great fancy to him. This marriage drew upon him a troubleſome law-ſuit. The lady's relations, pretending he made uſe of ſorcery to gain her heart and money, accuſed him of being a magician before Claudius Maximus, proconſul of Africa. Apuleius was under no great difficulty of making his defence. As Pudentilla was determined, from conſiderations of health, to enter upon a ſecond marriage, even before ſhe had ſeen this pretended magician, the youth, deportment, pleaſing converſation, vivacity, and other agreeable qualities of Apuleius, were charms ſufficient to engage her heart. He had the moſt favourable opportunities too of gaining her friendſhip, for he lodged ſome time at her houſe: Pudentilla's eldeſt ſon having a great friendſhip for him, was likewiſe deſirous of the match, and ſolicited him in favour of Pudentilla. "Do you make a wonder (ſaid Apuleius, in his defence) that a woman ſhould marry again, after having lived a widow 13 years? it is much more wonderful that ſhe did not marry again ſooner. You think that magic muſt have been employed to prevail with a widow of her age, to marry a young man; on the contrary, this very circumſtance ſhews how little occaſion there was for magic." He offered to prove by his marriage-contract, that he got nothing of Pudentilla but a promiſe of a very moderate ſum, in caſe he ſurvived her and had children by her. He was alſo obliged to make ſuch confeſſions in court as Pudentilla would gladly have excuſed. He ſaid ſhe was neither handſome nor young, nor ſuch as could any ways tempt him to have recourſe to inchantments: moreover, he added, that Pontianus her ſon propoſed the marrying his mother to him only as a burden, and the action of a friend and philoſopher. He alſo took notice of many inconveniences which attend the marrying of widows, and ſpoke highly of the advantages of a maid above a widow: "A handſome virgin (ſaid he), let her be ever ſo poor, is abundantly portioned; ſhe brings to her huſband a heart quite new, together with the flower and firſt-fruits of her beauty. It is with great reaſon that all huſbands ſet ſo great a value upon the flower of virginity: all the other goods which a woman brings her huſband are of ſuch a nature, that he may return them again, if he has a mind to be under no obligation to her; that alone cannot be reſtored, it remains in the poſſeſſion of the firſt huſband. If you marry a widow, and ſhe leaves you, ſhe carries away all that ſhe brought you." Upon which paſſage Mr Bayle makes a very coarſe remark, *viz.* "That this good which is never taken back out of the hands of a huſband, is very chimerical; and that there is never a baker nor a butcher, who would lend ſixpence upon this unperiſhable poſſeſſion." The apology is ſtill extant, and is reckoned a very fine piece. Apuleius was extremely indefatigable in his ſtudies; and compoſed ſeveral books, ſome in verſe, and others in proſe; but moſt of them have been loſt. He took great pleaſure in declaiming, and was heard generally with great applauſe: when he declaimed at Oeca, the audience cried out with one voice, that they ought to confer upon him the honour of citizen. The citizens of Carthage heard him with great ſatisfaction, and erected a ſtatue to him; and ſeveral other cities did him the ſame honour. Several critics have publiſhed notes on Apuleius's Golden Aſs, and there have been tranſlations of it into different languages.

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* See *Demonſtration.*

APULIA, now Puglia, a territory of Italy, bordering on the Adriatic, and extending from the river Frento to Tarentum in length, and from the Adriatic to the Lucani in breadth. *Apuli* the people, (Horace), divided into the *Apulia Daunia*, now called *Puglia Pinna*, or the *Capitanata*; and into the *Apulia Peucetia*, now *Terra di Barri*, (Pliny, Ptolemy). Apulia abounded in ſheep, which yielded the fineſt wool, (Martial). It is now the eaſt ſide of the kingdom of Naples.

APYCNI suoni, in muſic, ſounds diſtant one or more octaves, and yet concord.

APYCNOS, in muſic, is ſaid of the diatonic genus, on account of its having ſpacious intervals, in compariſon of the chromatic and enharmonic.

APYREXY, among phyſicians, denotes the intermiſſion of a fever.

APYROUS, a word applied to denote that property of ſome bodies, by which they reſiſt the moſt violent fire without any ſenſible alteration. Apyrous bodies ought to be diſtinguiſhed from thoſe which are refractory. Refractory ſubſtances are thoſe which cannot by violent heat be fuſed, whatever other alteration they may ſuſtain. But a body, properly ſpeaking, apyrous, can neither be fuſed by heat, nor can undergo any other change. Diamonds were long thought to be poſſeſſed of this property. But ſome late experiments have ſhown, that diamonds may be entirely diſſipated or evaporated by heat, and are therefore not entitled to be ranked among apyrous ſubſtances. Perhaps there is no body in nature eſſentially and rigorouſly apyrous. But it is ſufficient that there be bodies apyrous relatively to the degree of fire which art can produce, to entitle them to that name.

AQUA, a term frequently met with in the writings of phyſicians, chemiſts, *&c.* for certain medicines, or menſtruums, in a liquid form, diſtinguiſhed from each other by peculiar epithets, as Aqua *Alexiteria*, Aqua *Aluminoſa*, Aqua *Mirabilis*, *&c.* for which ſee Pharmacy, nº 501, &c.

Aqua *Extincta*, or *Extinguiſhed Water*, is aqua fortis into which ſome river-water has been poured, in order to qualify it, and render it leſs corroſive. Its uſe is to get the ſilver from the aqua fortis that ſerved to part gold from it.

Aqua *Fortis*, a name given by artiſts to nitrous acid of a certain ſtrength, from its diſſolving power *.

Aqua *Marina*, a name by which the jewellers call the beryl, on account of its ſea-green colour †.

Aqua *Regia*, an acid corroſive ſpirit, ſo called becauſe it ſerves as a menſtruum to diſſolve gold, commonly eſteemed the king of metals *.

Aqua *Secunda*, is aqua fortis which has loſt part of its diſſolving quality, after being uſed in the parting of metals.

Aqua *Vitæ*, is commonly underſtood of what is otherwiſe

* See Chem ſtry, nº 17

† See Bery

* See Chem ſtry, nº 2

therwiſe called *brandy*, or ſpirit of wine, either ſimple, or prepared with aromatics. Some, however, diſtinguiſh between them; appropriating the term *brandy* to what is drawn from wine, or the grape; and *aqua vitæ* to that drawn after the ſame manner, from malt, *&c.*

AQUÆ AUGUSTÆ, (Ptolemy); AQUÆ TARBELLICÆ, (Antonine); AQUENSIS CIVITAS, in the Notitia. Now *Acqs*, or *Dax*, a town in Gaſcony, on the river Adour, famous for its baths. W. Long. 1° 40. Lat. 43. 56.

AQUÆ CUTILIÆ, a lake of the Sabines, in the territory of Reate, (Pliny); LACUS CUTILIENSIS, (Varro); with a moveable iſland in it, (Seneca, Pliny); ſuppoſed to be the centre of Italy, (Varro). The waters were medicinal, and extremely cold, good for a weak ſtomach and in weak nerves, (Pliny). Veſpaſian uſed them every ſummer; and there he died, (Sueton, Xiphilin from Dio). Now *Lago di Contigliano*.

AQUÆDUCT, in hydraulics and architecture, a ſtructure formed for conveying water from one place to another, over grounds that are unequal. The word is compounded of the Latin ſubſtantive *aqua* water, and of *ductus* a channel, by which that water may be conducted.

Architects diſtinguiſh two kinds of aquæducts; the *viſible*, and the *ſubterraneous*.—The *viſible* are conſtructed in valleys or marſhes, and protracted in longitude or latitude as the ſituation requires. They are compoſed of adminicula for ſupporting the arches and confining the ſtream, and of arcades.—The *ſubterraneous* are formed, by piercing the mountains, and conducting them below the ſurface of the earth. They are built of ſtone, hewn or rough; and covered above with vaults, or with flat ſtones, which may be termed *flags:* theſe flags ſhelter the waters from the heat of the ſun.

They divide them ſtill into *double* and *triple* aquæducts; that is to ſay, ſuch as are ſupported either by two or by three ranges of arcades. Such was the *aquæduct* which Procopius records to have been built by Coſroës king of the Perſians, for the city of Petra in Mingrelia: it had three conduits upon the ſame line, each elevated above the other.

Frequently aquæducts are paved. Sometimes the waters flow through a natural channel of clay. Frequently they are conveyed by pipes of lead into reſervoirs of the ſame metal, or into troughs of hewn ſtone. The channels are cut with an imperceptible deſcent, that the current may be accelerated by its own weight. Parallel to its courſe, on each ſide, is cut a narrow foot path, where people may walk when neceſſary. By conduits, or grooves, the waters are conveyed into large ciſterns, but not forced above their original level. To make them riſe and iſſue from their apertures with force, they muſt be confined in tubes of a ſmall diameter, and abruptly fall from a conſiderable declivity.

Aquæducts of every kind were long ago the wonders of Rome. The vaſt quantity of them which they had; the prodigious expence employed in conducting waters over arcades from one place to another, at the diſtance of 30, 40, 60, and even 100 miles, which were either continued or ſupplied by other labours, as by cutting mountains and piercing rocks; all this ought to ſurpriſe us; nothing like this is undertaken in our times: we dare not even think of purchaſing public conveniency at ſo dear a rate. Appius the cenſor adviſed and conſtructed the firſt *aquæduct*. His example gave the public luxury a hint to cultivate theſe objects; and the force of prodigious and indefatigable labour diverted the courſe of rivers and floods to Rome. Agrippa, in that year when he was ædile, put the laſt hand to the magnificence of theſe works. It is chiefly in this reſpect that the modern ſo much reſembles the ancient city of Rome. For this advantage, ſhe is peculiarly indebted to Sextus V. and to Paul V. who for grandeur and magnificence emulated the maſters of the univerſe *. There are ſtill to be ſeen, in different places contiguous to Rome, ſtriking remains of theſe *aquæducts;* arches continued thro' a long ſpace, over which were extended the canals which carried the water to the city. The arches are ſometimes low, ſometimes raiſed to a vaſt height, to humour the tumidities or depreſſions of the ground. There are ſome which have two arcades, one conſtructed above the other; and this precaution was obſerved, leſt the height of a ſingle arcade, if extended as far as the ſituation required, might render the ſtructure leſs firm and permanent. They are commonly of bricks; which by their cement cohere ſo ſtrongly, that the parts are not ſeparated without the utmoſt difficulty.—When the elevations of the ground were enormous, it became neceſſary to form *ſubterraneous* aquæducts. Theſe carried the waters to ſuch aquæducts as were raiſed above ground, in the declivity or at the foot of mountains. If the artificial channel of the water was not ſuſceptible of a downward bias but by paſſing through a rock, through this they cut a paſſage at the ſame height with the ſuperior aquæduct: ſuch an one may be ſeen above the city of Tivoli, and at the place called *Vicavaro*. The canal which formed the courſe of the aquæduct is hewn out of the rock to the extent of more than a mile, about five feet in height, and four in breadth.

There is one thing, however, which deſerves to be remarked. It is, that theſe *aquæducts*, which might have been directed in a ſtraight line to the city, did not arrive at it but by frequent and winding mazes. Some have ſaid that this oblique tract was purſued to avoid the expence which muſt attend the building of arcades to an extraordinary height: others, that it was their intention to diminiſh the impetuoſity of the current; which, rolling in a ſtraight line through an immenſe ſpace, muſt always have increaſed its velocity, muſt have worn the canals by perpetual and forcible attrition, and of conſequence afforded an impure and unwholeſome draught to the inhabitants. But ſince there was ſo great a deſcent between the caſcade of Tivoli and Rome, it is demanded why they ſhould go to draw water from the ſame river at the diſtance of more than 20 miles higher; nay, of more than 30 miles, if we reckon the curvatures of its direction through that mountainous country. It is replied, the motive of obtaining the water more ſalubrious, and more limpid, was ſufficient to make the Romans think their labour neceſſary, and their expence properly beſtowed; and to thoſe who reflect that the waters of this river were impregnated with mineral particles, and by no means wholeſome, the anſwer will appear ſatisfactory.

If any one will caſt his eyes upon plate 128th of the Antiquities of Father Montfaucon, he will ſee with how much care theſe immenſe works were conſtructed. From diſtance to diſtance ſpiramenta were left, that, if the

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* See *New Memoirs of Italy*, vol. I.

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the water ſhould happen to be ſtopped by any accident, it might gradually diſembogue, till they could clear its ordinary paſſage. There were likewiſe, even in the very canals which conveyed the water, cavities conſiderably deeper than its internal ſurface, into which the ſtream was precipitated, and where it remained ſtagnant till it was refined from mud and feculence; and ponds, where it might expand itſelf till it was purified.

The *aquæduct* of the *aqua Marcia* had an arch of 16 feet in diameter. The whole was compoſed of three different kinds of ſtone; one of them rediſh, another brown, and a third of an earth colour. Above, there appeared two canals; of which the higheſt was fed by the new waters of the Tiverone, and the lower by what they call the *Claudian* river. The entire edifice is 70 Roman feet high. Near this *aquæduct*, we have in Father Montfaucon the plan of another with three canals; the higheſt ſupplied by the water called *Julia*, that in the middle from Tepula, and the loweſt from the aqua Marcia.

The arch of the aquæduct of the aqua Claudia is of hewn ſtone, very beautiful; that of the aquæduct of the aqua Neronia is of bricks: they are each of them 72 Roman feet in height.

The canal of the aqueduct which was called the *aqua Appia*, deſerves to be mentioned for a ſingularity which is obſerved in it: for it is not, like the others, plain, nor gradual in its deſcent; but much narrower at the lower than the higher end.

The conſul Frontinus, who ſuperintended the *aquæducts* under the emperor Nerva, mentions nine of them which had each 13594 pipes of an inch in diameter. Vigerus obſerves, that, in the ſpace of 24 hours, Rome received 500,000 hogſheads of water.

We might likewiſe have mentioned the *aquæduct* of Druſus, and that of Riminius: but we ſhall ſatisfy ourſelves with obſerving here, that Auguſtus cauſed all the *aquæducts* to be repaired; and afterwards paſs to other monuments of the ſame kind, and ſtill more important, which give the moſt ſtriking ideas of Roman magnificence.

One of theſe monuments is the *aquæduct* of Metz, of which a great number of arcades ſtill remain. Theſe arcades croſſed the Moſelle, a river which is broad and vaſt at that place. The copious ſources of Gorze furniſhed water for the repreſentation of a ſea-fight. This water was collected in a reſervoir: from thence it was conducted by ſubterraneous canals formed of hewn ſtone, and ſo ſpacious that a man could walk erect in them: it traverſed the Moſelle upon its ſuperb and lofty arcades, which may ſtill be ſeen at the diſtance of two leagues from Metz; ſo nicely wrought and ſo firmly cemented, that, except thoſe parts in the middle which have been carried away by the ice, they have reſiſted, and will ſtill reſiſt, the ſevereſt ſhocks of the moſt violent ſeaſons. From theſe arcades, other *aquæducts* conveyed the water to the baths, and to the place where the naval engagement was mimicked.

If we may truſt Colmenarus, the *aquæduct* of Segovia may be compared with the moſt admired labours of antiquity. There ſtill remain 159 arcades, wholly conſiſting of ſtones enormouſly large, and joined without mortar. Theſe arcades, with what remains of the edifice, are 102 feet high; there are two ranges of arcades, one above another. The *aquæduct* flows thro' the city, and runs beneath the greateſt number of houſes which are at the lower end.

Aquæ F
viæ
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Aqueduc

After theſe exorbitant ſtructures, we may be in ſome degree believed when we ſpeak of the *aquæduct* which Lewis XIV. cauſed to be built near Maintenon, for carrying water from the river Bucq to Verſailles: it is perhaps the greateſt aquæduct which now ſubſiſts in the world; it is 7000 fathoms in length, above 2560 in height, and contains 242 arcades.

Aquæ flaviæ, a town on the confines of Gallicia and Portugal, ſo called from Veſpaſian and Titus. The inhabitants are called *Aquiſlavienſes*, (Coins). Now called *Chiaves*, a mean hamlet: but the ruins of its bridge teſtify its former grandeur. W. Long. 6. 6. Lat. 41. 40.

Aquæ tauri, hot waters or baths in Tuſcany, at the diſtance of three miles from the ſea, ſaid to be diſcovered by a bull; whence the appellation. There are ſtill to be ſeen the ruins of theſe baths. The people are called *Aquenſes Taurini*, (Pliny). Now *Acquapendente*, in Orvieto. E. Long. 12. 40. Lat. 42. 40.

AQUAMBOE, one of the greateſt monarchies on the coaſt of Guinea in Africa, ſtretching twenty miles in breadth, and ten times that ſpace in length from eaſt to weſt. According to Boſman, the coaſt is divided into a great number of petty royalties, but all of them ſubject to the king of Aquamboe, who indiſcriminately uſes an unlimited authority over them and the meaneſt of his ſubjects. His deſpotiſm gave riſe to a proverbial ſaying, that "there are only two ranks of men at Aquamboe; the royal family, and ſlaves." The natives of this country are haughty, turbulent, and warlike; and their power is formidable to all the neighbouring nations. They grievouſly infeſt ſuch nations as are tributaries to the king of Aquamboe, entering their territories by troops, carrying off from the inhabitants whatever they think proper; nor do they ever meet with any oppoſition from the inhabitants, as they are ſenſible the king would not fail to reſent this as an indignity offered to him.

AQUARIANS, Chriſtians in the primitive church who conſecrated water in the euchariſt, inſtead of wine. This they did under pretence of abſtinence and temperance; or, becauſe they thought it univerſally unlawful to eat fleſh, or drink wine. Epiphanius calls them *Encratites*, from their abſtinence; St Auſtin, *Aquarians*, from their uſe of water; and Theodoret, who ſays they ſprang from Tatian, *Hydroparaſtatæ*, becauſe they offered water inſtead of wine.

Beſides theſe, there was another ſort of Aquarians, who did not reject the uſe of wine as unlawful; for they adminiſtered the euchariſt in wine at evening ſervice: but, in their morning aſſemblies, they uſed water, for fear the ſmell of wine ſhould diſcover them to the heathens.

AQUARIUS, in aſtronomy, a conſtellation which makes the eleventh ſign in the zodiac, marked thus ♒.

AQUARTIA, in botany, a genus of the tetrandria monogynia claſs. There is only one ſpecies, called *aculeata*, a native of Europe.

AQUATIC, in natural hiſtory, an appellation given to ſuch things as live or grow in the water.

AQUAVIVA, a town of the kingdom of Naples, and province of Barri.

AQUEDUCT. See Aquæduct.

AQUEOUS, in a general ſenſe, ſomething partaking of the nature of water, or that abounds with it.

Aqueous *Humour*. See Anatomy, n° 406, q.

AQUILA, in ornithology, a ſynonime of the falco, or eagle. See Falco.

Aquila, in aſtronomy, a conſtellation of the northern hemiſphere.

Aquila, a fine large city of Italy, and the capital of Abruzzo, ſeated on a hill, on the banks of the river Peſcara, near its ſource. It has an ancient caſtle, and is a biſhop's ſee immediately under the pope. The land about it produces great plenty of ſaffron. It was very near being all deſtroyed by an earthquake, in February 1703. The firſt ſhock was ſo terrible, that the inhabitants abandoned the city; but returning to veſpers, it being Candlemas-day, the ſhocks followed one another with ſuch violence, that twenty-four thouſand people periſhed, and great numbers were wounded; eight hundred were killed in one ſingle church: many other churches, monaſteries, noble buildings, and the town-houſe, were either ſwallowed up or overturned, together with the greater part of the city and its walls. Aquila ſtands thirty miles from the ſea, and about ſixteen from the confines of the Pope's dominions. E. long. 14. 20. N. Lat. 42. 20.

AQUILEGIA, columbine, a genus of the pentagynia order, belonging to the polyandria claſs of plants.

Species. 1. The vulgaris or wild columbine, with blue flowers, is found growing wild in ſome woods of England. 2. The alpina, with long oval flowers, grows naturally near Ingleborough-hill in Yorkſhire. The flowers are much larger than thoſe of the garden columbine. 3. The inverſa, or garden columbine. Of this there are great varieties, not only in the colour and fullneſs of their flowers, but alſo in their form. Theſe are commonly called *roſe columbines;* the colours are cheſnut, blue, red, and white, and ſome are finely variegated with two colours. There are others with ſharp-pointed petals in form of a ſtar, and of theſe there are ſingle and double flowers of the ſame colours with the former. 4. The canadenſis, or Canada columbine, flowers almoſt a month before the other ſorts, and therefore is preſerved in the gardens of the curious, though not at all remarkable for its beauty. There is a variety of this with taller flower-ſtems.

Culture. Theſe plants are all propagated by ſowing the ſeeds, or parting the old roots; but the former method is chiefly practiſed, for the old roots are very apt to degenerate. The ſeeds ſhould be ſown in a nurſery-bed in Auguſt or September; for thoſe which are kept till the ſpring ſeldom grow well, or at leaſt remain in the ground a whole year. The ſpring following the plants will appear above ground, and ſhould be kept clear of weeds; and if the ſeaſon proves dry, they muſt be watered. In the middle or latter end of May, they will be ſtrong enough to tranſplant; for which purpoſe, ſome beds of good undunged earth ſhould be prepared, planting them therein at eight or nine inches diſtance from each other. In the following autumn, by which time the plants will have acquired ſtrength enough to flower the year following, the roots ſhould be carefully taken up and planted in the borders of the flower-garden: but where their roots are deſigned to be preſerved in perfection, all the flower-ſtalks muſt be cut off as ſoon as the flowers are paſt. In order to keep up a ſucceſſion of good flowers, freſh ſeeds ſhould be ſown every year; and it will likewiſe be advantageous to exchange the ſeeds with ſome brought from a diſtant place.

Medicinal Uſes. Columbine has been looked upon as aperient; and was formerly in great eſteem among the common people for throwing out the ſmall-pox and meaſles. A diſtilled water, medicated vinegar, and conſerve, were prepared from the flowers; but they have long given place to medicines of greater efficacy.

AQUILEIA, a large city of the Carni, or Veneti, and a noble Roman colony, which was led thither between the firſt and ſecond Macedonian wars, (Livy). It is waſhed by two rivers, the Natiſo and Turrus, (Pliny). The reaſon of leading this colony was, in order to be a bulwark againſt the neighbouring barbarians. The colony was afterwards increaſed with fifteen hundred families by a decree of the ſenate, (Livy); from which it became a very famous port-town, (Herodian). The emperor Julian aſcribes the appellation to the augury of an eagle at the time of building it; but Iſaac Voſſius on Mela, to the great plenty of water, as if the town were called *Aquilegia.* The harbour, at the mouth of the Natiſo, is diſtant ſixty ſtadia from the city; ſo that ſhips of burden are towed up the river, (Strabo). It is ſtill called *Aquileia,* but greatly fallen from its former ſplendor. E. Long. 15. 32. Lat. 45. 45.

AQUILICIUM, or Aquiliciana, in Roman antiquity, ſacrifices performed in times of exceſſive drought, to obtain rain of the gods.

AQUILINE, ſomething belonging to or reſembling an eagle: Thus, an aquiline noſe is one bent ſomewhat like an eagle's beak.

AQUINAS (St Thomas), ſtyled the *Angelical Doctor,* was of the ancient and noble family of the counts of Aquino, deſcended from the kings of Sicily and Arragon; and was born in the caſtle of Aquino, in the Terra di Lavora in Italy, in the year 1224 or 1225. He entered into the order of the Dominicans; and, after having taught ſchool-divinity in moſt of the univerſities of Italy, at laſt ſettled at Naples: where he ſpent the reſt of his life in ſtudy, in reading of lectures, and in acts of piety; and was ſo far from the views of ambition or profit, that he refuſed the archbiſhoprick of that city, when it was offered him by Pope Clement IV. He died in 1274, leaving an amazing number of writings, which were printed at Venice in 17 vols folio, in the year 1490. He was canonized by Pope John XXII. in the year 1323; and Pius V. who was of the ſame order with him, gave him, in 1567, the title of the Fifth Doctor of the church, and appointed his feſtival to be kept with the ſame ſolemnity as thoſe of the other four doctors. His authority has always been of great importance in the ſchools of the Roman Catholics. Lord Herbert, in his Life of Henry VIII. tells us, that one of the principal reaſons which induced that king to write againſt Luther, was, that the latter had ſpoken contemptuouſly of Aquinas.

AQUINO (Philip d'), in Latin *Aquinas* or *Aquinius,* having turned from Judaiſm, had a penſion from the clergy of France; and acquired much reputation by his knowledge of the Hebrew language, which he taught at Paris, in the reign of Lewis XIII. and by the books he publiſhed, among which is his *Dictionarium Hebræo-Chaldæo-Thalmudico-Rabbinicum.* His grandſon, Anthony D'Anquin, was firſt phyſician to Lewis XIV.

Aquino, a town of Italy, in the kingdom of Naples, and Terra di Lavora; a biſhop's ſee, but ruined by the emperor Conrade; and now conſiſts of about 35 houſes. It was the birth-place of the poet Juvenal, and Thomas Aquinas. E. Long. 14, 30. N. Lat. 41, 32.

ARA, in aſtronomy, a ſouthern conſtellation, containing eight ſtars.

ARABIA, a country of Aſia, famous from the remoteſt antiquity for the independency of its inhabitants during the vaſt conqueſts of the Aſſyrians, Perſians, Greeks, and Romans; and, in latter times, for being the centre of an empire equal, if not ſuperior, in extent to any that ever exiſted.

1 Whence named.

This country, or at leaſt the greateſt part of it, was in the earlieſt ages called *Arabah:* concerning the etymology of which word there are various conjectures; but the moſt probable is, that it is derived from the Hebrew word ארב, ſignifying, *the weſt*, *mixture*, or *traffic*. In its largeſt extent, Arabia lies between the 12th and 35th degrees of N. Lat. and the 36th and 61st of E. Long. Its greateſt length from north to ſouth is about 1100 miles, and its breadth from eaſt to weſt

2 Boundaries, &c.

between 1300 and 1400. It is bounded on the weſt by Paleſtine, port of Syria, the iſthmus of Suez, and the Red ſea, called by the Arabs the ſea *Al Kolzom*; on the eaſt by the Euphrates, the Perſian gulf, and bay of Ormus; on the north by part of Syria, Diyar-Becr, Irak, and Khuzeſtan; and on the ſouth by the ſtraits of Babel Mandel, and the Indian ocean. It grows narrower as we approach the frontiers of Syria and Diyar-Beer; and, by reaſon of the proximity of the Euphrates to the Mediterranean, may be looked upon as a peninſula, and that one of the largeſt in the whole world. —Arabia Proper, however, is much narrower, including little more than what was comprehended by the ancients under the name of Arabia Felix, which we ſhall preſently deſcribe; and here the Arabs have been ſettled almoſt ſince the flood.

3 Diviſion.

The firſt diviſion of the peninſula of Arabia was into *Arabah* and *Kedem*, as we learn from Scripture; the firſt of which implies the weſt, and the other the eaſt, denoting the ſituation of the two countries.—Ptolemy was the firſt who divided the peninſula we ſpeak of into three parts, Arabia Petræa, Arabia Deſerta, and Arabia Felix, which diviſion has generally prevailed ſince his time.

Arabia Petræa, on the eaſt, was bounded by Syria and Arabia Deſerta; on the weſt by Egypt, or rather the Iſthmus of Suez which ſeparates Aſia from Africa, and the Heroopolitan gulph or weſtern arm of the Red Sea. On the north it was bounded by Paleſtine, the lake Aſphaltites, and Cœloſyria; and on the ſouth by Arabia Felix. This tract did not admit of much cultivation, the greateſt part being covered with dry ſands, or riſing into rocks, interſperſed here and there with ſome fruitful ſpots. Its metropolis was Petra, which by the Syrians was ſtiled *Rakam*, and in Scripture *Joktheel*. Several other cities of Arabia Petræa are mentioned by Ptolemy; but as it is very improbable ſuch a barren country ſhould abound with large cities, we muſt look upon them as inconſiderable places.

Arabia Deſerta was bounded on the north by the Euphrates, which ſeparated it from Meſopotamia; on the weſt by Syria, Judæa, and Arabia Petræa; on the eaſt, by a ridge of mountains which ſeparated it from Babylonia and Chaldæa; on the ſouth, by Arabia Felix, from which it was likewiſe ſeparated by ſeveral ridges of hills. By far the greateſt part of this kingdom, as well as the former, was a loneſome deſart, diverſified only with plains covered with ſand, or mountains conſiſting of naked rocks and precipices; nor were they ever, unleſs ſometimes at the equinoxes, refreſhed with rain. The few vegetables which they produced were ſtinted by a perpetual drought, and the nouriſhment afforded them by the nocturnal dews was greatly impaired by the heat of the ſun in the day-time. Throughout the deſarts were found huge mountains of ſand, formed by the violence of the winds that continually blew over them in the day-time, though they ceaſed in the night. Wells and fountains were for the moſt part exceedingly rare; however, notwithſtanding the ſterility of theſe countries, the vaſt plains of ſand juſt now mentioned were interſperſed with fruitful ſpots, which appeared here and there like ſo many iſlands in the midſt of the ocean. Theſe being rendered extremely delightful by their verdure, and the more ſo by the neighbourhood of thoſe frightful deſarts, the Arabs encamped upon them; and having conſumed every thing they found upon one, removed to another, as is the cuſtom of their deſcendants the Bedoweens at this day. Theſe fruitful ſpots were likewiſe frequent in Libya, and by the Egyptians called *auaſes*, or *abaſes*, as we learn from Strabo. The barren part of Arabia Felix, bordering upon the Red Sea, was in like manner interſperſed with abaſes; which probably gave the name of *Abaſeni* to a nation ſettled there, and in the adjacent fertile region. A body of theſe, it is ſaid, croſſing the ſtraits of Babel-Mandel, paſſed into Ethiopia, which from them received the name of *Abaſſia*. From this account of Arabia Deſerta, we may reaſonably conclude, that the towns ſaid by Ptolemy to have been ſituated in it were places of very little conſequence.

Arabia Felix was bounded on the north by the two kingdoms juſt deſcribed; on the ſouth, by the Red ſea; on the eaſt and weſt, by part of that ſea, together with the Arabian and Perſian gulfs. In Strabo's time, it was was divided into five provinces, by the oriental hiſtorians called *Yaman*, *Hejaz*, *Tehâma*, *Najd*, and *Yamama*; for a particular deſcription of which, ſee thoſe articles. In this diſtrict ſtood ſeveral towns, particularly Nyſa, famous for being the birth-place of Bacchus; and Muſa, or Muza, a celebrated emporium or harbour, where the Arabian merchants reſorted with their frankincenſe, ſpices, and perfumes. Theſe two were ſituated in the province of Yaman. In that of Hejaz ſtood the ſtill more famous cities of Mecca and Medina; alſo Thaiſa or Taiſa, Gjudda or Jodda, Yanbo or Al Yanbo, and Madian, the Modiana of Ptolemy, and the Midian or Madian of Scripture.

4 When pled.

At what time the abovementioned kingdoms were firſt peopled we have no certain accounts. The moſt conſiderable nations inhabiting Arabia Petræa, in the early ages, were the Iſhmaelites, the Nabatei or Nabatheans,

theans, the Cedræi or Kedareni, and the Agareni or Hagareni; and of theſe the Iſhmaelites were the moſt powerful, if they did not comprehend all the reſt; and if the Hagareni were not the ſame people with them, they muſt at leaſt have been nearly related. Kimchi, an oriental hiſtorian, inſinuates, that they were originally the children of Hagar by an Arab, after ſhe had left Abraham. In after ages, the names of all the nations ſituated here were abſorbed in that of *Saracens*, by which the Iſhmaelites are diſtinguiſhed in the Jeruſalem Targum. A nation alſo is mentioned by Pliny, called *Arraceni*, and *Sarraceni* by Ptolemy and Dioſcorides, which was probably no other than the Iſhmaelites above mentioned. In Arabia Deſerta ſeveral tribes reſided, all of whom were very obſcure, except the Aiſitæ and Agræi. The former are ſuppoſed by Bochart to have been Job's countrymen, and the latter to have been the ſame with the Hagareni, Arraceni, or Sarraceni, above mentioned. Arabia Felix was inhabited by many different tribes; the moſt remarkable of which were the Sabæi, Gerræi, Minæi or Minnæi, Atramitæ, Maranitæ, Catabani, Aſcitæ, Homeritæ, Sapphoritæ, Omanitæ, Saraceni, Nabathæi, Thamydeni, and Bnizomenæ; but neither their limits nor ſituation can now be determined with any manner of preciſion.

5
iviſion of
he Arabs.

According to the Oriental hiſtorians, the Arabs are to be divided into two claſſes; *viz.* the *old loſt Arabians*, and the *preſent*. The moſt famous tribes among the former were thoſe of Ad, Thâmud, Taſm, Jadês, Jorham, Amalek, Amtem, Haſbem, Abil, and Bâr. Concerning theſe, though now entirely loſt, and ſwallowed up among other tribes, there are ſome remarkable traditions, of which the following may ſerve as a ſpecimen.

6
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The tribe of Ad deduced their origin from Ad the ſon of Aws, or Uz, the ſon of Aram, the ſon of Shem, who, after the confuſion of tongues, ſettled in Al Abkaf, or the winding ſands in the province of Hadramant, on the confines of Yaman, where his poſterity greatly multiplied. Their firſt king was Sheddâd, the ſon of Ad, who built a ſtately palace and made a delightful garden in the deſarts of Aden, which he deſigned as an imitation of the celeſtial paradiſe. This garden he called *Irem:* and when it was finiſhed, he ſet out with a great retinue to take a view of it; but, having ſome thoughts of aſſuming divine honours, he was deſtroyed by a tempeſt from heaven, while yet a day's journey from his paradiſe. The garden and palace, however, were preſerved, though inviſible, as a monument of divine vengeance.

After the death of Sheddâd, the kingdom of Ad was governed by a long ſeries of princes, concerning whom many fables are related by the eaſtern writers. The concluſion of their hiſtory, however, is as follows. "The Adites, in proceſs of time falling from the worſhip of the true God, into idolatry, God ſent the prophet Hûd, ſuppoſed to be the ſame with Heber, to preach to and reclaim them. But they refuſing to acknowledge his miſſion or to obey him, God ſent an hot and ſuffocating wind, which blew ſeven nights and eight days, and, entering at their noſtrils, paſſed thro' their bodies, and deſtroyed them all, a very few only excepted, who had liſtened to Hûd, and retired with him to another place." Others relate, "that, before this terrible cataſtrophe, they had been previouſly chaſtiſed with a three years drought; and therefore ſent Kail Ebn Ithar, and Morthed Ebn Saad, with 70 other principal men to Mecca, then in the hands of the tribe of Amalek, whoſe prince was Moawiyah Ebn Becr, to obtain of God ſome rain. Kail having begged of God that he would ſend rain to the people of Ad, three clouds appeared, a white, a red, and a black one; and a voice from heaven ordered him to chuſe which he would. Kail failed not to make choice of the laſt, thinking it would be laden with moſt rain; but when this cloud came over them, it proved to be fraught with the Divine vengeance, and a tempeſt broke forth from it which deſtroyed them all."

7
Arabs from whom deſcended.

The *preſent Arabs*, according to their own hiſtorians, are ſprung from Kahtan, the ſame with Joktan, the ſon of Eber; and Adnan, deſcended in a direct line from Iſhmael the ſon of Abraham. The former of theſe they call the *genuine* or *pure* Arabs, and the latter the naturalized or *inſititious* Arabs.

Joktan the ſon of Eber had 13 ſons, who ſome time after the confuſion of languages ſettled in Arabia, extending themſelves from Meſha to Sephar, a mountainous place in the ſouth-eaſtern part of that peninſula. According to the Arabian hiſtorians, he had 31 ſons, all of whom left Arabia and went into India, except two, *viz.* Yarab and Jorham; the former of whom, they ſay, gave the name both to their country and language. Iſhmael and his mother Hagar having been diſmiſſed by Abraham, entered into the wilderneſs of Paran, as related in the book of Geneſis. The ſacred hiſtorian informs us, that during his reſidence in the wilderneſs he married an Egyptian; and the Arabian writers ſay that he alſo took to wife the daughter of Modad king of Hejaz, lineally deſcended from Jorham the founder of that kingdom. By the Egyptian, he was probably the father of the Scenite or wild Arabs; and having allied himſelf to the Jorhamites, he is conſidered by the Arabians as the father of the greateſt part of their nation.

8
Joktan the firſt king.

Kahtan, or Joktan, is ſaid to have firſt reigned, and worn a diadem in Yaman; but the particulars of his reign we no where learn. He was ſucceeded by Yarab already mentioned, he by Yaſhab, and Yaſhab by Abd Shems. He was ſucceſsful in his expeditions againſt his enemies, carried off great ſpoils, and took many of them priſoners. He is ſaid to have built the city of Saba or Mareb, and above it a ſtupenduous mound or building which formed a vaſt reſervoir, containing all the water that came down from the mountains. By means of this reſervoir the kings of Yaman not only ſupplied the inhabitants of Saba and their lands with water, but likewiſe kept the territories they had ſubdued in greater awe, as by cutting off their communication with it they could at any time greatly diſtreſs them.

9
Reſervoir of Saba.

Abd Shems was ſucceeded by his ſon Hamyar, from whom the tribe of Hamyar is ſaid to take its name; and he by a ſeries of 17 kings, concerning whom we have no remarkable particular, except that from one of them called *Africus* the continent of Africa took its name. The laſt of theſe was ſucceeded by a daughter named *Balkis* or *Belkis*, whom ſome will have to be the queen of Sheba who paid a viſit to Solomon. After Balkis came Malea, ſurnamed *Naſherolneam* on account of his magnificence and liberality. Having had bad ſucceſs in an expedition, where his army was overwhelmed

10
Balkis ſuppoſed to be the queen of Sheba.

whelmed by torrents of ſand, he cauſed a braſen ſtatue to be erected with the following inſcription in the old Hamyaritic character. "There is no paſſage behind me, no moving farther; the ſon of Sharhabil."

11 Samarcand, by whom built.

He was ſucceeded by Shamar Yaraaſh, ſo called on account of his being affected with a conſtant tremor. To this prince the city of Samarcand is ſaid to owe its exiſtence. After Shamar Yaraaſh we have a liſt of 15 kings, of whom nothing worth mentioning is recorded, except of one Abu Carb Aſaad, who adorned the Caaba or temple of Mecca with tapeſtry, and firſt introduced Judaiſm among the Hamyarites. He was put to death by his ſubjects, probably on account of religion. The laſt of the 15 kings above-mentioned was called *Abrahah*, who was ſucceeded by his ſon Sabban. He had that famous ſword called *Samſanah*, which afterwards came into the hands of the Khalif Al Raſhid. This prince was ſucceeded by Dhu Shanater, who had ſix fingers on each hand. He was abandoned to unnatural luſt, and dethroned for abuſing ſome of the nobleſt youths in the kingdom.

12 Yeuſef, a bloody perſecutor.

To him ſucceeded Yuſef, who lived about 70 years before Mahomet. He perſecuted all thoſe who would not turn Jews, putting them to death by various tortures, the moſt common of which was throwing them into a glowing pit of fire; whence he had the appellation of the *lord of the pit*. This perſecution is taken notice of in the Koran. The laſt of the Hamyaritic monarchs was Dhu Jadan, according to Abulfeda; but, according to others, the Yuſef juſt mentioned, who was ſurnamed *Dhu Nowas* on account of his flowing curls, and was the laſt who reigned in an uninterrupted ſucceſſion.

13 His ſubjects call in the king of Ethiopia, who dethrones Yuſef.

He was a bigotted Jew, as already mentioned; and treated his ſubjects with ſuch barbarity, that they were obliged to aſk the aſſiſtance of Eleſbaas or Eleſbaan, king of Ethiopia, againſt him. Dhu Nowas, not being able to make head againſt the Ethiopians, was at laſt driven to ſuch extremity, that he forced his horſe into the ſea, and loſt both his life and crown together.

14 Chriſtian religion eſtabliſhed in Arabia.

The king of Ethiopia, having thus become maſter of Yaman, eſtabliſhed there the Chriſtian religion, and fixed upon the throne one Abryat an Ethiopian. He was ſucceeded by Abraha-Ebn-Al-Sabah, ſurnamed the *ſlit-noſed*, from a wound he had formerly received in it. He was likewiſe ſtiled *lord of the elephant*, from a ſtory too ridiculous to deſerve notice. He was ſucceeded by two other Ethiopian princes; but at laſt Seif Ebn Dhu Yazan, of the old royal family of Hamyar, having obtained aſſiſtance from the king of Perſia which had been denied him by the emperor Heraclius, recovered his throne, and drove out the Ethiopians; but was himſelf ſlain by ſome of them who were left behind.

15 Ethiopians driven out.

The ſucceeding princes were appointed by the Perſians, till Yaman fell into the hands of Mahomet.

16 Terrible inundation by the breaking down of the reſervoir of Saba.

We have already taken notice of the vaſt mound or reſervoir made by Abd Shems, from which he ſupplied the city of Saba with water. This building ſtood like a mountain above the city, and was by the Sabæans eſteemed ſo ſtrong, that they were under no fear of its ever failing. The water roſe almoſt to the height of 20 fathoms; and was kept in on every ſide by a work ſo ſolid, that many of the inhabitants had their houſes upon it. About the time of Alexander the Great, however, a terrible inundation happened. According to the Arabian hiſtorians, God being diſpleaſed at the pride and inſolence of the inhabitants of this city, reſolved to humble them; and for this purpoſe ſent a mighty flood, which broke down the mound by night, while the inhabitants were aſleep, and carried away the whole city with the neighbouring towns and people. This inundation is ſtyled in the Koran the *inundation of Al-Harem;* and occaſioned ſo terrible a deſtruction, that from thence it became a proverbial ſaying to expreſs a total diſperſion, "that they were gone and ſcattered like Saba."—By this accident no leſs than eight tribes were forced to remove their habitations, ſome of which gave riſe to the kindoms of Hira and Ghaſſan.

17 Origin, &c. of the kingdom of Hira.

The kingdom of Hira was founded by Malec, a deſcendant of Cahlan the brother of Hamyar; but after three deſcents, the throne came by marriage to the Lakhmians, who were deſcendants of Lakhm the ſon of Amru, the ſon of Abd Ems. Theſe princes, whoſe general name was *Mondar*, preſerved their dominion, notwithſtanding ſome ſmall interruption from the Perſians, till the khalifat of Abubecr, when Al Mondar Maghrur, the laſt of them, loſt his life and crown by the arms of Khaled-Ebn-Al-Walid. This kingdom continued 622 years and eight months, according to Ahmed Ebn Yuſef. Its princes were under the protection of the kings of Perſia, and were their lieutenants over the Arabs of Irak, as the kings of Ghaſſan were for the Roman emperors over thoſe of Syria.

18 Of Ghaſſan.

The kingdom of Ghaſſan was founded by the tribe of Azd, who, according to ſome, ſettling in Syria Damaſcena, near a water called *Ghaſſan*, from thence took their name; but others ſay they went under this appellation before they left Yaman. Having driven out the Dajaamian Arabs, who before poſſeſſed the country, they made themſelves maſters of a conſiderable territory. Here they maintained themſelves, according to ſome 400, according to others 600, and according to Abulfeda 613 years, when the laſt of their kings ſubmitted to the khalif Omar, and embraced the Mahometan religion; but receiving afterwards a diſguſt, ſoon returned to Chriſtianity, and took refuge in Conſtantinople.

19 Of Hejaz.

The kingdom of Hejaz was founded by Jorham the ſon of Kahtan, where princes of his line reigned till the time of Iſhmael, who married the daughter of Modad one of thoſe princes. Some authors relate that Kidar, one of Iſhmael's ſons, had the crown reſigned to him by his uncles the Jorhamites: but, according to others, the deſcendants of Iſhmael expelled that tribe; who, retiring to Johainah, were after various adventures deſtroyed by an inundation. After the expulſion of the Jorhamites, the government of Hejaz ſeems not to have continued long in the hands of one prince, but to have been divided among the heads of tribes, almoſt in the ſame manner as the Arabs of the deſert are governed at this day.

20 Tribe of Khozaab aſſumes the government of Mecca.

The tribe of Khozaab, after the abovementioned inundation of Saba, fled into the kingdom of Hejaz, and ſettled themſelves in a valley called *Marri* near Mecca. Here they founded an ariſtocracy, aſſuming to themſelves both the government of the city of Mecca, and the cuſtody of the Caaba or temple there. They continued maſters of this city and territory, as well as preſidents of the Caaba, for many ages; till at length one Koſa, of the tribe of Koreiſh, circumvented Abu Gabſhan, a weak and ſilly man, of whom, while in a druken humour, he bought the keys of the

21
Folly of Abu Gabſhan.

the temple for a bottle of wine; but when Abu Gabſhan grew cool, and reflected on his imprudence, he ſufficiently repented of what he had done; whence the Arabian proverbs, "More vexed with late repentance than Abu Gabſhan; More fooliſh than Abu Gabſhan," &c. The tribe of Khozaab endeavoured afterwards to give ſome diſturbance to the Koreiſh in the poſſeſſion of the keys of the Caaba, which furniſhed the latter with a pretence for depriving them of the civil government of Mecca. After the Koreiſh had poſſeſſed themſelves of this city, they kept up the ſame form of government which had prevailed there before. Beſides theſe kingdoms there were many others of leſſer note, of which we find nothing remarkable.

Thus we have briefly mentioned the moſt memorable events recorded by the Arabian hiſtorians previous to the time of Mahomet; but, before entering upon an account of that famous impoſtor and the kingdom founded by him, it will be proper to take notice of ſeveral circumſtances in different parts of the world, which at that time concurred to facilitate Mahomet's ſcheme, and without which, in all probability, he would never have been able to accompliſh it.

22
Cauſes of Mahomet's ſucceſs.

The firſt and great cauſe of Mahomet's ſucceſs in propagating his infamous impoſture, was the groſs corruption and ſuperſtition with which the Chriſtian religion was at that time obſcured in all parts of the world. Had the pure doctrines of Chriſtianity been then as publicly known, as the ridiculous fopperies which deformed the Eaſtern and Weſtern churches, Mahometaniſm could never have got a hearing. But, along with the true religion, mankind ſeemed alſo to have loſt the uſe of their rational faculties, ſo that they were capable of ſwallowing the groſſeſt abſurdities; ſuch as it now appears almoſt incredible that any of the human race could receive as truths. Another cauſe was, the manner of government and way of life among the Arabs. Divided into ſmall independent tribes, they never were capable of a firm union but by ſuperſtition; and had Mahomet attempted their conqueſt in any other way, it was impoſſible he could have ſucceeded. As there were alſo among them Jews, Pagans, and Chriſtians of all ſorts, this impoſtor, by adopting ſomething out of every religion then extant, cunningly recommended himſelf to the profeſſors of every one of them. Add to all this, that, by allowing of polygamy, and ſetting forth his paradiſe as conſiſting in the enjoyment of women, he adapted himſelf to the corrupt diſpoſitions of mankind in general.

If the diſtracted ſtate of religion favoured the deſigns of Mahomet on the one hand, the weakneſs of the Grecian and Perſian monarchies aſſiſted him no leſs powerfully on the other. Had thoſe once formidable empires been in their vigour, either of them would have been ſufficient to cruſh Mahometaniſm in its birth; but both of them were then ſtrangely reduced. The Roman empire had continued to decline after the time of Conſtantine; the weſtern parts of it were then entirely over-run by the Goths and other barbarous nations; and the eaſtern, or Greek empire, was ſo much reduced by the Huns on one hand, and the Perſians on the other, as to be incapable of making any great effort. The Perſian monarchy itſelf was in little better condition. It is true, they ravaged the dominions of the Greeks, and often overcame them in the field; but that was more owing to the weakneſs of the Grecian empire, than to the ſtrength of the Perſians; and ſo effectually did the inteſtine broils, which aroſe chiefly on account of religion, weaken the kingdom of Perſia, that the moſt conſiderable part of it was annexed by the khalif Omar to his dominions.

As the Greeks and Perſians were then in a languiſhing ſituation, ſo the Arabs were ſtrong and flouriſhing. Their country had been peopled at the expence of the Grecian empire, whence the violent proceedings of the different religious ſectaries forced many to take refuge in Arabia. The Arabs were not only a populous nation, but unacquainted with the luxuries and delicacies of the Greeks and Perſians. They were inured to hardſhips of all kinds, and conſequently much better fitted than their effeminate neighbours to endure the fatigues of war, as the event very fully verified.

23
Mahomet's birth, deſcent, &c.

24
Fehr head of the Koreiſh.

25
Haſhem's generoſity.

Mahomet was born in the year of Chriſt 578. According to the Eaſtern hiſtorians, he was deſcended in a direct line from Iſhmael. Kedar, or, as the Arabians call him, *Kidâr*, after his father Iſhmael's death, communicated his name to the greateſt part of Arabia Petræa. He was ſucceeded in his authority and poſſeſſions by his ſon Hamal; Hamal by Nabet, and Nabet by Salâmân. After Salaman came Al Homeiſa, then Al Yaſa, whoſe ſon Odad was ſucceeded by Odd the father of Adnan. Counting ten generations forward in the ſame line, we come at laſt to Fehr, who ſeems to have diſtinguiſhed himſelf by ſome glorious actions, as he was denominated *Koreiſh*, on account of his bravery. He is to be conſidered as the root of the politeſt and moſt celebrated tribe of the Arabs. He had three ſons, Gâleb, Mohâreb, and Al Hâreth. From Mohâreb the Banu Mohâreb, denominated likewiſe *Sheibân*, took their origin; from Al Hâreth, the Banu Al Kholoj; and from Gâleb, in a direct line, the impoſtor Mahomet. Gâleb was the father of Lowa; and he of Caab, whoſe ſon Morrah had for his immediate deſcendant Kelâb the father of Koſa. It was this Koſa who aggrandized the tribe of the Koreiſh, by purchaſing the keys of the Caaba from Abu Gabſhan, as we have already related. By this he not only aggrandized his tribe, but became the prince of it himſelf. He was ſucceeded by his ſecond ſon Abd Menâf, to whom the *prophetic light*, which is ſaid to have manifeſted itſelf in his face, gave the right of primogeniture. Abd Menâf was ſucceeded by his ſon Amni, ſurnamed *Hâſhem*, or one that broke bread, on account of his ſingular generoſity during a famine at Mecca. Having amaſſed great ſums of money, he took a journey into Syria, where he purchaſed a vaſt quantity of meal, which he made into cakes and divided with his own hands amongſt the people of Mecca. He likewiſe killed a prodigious number of camels, with which he fed them, and relieved them in the time of their diſtreſs: and finding that the ſoil about Mecca was ſo barren as to produce no fruits but what are common in the deſarts, and conſequently no corn or grain, which the Meccans are obliged to bring from other places, he appointed two caravans to ſet out yearly for that purpoſe, the one in ſummer, and the other in winter; by means of which, the city was amply ſupplied with proviſions of all kinds. The proviſions brought by them were diſtributed twice a-year; and Hâſhem, by his prudent conduct, raiſed the glory of his people to the higheſt pitch; inſomuch, that all the neighbouring great men, and heads of tribes made their court to him. Nay, ſo great veneration is the memory of Hâſhem held in by the Arabs, that from him the family of Mahomet among them are called *Hâſhemites;* and he who preſides over Mecca and Medina, who muſt always be of the race of Mahomet, has to this day the title of the "Chief or Prince of the Hâſhemites."

26 Well Zemzem diſcovered by Abdal Motalleb.

Hâſhem died at Gaza in Syria, and was ſucceeded by his ſon Abdal Motalleb or Mateleb. He is ſaid to have been extremely affable and eaſy of acceſs, as well as juſt and generous to a great degree; ſo that, in the beginning of the month *Ramadan*, he entertained the poor upon the flat roof of his houſe, and afterwards ſupplied the fowls of the air and wild beaſts of the field with proviſions of various kinds which he ordered his ſervants to leave upon the ſummits of the neighbouring mountains. The well which God ſhewed to Hagar in the wilderneſs is ſaid to have been miraculouſly diſcovered to Abdal Motalleb, about 500 years after it had been filled up by Amru prince of the Jorhamites. This well is by the Arabs called *Zemzem;* which ſome derive from her calling to Iſhmael, when ſhe ſpied it, in the Egyptian tongue, *Zem, Zem,* i. e. Stay, Stay; though others aſcribe it to a different origin. The water of this well, which is on the eaſt-ſide of the Caaba, and covered with a ſmall building and cupola, is highly reverenced; being not only drank with particular devotion by the pilgrims, but alſo ſent in bottles as a great rarity to moſt parts of the Mahometan dominions.

27 Mahomet at firſt a merchant.

Abdalla, the father of Mahomet, was a younger ſon of Abdal Motalleb; and ſo remarkable for his beauty, that ſeveral ladies of the tribe of Koreiſh fell deſperately in love with him, and are ſaid to have made the ſame attempt upon him that Potiphar's wife did upon Joſeph. In his 24th or 25th year, he married Amena, the daughter of Wáheb, the ſon of Abdal Menâf. She is repreſented as the moſt beautiful, prudent, and virtuous lady of her tribe; and conſequently the moſt worthy of ſuch an extraordinary perſon as Abdalla. He died young, and, in his father's life-time, left his widow and infant ſon in very mean circumſtances; his whole ſubſtance conſiſting only of five camels, and one female Ethiopian ſlave. Abdal Motalleb was, therefore, obliged to take care of his grandſon Mahomet; which he not only did during his life, but at his death enjoined his eldeſt ſon Abu Taleb to provide for him for the future. Abu Taleb was extremely kind to his nephew, and inſtructed him in the buſineſs of merchandiſe; for which purpoſe, he took him into Syria when he was but 13 years of age, recommending him to Khadijah, a noble and rich widow, for her factor; in whoſe ſervice he behaved ſo well, that ſhe married him, and thus raiſed him to an equality with the richeſt in Mecca.

28 Begins to broach his doctrine.

Though Mahomet had probably formed a deſign of introducing his new religion pretty early, he did not think proper to avow it till the 40th year of his age. The grand article of his faith was, the unity of the divine nature, which he pretended was violated by the Jews and Chriſtians no leſs than by the Pagans; for which reaſon, he reſolved to make an attempt to reſcue the world from the ignorance and ſuperſtition which prevailed at that time. This reformation he intended ſhould begin in his own family; and therefore, having retired with his houſehold to a cave in Mount Hara, near Mecca, he there opened the ſecret of his miſſion to Khadijah; acquainting her that the angel Gabriel had juſt appeared to him, and told him that he was appointed the Apoſtle of God. He alſo repeated to her a paſſage which he ſaid had been revealed to him by the miniſtry of the angel, with an account of many prodigies which happened at his birth*. This pretended revelation was received by Khadijah with the greateſt joy; and in a kind of ecſtaſy ſhe immediately communicated the good news to her couſin Waraka Ebn Nawfal, who, being a Chriſtian, could write in the Hebrew character, and was pretty well verſed in the Scriptures both of the Old and New Teſtament. He very readily came into her opinion, ſwore by God that what ſhe ſaid was true, and that "Mahomet was the great prophet foretold in the law by Moſes the ſon of Amram."

29 Converts hi wife and couſin, &c.

Mahomet finding his firſt ſtep ſo ſucceſsful, as Waraka was a very conſiderable perſon, began to entertain great hopes of accompliſhing his deſign. He next converted his ſervant Zeid, to whom he gave his liberty on the occaſion, which afterwards became a rule to his followers; and then Ali the ſon of Abu Taleb, though at that time only nine or ten years of age. This laſt, however, making no account of the other two, he uſed to call *the firſt of believers.* The next perſon he applied to was Abu Becr, a man of very conſiderable authority among the Koreiſh. He was eaſily gained over, and by his influence ſeveral others, ſo that Mahomet now made his miſſion no longer a ſecret. To Abu Becr he gave the name of *Al Saddik*, or *the faithful witneſs;* becauſe he not only vouched for every thing he ſaid, but alſo greatly increaſed the number of his followers. Mahomet likewiſe complimented him with the title of *Atik*, or *preſerved;* intimating thereby that he was certainly ſaved from hell-fire.

30 Rejected b the Koreiſ

Having given out that he was commanded from heaven to admoniſh his near relations, Mahomet directed Ali to prepare an entertainment, and invite to it the ſons and deſcendants of Abdal Motalleb. He intended to open his mind to them; but Abu Laheb, one of Mahomet's uncles, making the company break up before the prophet had an opportunity of ſpeaking to them, he was obliged to invite them again the next day. Having now propoſed the matter, he aſked which of them would become his wazir, prime miniſter, or vicegerent. This was accepted by Ali; upon which Mahomet ſaid to him, "This is my brother, my deputy, and my *(khalif)* ſucceſſor, or vicar; therefore ſhew yourſelves ſubmiſſive and obedient to him." At this ſpeech all the company fell a-laughing, telling Abu Taleb that he muſt now pay obedience and ſubmiſſion to his own ſon. Notwithſtanding this repulſe, however, Mahomet was ſo far from being diſcouraged, that he began to preach to the people in public. They heard him with ſome patience till he began to upbraid them with the idolatry, obſtinacy, and perverſeneſs of themſelves and their fathers; which ſo highly provoked them, that they openly declared themſelves his enemies, except ſome few who were converted. The prophet was now protected by the authority of his uncle Abu Tâleb; who, however, was earneſtly ſolicited to perſuade his nephew to deſiſt, and at laſt threatened with an open rupture in caſe he could not prevail on him ſo to do. This had ſuch an effect upon Abu Taleb, that he advised his nephew not to puſh the matter any farther; repreſenting the great danger he and his followers would otherwiſe run: but our prophet was not to be ſo intimidated; and told his uncle plainly, that "if they ſet againſt him the ſun on his right hand, and the moon on his left, he would not abandon his enterprize." Abu Tâleb, therefore, finding him ſo firmly reſolved, uſed no further arguments, but promiſed to ſtand by him to the utmoſt of his power: ſo that notwithſtanding the people of his tribe came to a determination to expel both Mahomet and his followers, he found a powerful ſupport in his uncle againſt all their machinations.

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* See Mah met.

31
is reſolu-
ion.

Mahomet now entered upon his apoſtolic function with uncommon diligence and application; and ſoon gained over his uncle Hamza, and Omar Ebn Al Khattâh, a perſon very much eſteemed, and who before had been his violent oppoſer. Notwithſtanding this ſucceſs, however, the Koreiſh continued their oppoſition, and came to a reſolution to proſcribe all who had embraced Mahomet's doctrine. In conſequence of this reſolution, the *Moſlems*, as his followers were called, were now treated with ſuch ſeverity, that they found it no longer ſafe to continue in Mecca; nay, ſeveral of them in the fifth year of his miſſion found themſelves obliged to fly into Ethiopia, where they were kindly received by the Najaſhi or king of that country, who refuſed to deliver them up to thoſe whom the Koreiſh ſent to demand them. At this refuſal they were ſo exaſperated, that they came to a reſolution to ſuppreſs effectually the new religion which had now made a conſiderable progreſs. In order to this, they entered into a ſolemn league or covenant againſt the Hâſhemites, and the family of Abdal Motalleb in particular, engaging themſelves to contract no marriages with them, nor to have any manner of communication with them otherwiſe; and, to give this the greater weight, they reduced it into writing, and laid it up in the Caaba. Upon this, the tribe became divided into two factions; and all the family of Haſhem, both Moſlems and unbelievers, repaired to Abu Tâleb as their head; except only Abdal Uzza, ſurnamed Abu Laheb, the ſon of Abdal Motalleb, who, out of hatred to his nephew and his doctrine, went over to the oppoſite party. After this the authority of Abu Tâleb was ſcarce ſufficient to protect Mahomet from the fury of the Koreiſh; who, according to Al Jannabi, made frequent attempts upon him; ſometimes endeavouring to deſtroy him by force, at other times by ſecret wiles and machinations: nay, to compaſs their end, he tells us that they had recourſe to magic, inchantments, and diabolical illuſions. In ſhort, they gave him at laſt ſo much trouble, that he was obliged to change his habitation, and ſeek a new aſylum for himſelf and his companions. This he found in the houſe of one Orkam, which was advantageouſly ſituated on a hill called *Safa*. Here he converted Orkam's family, and the houſe was afterwards held in high eſtimation by the Moſlems.

32
is follow-
s perſecu-
d.

33
e Koreiſh
ter into a
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The two factions into which the tribe of Koreiſh was divided ſubſiſted for five years, when they were put an end to by a very ſtrange accident. Mahomet told his uncle Abu Tâleb, that God had manifeſtly ſhewed his diſapprobation of the covenant entered into againſt them, by ſending a worm to eat out every word of the inſtrument except the name of God. With this particular Abu Tâleb immediately acquainted the Koreiſh; offering, in caſe it proved falſe, to deliver up his nephew to them; but if it ſhould prove true, he inſiſted that they ought to lay aſide their animoſity, and annul the league they had made againſt the Hâſhemites. To this they acquieſced; and going to inſpect the writing, found it to be as Abu Tâleb had told them; the words "In thy name O God," being the only ones which remained. On ſo remarkable a proof of the divine diſpleaſure, the league was immediately annulled, and all acts of hoſtility between the two parties ceaſed.

34
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After this memorable event Mahomet remained with his uncle Abu Tâleb, who ſurvived the reconciliation only about eight months. The ſame year alſo died Khadijah, Mahomet's wife. Her death, as well as that of his uncle, proved a great detriment to his affairs; for the Koreiſh, notwithſtanding the former reconciliation, began now to proſecute him with more violence than ever. He was therefore obliged to fly for ſhelter to Al Tayef; which he choſe on account of its being the reſidence of his uncle Al Abbâs, whoſe protection he imagined he would be able to ſecure. In this, however, he found himſelf miſtaken; and though he ſtaid a month in the city, during which time he gained over a few, yet at laſt the lower ſort of people roſe againſt him and obliged him to return to Mecca. This refuſal, though it greatly diſcouraged the new converts, did not in the leaſt abate the zeal of Mahomet: on the contrary, he continued to preach boldly to the public aſſemblies at the pilgrimage to Mecca, exclaiming againſt idolatry, and particularly againſt the worſhip of two idols Allat and Al Uzza, to which the tribes, eſpecially the women of that of Thakif, were very much addicted. By this the prophet was often expoſed to great danger: however, he gained ſome converts, and amongſt them ſix of the inhabitants of Yathreb, of the Jewiſh tribe of Khazraj; who, on their return home, failed not to ſpeak much in commendation of their new religion, and exhorted their fellow-citizens immediately to embrace it. Theſe converts of the tribe of Khazraj are by the Arab writers called *Al Anſar*, *Al Anſarii*, or *Anſars*; that is, aſſiſtants, favourers, ſupporters, &c. becauſe they aſſiſted and ſupported the prophet when he was purſued to the very brink of deſtruction. They firſt met Mahomet on a little hill called *Al Akaba*, where a temple ſtood, and where they firſt took an oath to exert themſelves in ſupport of their new apoſtle and his religion. An uninterrupted friendſhip and harmony reigned for a long time amongſt the members of the Jewiſh tribes of Khazraj, Koreidha, and Nadir, whoſe great progenitor, ſay the Arabs, was Aaron the ſon of Amran. Mahomet therefore inſinuating himſelf into the good graces of the Anſars, they readily embraced his religion, and proved of very conſiderable ſervice.

35
Mahomet
ſtill perſecuted by the
Koreiſh.

36
Anſars, who

The next remarkable thing recorded of Mahomet is the invention of his night-journey to heaven. This he probably intended to ſupply the place of miracles; which, being performed by all other prophets, would no doubt have been conſidered as a capital defect in Mahomet's miſſion, had they been totally wanting. The abſurdities contained in that relation, however, are ſo great, that when he related it to his uncle Al Abbâs, and Omm-Hâna the daughter of Abu Tâleb, they endeavoured

37
Mahomet's
journey to
heaven.

38 Almoſt proves the ruin of his cauſe.

deavoured to diſſuade him from making it public. This advice he was ſo far from following, that he related the whole to Abu Jahl, one of his moſt inveterate enemies, who ridiculed him for it. Nay, he placed this ſtory in ſuch a ridiculous light to the Koreiſh, that they were on the point of inſulting him; ſeveral of his followers left him; and the whole deſign had probably been ruined, had not Abu Becr vouched for his veracity, and declared, that, if Mahomet affirmed it to be true, he firmly believed the whole. This happy incident not only retrieved the prophet's credit, but increaſed it to ſuch a degree, that he was ſure of making his diſciples ſwallow whatever he pleaſed; and on this occaſion it is ſaid by ſome that he gave Abu Becr the name of the *faithful witneſs*, as we have already related.

39 Congregation of Moſlems formed at Medina.

In the twelfth year of Mahomet's miſſion, twelve men of Yathreb, or Medina, of whom ten were of the tribe of Kharai, and two of that of Aws, came to Mecca, and took an oath of fidelity to the prophet at the hill Al Akaba. When they had ſolemnly engaged to do all required of them, Mahomet ſent one of his diſciples, named *Maſab Ebn Omair*, home with them, to inſtruct them more fully in the grounds of their new religion. Maſab being arrived at Medina, with the aſſiſtance of the new proſelytes, gained ſeveral others; and acquainting Mahomet with the ſucceſs of his miſſion, deſired leave to form a congregation of Moſlems at Medina. This the prophet readily granted; in conſequence of which, the new Moſlems regularly aſſembled, to the number of forty perſons, in the houſe of Saad Ebn Khaithama. The next year Maſab returned to Mecca, accompanied by ſeventy-three men and two women of Medina, who had profeſſed Mahometaniſm, beſides ſeveral others who were yet unbelievers. On their arrival they ſent immediately to Mahomet, and offered him their aſſiſtance, of which he now ſtood in the greateſt need; for his adverſaries were by this time grown ſo powerful in Mecca, that he could not ſtay there much longer without imminent danger. He therefore accepted their propoſal, and met them one night by appointment at the hill Al Akaba. At this interview he was attended by his uncle Al Abbas; who, though then an unbeliever, wiſhed his nephew well, and made a ſpeech to the people of Medina, wherein he told them, that as Mahomet was obliged to quit his native city and ſeek an aſylum elſewhere, and as they had offered him their protection, they would do well not to deceive him; and if they were not firmly reſolved to defend, and not to betray him, they had better declare their minds, and let him ſeek for protection ſomewhere elſe. Upon their proteſting their ſincerity, Mahomet ſwore to be faithful to them, a part of the Koran being read to all preſent, on condition they ſhould protect him againſt all inſults, as heartily as they would do their own wives and families. They then aſked him what recompence they were to expect if they ſhould happen to be killed in his quarrel: he anſwered, Paradiſe; upon which they pledged their faith to him, after Mahomet had choſen twelve out of their number, who were to have the ſame authority under him that the twelve apoſtles had under Chriſt.

Finding now a confederacy formed in his favour, our prophet began to pull off the maſk as to his true ſentiments concerning the means of reformation. Hitherto he had propagated his religion by fair means only; and in ſeveral paſſages of the Koran, which he pretended were revealed before this time, he declared, that his buſineſs was only to preach and admoniſh; that he had no authority to compel any perſon; and that whether they believed or not, was none of his concern, but belonged ſolely to God. But no ſooner did he find himſelf enabled, by the alliance abovementioned, to reſiſt his enemies, than he gave out that God had allowed him and his followers to defend themſelves; and at length, as his forces increaſed, he pretended not only to have leave to act on the defenſive, but to attack the infidels, deſtroy idolatry, and ſet up the true religion by the power of the ſword. To this he was excited by an apprehenſion that pacific meaſures would greatly retard, if not entirely overthrow, his deſigns; and therefore he determined to uſe the moſt violent methods to convert the Pagan Arabs, or rather to extend his own authority.

40 The Kor reſolve to put Mah met to death.

41 He out them a eſcapes.

42 In great danger mount Thur.

The Koreiſh, in the mean time, finding that Mahomet had conſiderably extended his influence, and hearing of the league concluded with the Anſars, began to think it abſolutely neceſſary that he ſhould be prevented from eſcaping to Medina; and, in order to do this the more effectually, they reſolved in a council, wherein it is ſaid the devil aſſiſted in perſon, to put an end to his life. To accompliſh this with the greater ſafety, they agreed that a man ſhould be choſen out of every tribe, and that each ſhould have a blow at him; that ſo the guilt of his death might fall equally on all the tribes, and thus the Haſhemites would be prevented from attempting to revenge the death of their kinſman, as they were much inferior in power to the reſt of the tribes put together. Mahomet now directed his companions to repair to Medina, where, in conſequence of the late treaty, they might be aſſured of protection. This they accordingly did: but he himſelf, with Abu Becr and Ali, remained behind; not having received, as he pretended, the divine permiſſion to retire. Here he narrowly watched the motions of the Koreiſh, and was ſoon appriſed of their machinations: for the abovementioned conſpiracy was ſcarce formed, when by ſome means or other it came to Mahomet's knowledge; and he gave out that it was revealed to him by the angel Gabriel, who alſo commanded him to retire from Mecca. The conſpirators were already aſſembled at the prophet's door; but he, to amuſe them, ordered Ali to lie down in his place, and wrap himſelf in his green cloak: this Ali complied with, and Mahomet miraculouſly, according to the Arabs, eſcaped to the houſe of Abu Becr. The conſpirators, in the mean time, perceiving through a crevice Ali wrapped up in the green cloak, took him for Mahomet himſelf, and watched there till morning, when Ali aroſe, and they found themſelves deceived. The prophet next retired in company with Abu Becr to a cave in mount Thûr, an hill a little ſouth of Mecca. Here he had ſtill a more narrow eſcape, concerning which we have the following account from an Arabic tradition. "The Koreiſh having detached a party from Mecca to reconnoitre the mouth of the cave, when they came there, found it covered by a ſpiders web, and a neſt built at the entrance by two pigeons which they ſaw, and which had laid two eggs therein. On ſight of this they reaſoned with themſelves in the following manner:

ner: "If any perſon had lately entered this cavern, "the eggs now before us would infallibly have been "broke, and the ſpider's web demoliſhed; there can "therefore be no body in it:" after which, they immediately retired. As the prophet, therefore, and his friend, were now ſaved ſo miraculouſly, by means of the pigeon's eggs and the interpoſition of the ſpider's web, he afterwards enjoined his followers, in memory of ſo remarkable an event, to look upon pigeons as a kind of ſacred animals, and never to kill a ſpider."

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The prophet and Abu Becr having ſtaid in this cave three days in order to recover a little from their conſternation, ſet out for Medina; but the Koreiſh, being informed of the route they had taken, ſent a party after them, under the command of Soraka Ebn Malec. Theſe overtook them; and, as the Arab hiſtorians tell us, Soraka's horſe fell down when he attempted to ſeize Mahomet. Upon this he recommended himſelf to the prophet's prayers, and remounted his horſe without hurt: but, as he ſtill continued the purſuit, his horſe fell down with him a ſecond time; upon which he returned to Mecca, without offering any further violence; and Mahomet, thus happily delivered from the greateſt dangers, arrived without further moleſtation at Medina, where he was received with the greateſt demonſtrations of joy.—This flight of the prophet from Mecca to Medina was reckoned ſo remarkable by the Moſlems, that they made it the æra from whence all their remarkable tranſactions were dated; calling it the *Æra of the Hegira*, or *flight*. The beginning of the Hegira correſponded with the 16th of July, A. D. 622.

44
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gira.

On Mahomet's arrival at Mecca, his firſt care was to build a moſque for his religious worſhip, and an houſe for himſelf. The city of Medina at that time was inhabited partly by Jews, and partly by heretical Chriſtians, that formed two factions which perſecuted one another with great violence. This gave the impoſtor ſuch an opportunity of propagating his new religion, that in a ſhort time the city was entirely at his devotion. Here he ſtrengthened himſelf by marrying Ayeſha the daughter of Abu Becr, though then only ſeven years of age, and gave his own daughter Fatima in marriage to Ali the ſon of Abu Tâleb. The next point he had in view was the union of the Mohâjerin, or thoſe who fled from Mecca on account of their religion, with the Anſars above mentioned. To facilitate this, after his moſque and houſe were finiſhed, he eſtabliſhed among the Moſlems a fraternity, the principal ſtatute of which was, that they ſhould not only treat one another like brethren, but likewiſe moſt cordially love and mutually cheriſh one another to the utmoſt of their power. But, leſt even this ſhould prove inſufficient, he coupled the individuals of the two bodies of Anſars and Mohâjerin; and this was the laſt tranſaction of the firſt year of the Hegira.

45
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The next year was uſhered in, according to Abulfeda, with a change of the *Kebla*, or place whither the Mahometans were to turn their faces in prayer. At firſt it had been declared to be perfectly indifferent where they turned their faces. Afterwards he directed them to pray with their faces towards the temple of Jeruſalem, probably with a view to ingratiate himſelf with the Jews; and now, in order to gain the Pagan Arabs, he ordered his followers to pray with their faces towards the eaſt. This inconſtancy gave great offence, and occaſioned the apoſtacy of many of his diſciples. About this time Mahomet receiving advice that a rich caravan of the Koreiſh was on the road from Syria to Mecca, he detached his uncle Hamza, at the head of 30 horſe, to ſeize upon it; who accordingly lay in wait for it in one of the woods of Yamama, thro' which it was to paſs: here, however, he was informed that the caravan was guarded by 300 men, ſo that he returned without making any attempt; but the prophet made the proper diſpoſitions for acting hereafter againſt the Koreiſh with ſucceſs. This year alſo Mahomet ſent out a party of 60 or 80 horſe, all Mohajerin, except one who was an Anſar, to make repriſals on the Koreiſh. They were met by a party of their enemies, and both ſides immediately prepared for an engagement: however, they parted without bloodſhed, except one of the Koreiſh, who was killed by an arrow ſhot by one of the Moſlems.

46
Mahomet takes a caravan, and gains the battle of Bedr.

Mahomet, having now put himſelf into an offenſive poſture, began in earneſt to make repriſals on the Koreiſh. His firſt exploit was the taking of a caravan attended by a ſmall guard; and this being accompliſhed by a party conſiſting only of nine men, contributed greatly to encourage the Moſlems. But what moſt eſtabliſhed the impoſtor's affairs, and was indeed the true foundation of all his future greatneſs, was his gaining the battle of *Bedr*, of which we have the following account.——The prophet being informed that Abu Sofian Ebn Harb eſcorted a caravan of the Koreiſh with only 30 or 40 men, reſolved to advance at the head of a ſmall detachment of his troops to intercept it. To this he was excited by the riches of the caravan, which conſiſted of a large quantity of merchandize, conſiſting of the riches of Syria, carried on the backs of a thouſand camels. He therefore ſent out a party to reconnoitre it, with orders to wait in ſome convenient place, where they might remain undiſcovered. But Abu Sofian having notice of Mahomet's motions, diſpatched a courier to Mecca, requeſting ſuccours from his countrymen, that he might be able to defend the caravan. Upon this Mahomet drew together all his forces, which amounted to no more than 313; while his enemies conſiſted of very near 1000, Abu Sofian having been reinforced by the Meccans with 950 men. The two armies did not long remain in a ſtate of inaction: but before the battle three champions from each party engaged each other in ſingle combat. In this the Moſlem champions were victorious, and the event greatly diſcouraged the Koreiſh. Mahomet, in the mean time, taking advantage of this lucky event, offered up his prayers to God with great fervency and vehemence; after which, feigning himſelf in a trance, he pretended that God had aſſured him of victory. Then, throwing an handful of duſt or gravel towards the enemy, he cried out, "May the faces of them be confounded;" and attacked the Koreiſh with ſuch bravery, that they were ſoon put to flight, leaving 70 dead on the ſpot, and having as many taken priſoners. The loſs on Mahomet's ſide was only 14 men, and among the priſoners was Al Abbas the prophet's uncle.

Though this action may ſeem of little conſequence in itſelf, it was of very great advantage to Mahomet's affairs at that time. He was immediately treated with the higheſt reſpect by the Najaſhi, or king of Ethiopia,

pia, who received a particular account of the victory ſoon after it was gained; while the ſuperſtitious Moſlems did not fail to look upon it as an evident declaration of heaven in their favour. Nay, notwithſtanding the ſmall number of enemies to be overcome, and who were only mortal men, theſe ignorant bigots did not heſitate to own the aſſiſtance of no leſs than four thouſand angels, who, according to them, rode on black and white horſes, having on their heads white and yellow ſaſhes, that hung down between their ſhoulders!

47 His law concerning the diviſion of ſpoils.

Notwithſtanding this diſaſter, however, Abu Sofian made a pretty good retreat, and conducted the greateſt part of the caravan to Mecca. This chagrined the Moſlems, though they found great ſpoils on the field of battle, the diviſion of which had likely to have proved fatal to their cauſe, by the quarrels that it occaſioned among them. So hot, indeed, were the diſputes on this occaſion, that the impoſtor was obliged to pretend an immediate revelation from heaven, empowering him to retain a fifth part for religious purpoſes, and to diſtribute the reſt equally. This became a law for his ſucceſſors; but, with regard to himſelf, the prophet often took the liberty of infringing it; for which, no doubt, a new revelation was always a ready and convenient ſalvo. As for thoſe who were ſlain on Mahomet's part in this battle, they were all looked upon by the Moſlems as martyrs; and the prophet perceiving among the priſoners two of his inveterate enemies, immediately cauſed their heads to be ſtruck off.

48 Abu Sofian's cowardice.

The Koreiſh, in order to be revenged on Mahomet for their late defeat at Bedr, ſent Amru Ebn Al As, who afterwards conquered Egypt, with ſome other of their principal people, on an embaſſy to the king of Ethiopia, in order to intereſt him in their quarrel. To do this the more effectually, they accuſed Mahomet and his followers of ſpeaking diſreſpectfully of JESUS, and of his mother MARY; which accuſation they hoped would likewiſe induce him to deliver up the Moſlem refugees that were then at his court. But the bad ſucceſs that had attended the arms of the Koreiſh hitherto, joined to the excuſes made by the refugees, not only hindered the Najaſhi from delivering them up, but alſo prompted him to diſmiſs the ambaſſadors, and return the preſents they had brought him. In the mean time, Abu Sofian, who had ſworn never to uſe perfumes or enjoy women till he had another battle with Mahomet, ſet out from Mecca with a body of two hundred horſe. He advanced to a poſt within three miles of Medina; from whence he ſent a detachment, who burnt a barn, together with a man in it that was winnowing wheat. Mahomet, being informed of this outrage, moved immediately towards him with a detachment of cavalry; but Abu Sofian was ſo intimidated by his approach, that he fled with precipitation, leaving behind him all the ſacks of flower or meal that had been brought for the ſubſiſtence of his troops. Inſtead therefore of coming to an engagement with the impoſtor, as he had ſworn, he contented himſelf with alarming the country, and pillaging ſuch as he ſuſpected of favouring Mahometaniſm.—This year alſo Mahomet conquered the tribes called *Banu Solaim*, *Ghatfan*, and the *Banu Kainoka*; plundering likewiſe a rich caravan belonging to the Koreiſh, and acquiring from thence 25,000 dirhems for his own ſhare of the plunder.

49 Battle of Ohod.

50 Mahomet defeated.

In the year of Chriſt 625, being the third of the Hegira, the Koreiſh aſſembled an army of 3000 men, among whom were 200 horſe and 700 armed with coats of mail. The command of this army was given to Abu Sofian, who was attended by his wife Henda Bint Otba, and ſat down at a village about ſix miles diſtant from Medina. Mahomet, being much inferior to the enemy, reſolved at firſt to keep himſelf within the town, and receive them there; but afterwards, by the advice of his companions, marched out againſt them at the head of 1000, according to ſome, 1050 according to others, or, as ſome ſay, only 900 men. Of theſe 200 were cuiraſſiers; but he had only one horſe beſides his own in the whole army. He diſtributed three ſtandards among his troops; of which one was given to the tribe of Aws, another to that of Khazraj, and the third to the Mohajerin. The grand ſtandard was carried before the prophet by Moſaab Ebn Omair. With theſe forces Mahomet formed a camp in a village near Ohod, a mountain about four miles north of Medina, which he contrived to have on his back; and the better to ſecure his men from being ſurrounded, he placed 50 archers, the flower of his troops, in the rear, with ſtrict orders not to quit their poſt. On the other hand, the army of the Koreiſh was drawn up in the form of a creſcent, and made a very good appearance. The right wing was commanded by Khaled Ebn Al Walid, afterwards ſo terrible to the Greeks; the left by Acrema Ebn Abu Jahl; and the centre by Abu Sofian. The corps de reſerve was headed by Abu Sofian's wife, accompanied by 15 other matrons, who performed the office of drummers, lamenting the fate of their countrymen ſlain at Bedr, in order to animate the troops who attended them. The attack was begun by the Moſlems, who fell upon the enemy with ſuch fury, that their centre immediately began to give way. Ali, or, according to Abulfeda, Hamza, ſlew Arta the enemy's great ſtandard-bearer; which ſtruck them with ſuch terror, that they ſoon betook themſelves to flight, falling foul upon their own corps de reſerve. Victory had now been no longer doubtful, notwithſtanding the vaſt inferiority of Mahomet's troops, had not the 50 archers, contrary to the prophet's expreſs commands, quitted their poſt to pillage the enemy. Upon this, Khaled perceiving the Moſlem army to be greatly expoſed, attacked them in the rear with ſuch bravery, that he turned the fortune of the day. Not content with putting the troops there in diſorder, he cried out with all his might "Mahomet is ſlain;" and this had ſuch an effect upon the Moſlems, that they immediately took to their heels, nor could the utmoſt endeavours of the prophet himſelf afterwards rally them. He therefore found himſelf obliged to quit the field of battle, in doing which he was very near loſing his life; being ſtruck down by a ſhower of ſtones, and wounded in the face by two arrows, which occaſioned the loſs of two of his fore-teeth. He likewiſe received a contuſion on his upper lip; and had even been killed on the ſpot, had not one of his companions, named *Telha*, Abu Becr's nephew, received a blow that was levelled at him. On this occaſion Telha received a wound in his hand, which deprived him ever after of the uſe of ſome of his fingers. Of the Moſlems 70 were ſlain; among whom were Hamza the prophet's uncle, and Moſaab the ſtandard-bearer. Amongſt the wounded were Abu Becr, Omar, and Othman; but as ſoon as they underſtood that the prophet was ſafe, they returned to the charge with a conſiderable body, and, after an obſtinate diſpute, carried him off. The good retreat made by theſe champions ſo diſcouraged the troops of Abu Sofian, that they did not purſue the flying enemy, but contented themſelves with remaining maſters of the field of battle; nor did that general, tho' he exulted not a little in his victory, make any further uſe of it than to give Mahomet a challenge to meet him the next year at Bedr, which was accepted; and after his return to Mecca, he deſired a truce with the Moſlems, which was readily granted.

51 He apologizes for his defeat.

This defeat had like to have proved the total ruin of the impoſtor's affairs, and muſt inevitably have done ſo had the conquerors made the leaſt uſe of their victory. Some of his followers now aſſerted, that, had he been really a prophet ſent from God, he could not have been thus defeated; and others were exaſperated on account of the loſs of their friends and relations who had been ſlain in the late engagement. To ſtill the murmurs of the former, he laid the blame on the ſins of thoſe who had accompanied him; and, to pacify the latter, he pretended a revelation from heaven, wherein the period of all mens lives was ſaid to be unalterably fixed without regard to their own actions, or to any external objects; ſo that thoſe who were killed in battle behoved to have died, though they had remained at home in their own houſes. By the aſſiſtance of this laſt doctrine he encouraged his followers to fight, without fear, for the propagation of their faith, as all their caution would not be ſufficient to avert their deſtiny, or prolong their lives even for a ſingle moment.

52 ge of Me-na.

The next year, (A. D. 626), Mahomet, beſides ſeveral other leſs conſiderable ſucceſſes, reduced a fortreſs belonging to the Jewiſh tribe of Al Nadir, who had revolted on account of the defeat at Ohod: on this occaſion, by an expreſs revelation, as he pretended, he kept the whole booty to himſelf; and, about the ſame time, forbad his followers the uſe of wine, or to play at games of chance, on account of the diſturbances and quarrels which were likely to be excited by that means among them. This year alſo he marched with a body of infantry to Bedr, to meet Abu Sofian, as he had promiſed the year before: but that general's heart failing him, he returned home without facing the prophet; and this piece of cowardice the Moſlems did not fail to impute to a terror ſent immediately from God. The year following, however, the Koreiſh, in conjunction with the tribe of Ghatfan, and the Jews of Al Nadir and Koreidha, aſſembled an army of 12,000 men, with which they formed the ſiege of Medina; thus threatening the impoſtor and all his followers with utter deſtruction at once. On the enemies approach, Mahomet, by the advice of a Perſian named *Salman*, ordered a deep ditch to be dug round the city, and went out to defend it with 3000 men. The Arabs having inveſted the town, both ſides remained in a ſtate of inactivity for ſome time, which was ſo well employed by the impoſtor, that he found means to corrupt ſome of the leading men in the enemy's camp. The good effects of this ſoon appeared; for a champion having advanced to the Moſlem entrenchments, and challenged the beſt man in their army to fight him in ſingle combat, the challenge was immediately accepted by Ali, who ſlew him and another that came to his aſſiſtance: after which, thoſe who had been corrupted by Mahomet's agents ſo ſoured a conſiderable part of the forces, that they deſerted their camp; upon which all the reſt were obliged to raiſe the ſiege, and return home.

53 The ſiege raiſed.

The prophet, being now happily delivered from the moſt powerful combination that had ever been formed againſt him, was viſited by the angel Gabriel; who aſked him whether he had ſuffered his men to lay down their arms, when the angels had not laid down theirs, ordering him at the ſame time to go immediately againſt the tribe of Koreidha, and aſſuring him that he himſelf would lead the way. Upon this, Mahomet immediately ſet out for the fortreſs of the Koreidhites, and puſhed on the ſiege with ſo much vigour, that, tho' it was deemed impregnable, he obliged the garriſon to capitulate in twenty-five days. The Koreidhites, not daring to truſt themſelves to the impoſtor's mercy, ſurrendered at diſcretion to Saad Ebn Moâdh, prince of the tribe of Aws, hoping that he, being one of their old friends and confederates, would have ſome regard for them. Here, however, they found themſelves diſappointed; for Saad, being highly provoked at them for aſſiſting the Koreiſh, while in league with Mahomet, ordered the men to be put to the ſword, the women and children made ſlaves, and their goods divided among the Moſlems. This ſentence was no ſooner heard by Mahomet, than he cried out that Saad had pronounced the ſentence of God; and, in conſequence of this deciſion, ordered the men, to the number of 600 or 700, to be immediately maſſacred. The women and children were alſo carried into captivity. Their immoveable poſſeſſions were given to the Mohajerin, and the goods divided equally.

54 Khoreidhites maſſacred.

Mahomet now continued to be ſucceſsful, gradually reducing the Arab tribes one after another. In 628, he ſent an agent to Conſtantinople, deſiring leave of the Greek emperor to trade with his ſubjects; which was immediately granted. The ſame year alſo he concluded a peace for ten years with the inhabitants of Mecca, and obtained liberty the next year to perform his devotions at the Caaba. What tended conſiderably to bring about this pacification was an account brought to the Koreiſh by one whom they had ſent with an actual defiance to Mahomet, of the prodigious veneration which his followers had for him. This meſſenger acquainted them that he had been at the courts both of the Roman emperors and of the kings of Perſia, but never ſaw any prince ſo highly reſpected as Mahomet was by his companions. Whenever he made the ablution, in order to ſay his prayers, they ran and caught the water which he had uſed; whenever he ſpit, they licked it up, and gathered up every hair that fell from him, with great veneration. This intimated how deſperately they would fight in his defence, and probably inclined his enemies to avoid hoſtilities. In 629, the impoſtor began to think of propagating his religion beyond the bounds of Arabia, and ſent meſſengers to ſeveral neighbouring princes to invite them to embrace Mahometaniſm; but, before ſending the letters, he cauſed a ſilver ſeal to be made, on which were engraved in three lines the following words, "MAHOMET THE APOSTLE OF GOD." This ſeal, he believed, would procure the letters to which it was affixed a more fa-

55 Prodigious veneration for Mahomet.

56 He invites foreign princes to embrace his religion.

vourable reception at the courts of thoſe princes whither they were directed. The firſt to whom he applied was Khoſru Parviz the king of Perſia; but he, finding that Mahomet had put his own name before his, tore the letter in pieces, and ſent away the meſſenger very abruptly. He alſo ſent a letter to the ſame purpoſe to Conſtantinople; but though the emperor Heraclius diſmiſſed his meſſengers honourably, he refuſed to abandon the Chriſtian faith. Beſides theſe, he wrote five other letters, which he diſtributed among thoſe who he thought would be moſt likely to acknowledge him for an apoſtle. However, we do not hear, that by means of letters he ever introduced his religion into a foreign country.—

57
Is poiſoned, but recovers.

But while our impoſtor was thus going on in the full career of ſucceſs, and induſtriouſly propagating his infamous falſehoods by all the means he could think of, he was poiſoned by a maid, who wanted, as ſhe ſaid, to make an experiment whether he was a prophet or not. This was done by communicating ſome poiſon to a ſhoulder of mutton, of which one of his companions named *Baſhar Ebn Al Bara*, eating heartily, died upon the ſpot; and Mahomet himſelf, though he recovered a little, and lived three years after, yet never enjoyed perfect health. Notwithſtanding this misfortune, however, he ſtill continued his enterprizes. The year 630 proved remarkably fortunate. It was uſhered in by the converſion of Khalid Ebn Al Walid, Amru Ebn Al As, and Othman Ebn Telha, three of the moſt conſiderable perſons among the Koreiſh; and this ſoon enabled him to become maſter of the whole peninſula of Arabia.

58
Meccans violate the treaty with Mahomet.

This year alſo the inhabitants of Mecca took it into their heads to violate the treaty concluded with Mahomet: for the tribe of Becr, who were the confederates of the Koreiſh, attacking thoſe of Khozaab, who were in alliance with Mahomet, maſſacred 20 of them, and afterwards retired; being ſupported in this action by a party of the Koreiſh themſelves.—The conſequence of this violation was ſoon apprehended; and Abu Sofian himſelf made a journey to Medina, in order to heal the breach, and renew the truce: but in vain; for Mahomet, glad of this opportunity, refuſed to ſee him. Upon this, he applied to Abu Becr, Ali, Omar, and Fatima, to intercede for their countrymen with the prophet; but ſome of theſe giving him rough anſwers, and others none at all, he was obliged to return to Mecca as he came. Mahomet immediately gave orders for the neceſſary preparations, that he might ſurpriſe the Meccans, who were by no means in a condition to receive him; but Hateb Ebn Abu Baltaa, hitherto a faithful Moſlem, attempted to give them notice of their danger by a letter, though without effect. His letter was intercepted; and he alleged in his excuſe, that the only reaſon he had for his conduct was to induce the Koreiſh to treat his family with kindneſs. This excuſe the prophet accepted, as he had greatly diſtinguiſhed himſelf at the battle of Bedr, but ſtrictly forbad any ſuch practices for the future; which having done, he immediately made the neceſſary diſpoſitions for ſetting forward.

Mahomet's army, on this occaſion, was compoſed of Mohajerin, Anſars, and other Arabs, who had lately become proſelytes. As they drew near to Mecca, he ſet up his ſtandards, and advanced in order of battle to Mar Al Dhahrân, a place about four paraſangs from Mecca, where the whole army encamped. Here he ordered 10,000 fires to be lighted, and committed the defence of the camp to Omar, who cut off all communication with the town, ſo that the Meccans could receive no certain advice of their approach. Among others that came from Mecca to reconnoitre the Moſlem camp, Abu Sofian Ebn Harb, Hakim Ebn Hezam, and Bodail Ebn Warka, fell into Omar's hands; and being conducted to Mahomet, were obliged to embrace Mahometaniſm in order to ſave their lives.

The firſt rumour of this expedition had not a little terrified the Koreiſh, though they were not apprized that the prophet had reſolved upon a war; but perceiving now, upon the report of Abu Sofian, who had been ſent back to them, that the enemy was at their gates, they were thrown into the utmoſt conſternation. Of this Mahomet being informed, he reſolved to take advantage of the confuſion that then reigned among them. He therefore firſt diſpatched Hakim and Bodail to the Meccans, inviting them to take an oath of allegiance to him, and become converts to his new religion; after which, he made the following diſpoſition of his forces. Al Zobeir was ordered to advance with a detachment towards the town on the ſide of mount Cada. Saad Ebn Obad, prince of the tribe Khazraj, marched by his order with another detachment towards the height of Coda, which commands the plain of Mecca. Ali commanded the left wing of the army, conſiſting of Anſars and Mohajerin. The prophet put into his hands the great ſtandard of Mahometaniſm, with orders to poſt himſelf upon mount Al Hajun, and to plant the ſtandard there; ſtrictly enjoining him, however, not to ſtir from thence till he himſelf arrived, and till a proper ſignal ſhould be given him from Saad for that purpoſe. Khaled led the right wing, conſiſting of the Arabs lately converted, with which he was to poſſeſs himſelf of the plain of Mecca. Abu Obeidah commanded in the centre, which conſiſted entirely of infantry: the prophet himſelf remained in the rear, from whence he could moſt eaſily diſpatch his orders to all the generals as occaſion ſhould require. He expreſsly prohibited Khaled and all his other officers to act offenſively unleſs they were firſt attacked. Things being in this ſituation, the army upon a ſignal given put itſelf immediately in motion. The prophet mounted his camel with great alacrity, and was that day cloathed in red. Al Zobeir purſued the route aſſigned him without oppoſition; nor did Saad diſcover the fainteſt traces of an enemy: Ali took poſſeſſion of his poſt without the loſs of a man; and in like manner Abu Obeidah ſeized on the ſuburbs. Khaled, however, in his march to the plain, was met by a large body of the Koreiſh and their confederates, whom he immediately attacked and defeated, putting 28 of them to the ſword.

59
Mecca taken.

Not content with this, he purſued them into the town, and maſſacred a great number of the inhabitants; which ſo terrified the reſt, that ſome ſhut themſelves up in their houſes, while others fled different ways in order to avoid the fury of the merciléſs and impious tyrant, who was now become maſter of the city. Thus was Mecca reduced, with the loſs only of two men on the ſide of the impoſtor.

Mahomet, being now maſter of the city, made his public entry into it exactly at ſun-riſing. When the firſt tumult was over, he went in proceſſion round the Caaba ſeven times, touching the corner of the black ſtone with the ſtaff in his hand, as often as he paſſed it, with great devotion. Then he entered the Caaba, where obſerving ſeveral idols in the form of angels, and the ſtatues of Abraham and Iſhmael with the arrows of divination in their hands, he cauſed them all to be deſtroyed. He alſo broke in pieces with his own hands a wooden pigeon, that had long been eſteemed a deity by the idolatrous Koreiſh. Afterwards entering into the interior part of the Caaba, he repeated with a loud voice the form uſed at this day by the Mahometans, "Allah Akbar, God is Great," &c. turning towards every part of the temple. Then he prayed between the two pillars there, with two inclinations, as well as without the Caaba; ſaying to thoſe that attended him, "This is your Kebla, or the place towards which you are to turn your faces in prayer."

Having thus effectually ſubdued the Koreiſh, put an end to all commotions, and purged the Caaba of 360 idols, the prophet's next care was to ingratiate himſelf with the people. Sending therefore for ſome of the principal of them, he aſked them what kind of treatment they expected from him, now he had conquered them? To this they replied, "None but what is favourable, O generous brother;" upon which he diſmiſſed them, telling them they were from that moment a free people. After this, pretending a new revelation, he reſtored the keys of the Caaba to Othman Ebn Telha, who was in poſſeſſion of them before; and who was now ſo much affected by this piece of juſtice, that he immediately became a proſylete. Next day, the prophet declared Mecca an aſylum, and publicly gave out that he would maintain to the utmoſt of his power the inviolable ſecurity of the place. He then was ſolemnly inaugurated; after which he proſcribed, according to ſome, ſix men and four women, according to others, eleven men and one woman: but of theſe only three men and one woman were put to death; the reſt being pardoned on their embracing Mahometaniſm, and one woman making her eſcape. The remainder of this year was ſpent in various expeditions againſt different tribes of the Arabs, which were in general attended with ſucceſs.

The ninth year of the Hegira, being that of Chriſt 631, is called by the Mahometans the year of *Embaſſies*; for the Arabs, who had hitherto been expecting the iſſue of the war between Mahomet and the Koreiſh, no ſooner ſaw that which was the moſt conſiderable of the whole ſubmit to him, than they began to come in to him in great numbers, and to ſend embaſſies to make their ſubmiſſions to him, both while at Mecca, and after his return to Medina, whither he had returned ſoon after the taking of Mecca: and thus good fortune continued without interruption to the year 632, when this famous impoſtor breathed his laſt, having juſt reduced under his ſubjection the whole peninſula of Arabia, and being ready to break into the neighbouring kingdoms in order to ſatisfy his ambition.

60 Mahomet dies.

61 Great confuſion on his death.

The death of Mahomet occaſioned ſuch a conſternation in Mecca, that the governor hid himſelf, fearing to be called to an account for his former conduct; and the inhabitants, upon the firſt arrival of this melancholy news, conſidered themſelves as deſtitute of all manner of protection. After the firſt impreſſions of their fear, however, were over, they began to meditate a revolt; but were prevented by one Sohail Ebn Amru, a principal man of the Koreiſh. The tumults at Medina, however, were not ſo eaſily appeaſed. The news of this ſad event was no ſooner publiſhed there, than a number of people aſſembled before his door, crying out, "How can our apoſtle be dead? Our interceſſor, our mediator, has not entirely left us! He is taken up into heaven, as was Iſa (Jeſus); therefore he ſhall not be buried." This was confirmed by Omar; who drew his ſword, and ſwore, that, if any perſon affirmed Mahomet to be dead, he would cut off his hands and his feet. "The apoſtle of God, ſays he, is not dead: he is only gone for a ſeaſon, as Moſes the ſon of Amran was gone from the people of Iſrael for forty days, and then returned to them again." The populace therefore kept the body above ground, even after the belly began to ſwell; nor could the prophet's uncle Al Abbas, notwithſtanding this, convince them to the contrary. Upon hearing of theſe tranſactions, Abu Becr immediately poſted from Al Sonah, another quarter of the city, and expoſtulated with them in the following manner: "Do you worſhip Mahomet, or the god of Mahomet? If the latter, he is immortal, and liveth for ever; but if the former, you are in a manifeſt error, for he is certainly dead." The truth of this aſſertion he immediately evinced from ſeveral paſſages of the Koran, in ſo clear and concluſive a manner, that he not only ſatisfied Omar, but calmed the minds of all the people.

The prophet having left no directions concerning a ſucceſſor, very warm diſputes aroſe between the Mohajerin and the Anſars about the right of electing a khalif. The former inſiſted on having that right, becauſe they had attended Mahomet in his flight to Medina; and the others, becauſe they had ſupported him when expelled from his native city, &c. In ſhort, the diſputes became ſo hot, that an open rupture muſt have commenced, had not they been terminated by a propoſal that each party ſhould chuſe a khalif. This amuſed them a little for the preſent; but not proving perfectly agreeable to the Mohajerin, Abu Becr propoſed two perſons, Omar and Abu Obeidah, offering to ſwear allegiance to him on whom the ſuffrages of both parties ſhould fall. But this producing no deciſion, Omar ſwore fealty to Abu Becr, and his example was followed by all the Moſlems on the ſpot; upon which, he was acknowledged, both by the Mohajerin and Anſars, as the rightful ſucceſſor of Mahomet.

62 Abu Becr ſucceeds him.

63 Ali diſſatiſfied.

Theſe tranſactions, however, were not at all agreeable to Ali, who, as ſon-in-law to the prophet, had undoubtedly the beſt title to the ſucceſſion. He expoſtulated with Abu Becr about the manner of his election, which had been effected without his knowledge; and received for anſwer, that the exigence of affairs would not admit of deliberation; and that, had not the election been ſo ſudden, the oppoſite party would have wreſted the power entirely out of their hands. Ali was in Fatima's apartment when Abu Becr had the good luck to be elected khalif; and, upon the arrival of the news, expreſſed great diſſatiſfaction. He found himſelf, however, ſoon obliged to change his note, when the new khalif ſent Omar with orders to burn the houſe where he and his friends were aſſembled, in caſe he did not concur in ſupporting the election. But, notwithſtanding his forced compliance on this occaſion, it is not to be doubted that he reckoned himſelf injured; and his pretenſions were thought to be juſt by a great num-

Arabia.

ber of Moſlems: which notion is entertained by a very conſiderable party of Mahometans even at this day; and theſe are called *Shiites*, or *ſectaries*.

64
Rebellions extinguiſhed by Khaled.

Soon after Abu Becr's acceſſion, many of the Arabs refuſed to pay the tribute impoſed upon them by Mahomet, and even attempted to ſhake off his yoke altogether. This ſo alarmed the khalif and his ſubjects at Medina, that, fearing a general revolt, they ſent all not able to bear arms into the cavities of the rocks and mountains, and put themſelves in as good a poſture of defence as the ſhort time would permit. In the mean time, Khaled was diſpatched with an army of 4500 men, to reduce the rebels; and he ſoon coming up with them, gave them a total defeat, brought off a vaſt quantity of plunder, and made many of their children ſlaves. Nor was he content with this; for being ſent by Abu Becr to Malec Ebn Noweirah, an eminent perſon among the Arabs, and famous for his ſkill in poetry, as well as his horſemanſhip and bravery, to bring him over by fair means, he immediately ordered his head to be cut off. By this means, indeed, he extinguiſhed all the remains of rebellion; but rendered himſelf exceedingly obnoxious to Abu Becr, who would have put him to death, had not Omar ſtrongly interceded for him: for Khaled had greatly exceeded his commiſſion, as Malec had returned to Mahometaniſm, and had offered to pay the money. This was not, however, the only piece of ſervice Khaled performed at this time; he alſo defeated and killed Moſeilama, who had ſet up for a prophet in the time of Mahomet, and even wanted to take the grand impoſtor himſelf into company with him. The ſame general likewiſe defeated and diſperſed the troops of another prophet, called *Toleiah Ebn Khowailed*, obliging himſelf to remain concealed till after the death of Abu Becr. About the ſame time another body of rebels committed great diſorders in the province of Bahrein. Againſt theſe, Abu Becr diſpatched Al Ola at the head of a conſiderable army, who ſoon obliged them to return to Mahometaniſm; having put great numbers of them to the ſword, and plundered their country in a dreadful manner.

5
War with the Greeks.

Abu Becr having now no enemy to contend with in Arabia, and being free from all apprehenſions of a competitor, reſolved next to turn his arms againſt the Greek emperor. Some ſkirmiſhes had happened, in the time of Mahomet, between the Moſlems and Greeks; in one of which, Zeid, a Moſlem commander, had been killed. To revenge his death, his ſon Oſama was on the point of making an irruption into Syria at the time of Mahomet's deceaſe. This enterprize the khalif ordered him to go on with, and it was executed by Oſama with great ſucceſs. He entered Syria, and laid waſte the country, doing the Greeks a good deal of damage; after which, he returned to Arabia without any conſiderable loſs.

66
Kingdom of Hira deſtroyed.

Soon after, the khalif ſent Khaled at the head of a powerful army to invade Irak, and put an end to the kingdom of Hira. In this undertaking he was attended with his uſual ſucceſs. The king Al Mondar Al Maghrur loſt his life in defence of his dominions; and the kingdom was totally deſtroyed, after it had continued 622 years and eight months, as we have already hinted. The inhabitants became tributaries; and, according to Eutychius, the tribute collected on this occaſion amounted to 70,000 pieces of money. This, according to Al Makin, was the firſt tribute-money ever brought to Medina.

Arabia.

67
Abu Becr'
directions
his genera

The exigence of the khalif's affairs in Syria, however, did not ſuffer Khaled long to remain in Irak. Before the departure of the army under his command, Abu Becr had come to a reſolution to invade Syria; and finding his deſign approved by the principal officers of his court, he ſent circular letters to the petty princes of Yaman, the chief men of Mecca, &c. informing them of his intention to take Syria out of the hands of the infidels; acquainting them, at the ſame time, that a war for the propagation of the true religion was an act of obedience to God. To theſe letters they paid a proper regard; and in a very ſhort time appeared at Medina at the head of their reſpective troops, and pitched their tents round the city. Here they ſtaid, till the Moſlem army deſtined to act againſt the emperor was completely formed, and in a capacity to begin its march. The khalif, having viewed the troops from the top of an hill, and prayed to God for ſucceſs, attended the generals a little way on foot. As the generals were on horſeback, they could not forbear expreſſing their uneaſineſs at the khalif's thus demeaning himſelf; but he told them, that it ſignified little whether they walked on foot or rode, as they had all the ſame views, *viz.* the ſervice of God, and the propagation of religion. At parting, he addreſſed Yezid Ebn Abu Sofian, whom he had inveſted with the ſupreme command, in the following manner: "Take care, Yezid Ebn Abu Sofian, to treat your men with tenderneſs and lenity. Conſult with your officers on all preſſing occaſions, and encourage them to face the enemy with bravery and reſolution. If you ſhall happen to be victorious, deſtroy neither old people, women, nor children. Cut down no palm-trees, nor burn any fields of corn. Spare all fruit-trees, and ſlay no cattle but ſuch as you ſhall take for your own uſe. Adhere always inviolably to your engagements, and put none of the religious perſons you ſhall meet with in monaſteries to the ſword. Offer no violence to the places they ſerve God in. As for thoſe members of the ſynagogue of Satan *who ſhave their crowns*, cleave their ſculls, and give them no quarter, except they embrace Iſlamiſm (Mahometaniſm), or pay tribute."

68
The Moſlems defea
ed.

The Greek emperor was greatly alarmed at the approach of the Moſlem army; however, he made all neceſſary preparations for his defence, and ſent out a detachment to reconnoitre the enemy. Theſe having fallen in with the Arabs, a battle enſued, in which the Greeks were defeated with the loſs of 1200, while the Arabs loſt only 120 men. This was ſucceeded by a great many ſkirmiſhes, in which the Moſlems were generally victorious. The rich ſpoil taken on theſe occaſions was ſent as a preſent to the khalif; who having acquainted the inhabitants of Mecca with his good ſucceſs, they were thereby ſo elated, that they furniſhed him with a ſtrong reinforcement, which was immediately ordered into Syria. The Greek emperor, in the mean time, having ordered another body of his troops to advance towards the frontiers, they found an opportunity of engaging the Moſlem army under Abu Obeidah, a perſon of great piety, but little experience in war. Him they totally defeated; and Abu Becr was ſo much provoked at his defeat, that he deprived him of the command, which was given to Khaled, who was

for

69 Damaſcus beſieged.

for this purpoſe recalled from Irak. That general's firſt exploit was the reduction of Boſtra, a very rich and populous city of Syria Damaſcena; which, however, he accompliſhed by treachery rather than by force of arms. Having left a garriſon of 400 men in Boſtra, and being joined by Abu Obeidah's forces, he laid ſiege to Damaſcus with an army of 45,000 men. This ſo alarmed the emperor, that he diſpatched an army of 100,000 men, commanded by one Werdan, to the relief of that city. Khaled, on hearing of the approach of this formidable army, was for marching immediately with all his forces, and giving them battle; but this was oppoſed by Abu Obeidah, as it would enable the inhabitants of Damaſcus to procure freſh ſupplies both of arms and proviſions, and conſequently render the reduction of the place more difficult. It was, therefore, at laſt agreed, that a body of troops ſhould be detached under Derar Ebn Al Wazâr, an excellent officer, and an implacable enemy to the Chriſtians (as indeed were all the Moſlem generals except Abu Obeidah), to fight the enemy, whilſt the ſiege was carried on by the two generals.

70 The Greeks defeated with great ſlaughter.

Khaled, fearing leſt Derar's furious zeal and hatred to the Chriſtians ſhould prove fatal to his troops, told him before his departure, that though they were commanded to fight for the propagation of their religion, yet they were not allowed to throw away the lives of their men; and therefore ordered him to retire to the main body of the army, in caſe he found himſelf preſſed by a ſuperior force. But Derar, deaf to this ſalutary admonition, with his ſmall body of troops ruſhed upon the whole Chriſtian army, notwithſtanding the vaſt diſproportion of numbers. He charged them, however, with ſuch bravery, that he penetrated to the ſpot where the general gave his orders, killed the ſtandard bearer, and carried off the ſtandard itſelf, in which was a croſs richly adorned with precious ſtones. Nay, he would in all probability have put Werdan's army to flight, had not that general's ſon, the commandant of Hems, arrived in the heat of the engagement with a body of 10,000 men; with which he attacked the Moſlems ſo briſkly in the rear, that he forced them to retire, and took Derar himſelf priſoner. This ſo diſcouraged them, that they would have taken to their heels, had not Rafi Ebn Omeirah animated them with the following words. "What! do not you know, that whoever turns his back upon his enemies offends God and his prophet? and that the prophet declared the gates of paradiſe ſhould be open to none but ſuch as fought for religion? Come on! I will go before you. If your captain be dead, or taken priſoner, yet your God is alive, and ſees what you do." This exhortation had ſuch an effect upon his troops, that, returning to the charge, they maintained their ground with unparalleled bravery, till Khaled arrived with a conſiderable body of infantry and 1000 horſe. The arrival of this general ſoon turned the fortune of the day. A party of the imperial army went over to the Moſlems, and the reſt took to their heels. Derar alſo was retaken, and carried off in triumph. However, Werdan, having collected the ſhattered remains of his forces, and received a reinforcement from the emperor, found his army ſtill to amount to 70,000 men, with which he reſolved to make another attempt for the relief of Damaſcus. They were attended with ſtill worſe ſucceſs in this ſecond attempt than they had been before; being utterly defeated, with the loſs of 50,000 men, ſo that they were no more in a condition to attempt any thing; and, in conſequence of this, the city was ſoon taken, notwithſtanding the utmoſt efforts of the beſieged.

71 The city taken.

72 Abu Becr dies and is ſucceeded by Omar.

This diſaſtrous event happened in the year 634; and the very day that Damaſcus was taken, Abu Becr died of a conſumption in the 63d year of his age. He was ſucceeded by Omar, who was proclaimed khalif that very day; and the firſt title aſſigned him was, *The khalif of the khalif of the apoſtle of God.* But the Arabs conſidering, that, by the additions to be continually made at the acceſſion of every new khalif, the title would become too long, they with one voice ſaluted him, *Emperor of the believers;* which illuſtrious title deſcended afterwards to his ſucceſſors by a kind of inconteſtable right.

The new khalif was no ſooner ſettled than he replaced Abu Obeidah in the command of the army in Syria, being greatly diſpleaſed with the cruel and bloodthirſty diſpoſition of Khaled. He alſo commanded Abu Obeidah to have an eye upon Paleſtine, and to invade it as ſoon as an opportunity offered. Khaled bore his diſgrace with great magnanimity; and ſwore, that though he had always had the greateſt regard for Abu Becr, and the utmoſt averſion to Omar, he would ſubmit to God's will, and obey the new khalif as the lawful ſucceſſor of Mahomet. The Moſlem forces in the mean time having made all proper diſpoſitions for improving the advantages they had gained, Abu Obeidah ſent a detachment of 500 horſe to a place called *Dair Abil Kodos*, about 30 miles from Damaſcus, to plunder the Chriſtians there. In this place there lived a prieſt ſo eminent for his ſanctity, that the neighbouring people of all ranks reſorted to him for his bleſſing and inſtruction. When any perſon of diſtinction married, he took with him his new ſpouſe, in order to receive this holy man's benediction. The fame of this prieſt's ſanctity drew ſuch numbers of people to that place every Eaſter, that a great fair was kept annually at his houſe, to which were brought vaſt quantities of the richeſt ſilks, plate, jewels, &c. When the Arabs drew near to this place, to which they were conducted by a Chriſtian, they were informed that the governor of Tripoli had married his daughter to a perſon of diſtinction, who had carried his lady to the above-mentioned prieſt. She was attended by a guard of 5000 men; beſides which the Jews, Greeks, Copts, and Armenians, at that time aſſembled about the monaſtery, amounted to 10,000. Notwithſtanding this, the Moſlem commander determined to carry off the lady; and having told his men, that they ſhould either enjoy the riches of the Chriſtians, or the pleaſures of paradiſe, he commanded them to fall on the enemy. The impetuoſity of theſe enthuſiaſts at firſt bore all down before them; but the Chriſtians, perceiving they were but an handful of men, ſurrounded them on all ſides, and reſolved to make them pay dear for their temerity. But Abu Obeidah, being informed of their dangerous ſituation, immediately diſpatched Khaled with a ſtrong detachment to the relief of his diſtreſſed countrymen. The conſequence of this was, that the Chriſtians were entirely defeated, and the unhappy lady carried off, with 40 maids that waited upon her, as well as all the wealth brought to the above-mentioned fair; among which were many rich garments

73 Governor of Tripoli's daughter carried off.

curiouſly

74 Puniſhment of ſome ſoldiers who had drunk wine.

curiouſly wrought, and in particular one adorned with the effigies of our Saviour. All theſe were ſold for ten times their weight of gold to ſome of the opulent Arabs of Yaman. The young lady was given to Abdallah, who kept her to the reign of Yezid. Of this advantage Abu Obeidah ſent notice to the khalif by a letter, in which he alſo acquainted him that ſome of his men had drunk wine. Theſe delinquents, by the advice of Ali, had each of them 80 ſtripes beſtowed upon the ſoles of their feet; after which, many others, who had never been ſuſpected of drinking this prohibited liquor, made a voluntary confeſſion, and received the ſame chaſtiſement.

75 The Greeks utterly defeated at Yermouk.

The Moſlem general next ſet about reducing the principal fortreſſes in Syria, and ſoon became maſter of Kinniſrin, Baalbec, Adeſtan, Shaizar, and Hems; on the news of which, the Greek emperor Heraclius, reſolving if poſſible to put a ſtop to the cruel and unprovoked ravages of theſe barbarians, ſent againſt them an army of 240,000 men, commanded by one Manuel, whom the Arabs call *Mahan*. But this vaſt multitude was utterly defeated by Khaled; upon whom Abu Obeidah conferred the ſupreme command, on account of his ſuperior ſkill in military affairs. This battle was fought near a village called *Yermouk;* and, according to the Arabian hiſtorians, the Chriſtians had 150,000 men killed, and 40,000 taken priſoners, while the Moſlems loſt no more than 4030 men.

76 Omar viſits Jeruſalem.

The defeat of Yermouk was immediately followed by the loſs of the whole province of Paleſtine. The reduction of Jeruſalem was one of its firſt conſequences; and Omar, being appriſed of the ſucceſs of his arms, immediately ſet out to viſit that holy place, at the requeſt, it is ſaid, of the inhabitants. The khalif was attended in his journey by a numerous retinue, moſt of whom afterwards returned home. He rode upon a red camel, and carried with him two ſacks, one of which contained a ſort of proviſion, conſiſting of barley, rice, or wheat, ſodden and unhuſked, and the other, fruits. Before him he had a leather bottle, very neceſſary in theſe deſart countries to put water in; and behind him a wooden platter. Before he left the place where he had reſted the preceding night, he conſtantly ſaid the morning prayer; after which he addreſſed himſelf to his attendants in a devout ſtrain, always uttering before them ſome pious ejaculations. Then he communicated his proviſion to them; every one of his fellow-travellers eating with him out of the ſame platter, without the leaſt diſtinction. His clothes were made of camels hair, and were in a very tattered condition; nor could any thing be more mean or ſordid than the figure he made. On the road he diſtributed juſtice among his ſubjects, concerning which we have ſeveral anecdotes; but that moſt to his honour is the following.

77 Anecdote of him.

Having obſerved ſome poor tributaries expoſed to the heat of the ſun, a very cruel puniſhment in thoſe hot countries, for not being able to pay the ſum demanded of them, he ordered them to be releaſed; telling his attendants, that he once heard the apoſtle of God ſay, "Do not afflict men in this world; for thoſe who do ſo, God ſhall puniſh in hell-fire at the day of judgement." His orders were immediately executed, to the great grief of the oppreſſors; and the khalif continued his route. On the confines of Syria he was met by Abu Obeidah attended by an eſcorte, who conducted him to the Moſlem camp, where he was received with the utmoſt demonſtrations of joy; and from thence to Jeruſalem. The morning after his arrival, he ſaid prayers and preached to the troops. In his ſermon he repeated the following paſſage out of the koran, "Whomſoever God ſhall direct, he ſhall be rightly directed; and whomſoever he ſhall cauſe to err, thou ſhalt not find any to defend or to direct." Upon this a Chriſtian roſe up, and ſaid aloud twice, "God cauſes no one to err." Omar made no anſwer to him, but commanded the Moſlems near him to ſtrike off the infidel's head if he repeated thoſe words again; but the prieſt took care to give him no further interruption. After the concluſion of his ſermon, he pitched his tent made of hair, within ſight of the city. Then he ſigned the articles of capitulation, by which the inhabitants were intitled to the free exerciſe of their religion, the poſſeſſion of their properties, and his protection.

The articles of capitulation being ſigned, Omar, in purſuance of his engagements, gave the inhabitants a ſchedule, by which they were ſecured in the full poſſeſſion of all that had been agreed upon; after which the gates were opened to him, and he entered the town, where he was waited upon by the patriarch Sophronius, with whom he converſed familiarly, and aſked him many queſtions concerning the antiquities of the city. One of the firſt places they viſited was the temple of the reſurrection, in the midſt of which Omar ſat down, and when the hour of prayer was come, told the patriarch he had a mind to pray, and deſired him to ſhew him a place for that purpoſe. Sophronius told him he might do ſo where he was; but this he abſolutely refuſed. Then the patriarch led him to St Conſtantine's church; but he likewiſe declined praying there. At laſt he ſaid his prayers upon one of the ſteps of the eaſt gate of the church; telling the patriarch afterwards, that, had he prayed in any of the churches, the Moſlems would have infallibly have taken it from them, which he ſaid they might attempt as it was, and therefor gave him a paper, wherein the Moſlems were commanded not to pray on the ſteps of St Conſtantine's church in any numbers, but only one by one. After this he deſired the patriarch to ſhew him a place where he might erect a moſque; and was conducted to the place where Jacob's ſtone lay, on which he ſlept when he ſaw the viſion of the ladder. This ſtone had been hitherto ſlighted, and no building ſuffered to be erected upon it, in order to fulfil our Saviour's prophecy, that the habitation of the Jews ſhould be left unto them deſolate, and that not one ſtone ſhould be left upon another. In conſequence of this neglect it was entirely covered with dirt, which the khalif immediately began to carry away in his veſt; and the Moſlems ſoon haſtening to aſſiſt him, the ſtone was cleared in a very ſhort time. We are told by Theophanes, that when Omar entered the temple of the reſurrection, he was clad in ſuch mean and dirty apparel, that the patriarch took great offence at his appearance, and with much difficulty at laſt prevailed upon him to put on ſome clean linen and clothes, till his own could be waſhed. The ſame author relates, that when the patriarch firſt ſaw Omar in that place, he could not forbear crying out, "This is of a truth the abomination of deſolation, ſpoken of by Daniel the prophet, ſtanding in the holy place!" Theſe words, as Mr Ockley imagines, being overheard by the Moſlems, they trumped up a ſtory of the patriarch's having owned that the conqueſt of Jeruſalem by Omar was foretold by the prophet Daniel; and that an ancient prophecy was kept in Jeruſalem concerning Omar, wherein his perſon was deſcribed, his name and religion ſpecified, and he declared to be the only man that could reduce that city.

78 He returns to Medina.

Before the khalif left Syria, he divided that country into two parts; one of which, that lay between Haûran or Aûran and Aleppo, which was not perfectly conquered, he committed to the care of Abu Obeidah, giving him the ſtricteſt orders to reduce it as ſoon as poſſible. Yezid Ebn Abu Sofian was commanded to take upon him the care of the other, which comprehended Paleſtine, and the ſea-coaſt, and to make himſelf abſolute maſter of it, having a body of troops aſſigned him for that purpoſe. He alſo directed Amru Ebn Al As to invade Egypt, then in a very languiſhing condition, with a body of Moſlem forces. After having made theſe diſpoſitions for extending his conqueſts, Omar ſet out for Medina, where he arrived in perfect health, to the great joy of the inhabitants, who apprehended, from his long ſtay at Jeruſalem, that he had intended to fix his reſidence there.

79 A Moſlem detachment defeated by Youkinna.

Soon after Omar's departure, Yezid advanced to Cæſarea; but found the place ſo ſtrong, that he was obliged to continue ſome time in a ſtate of inaction. Abu Obeidah, in the mean time, advanced towards Aleppo, the citadel of which was at that time the ſtrongeſt in Syria. The citizens were ſtruck with the utmoſt conſternation at his approach. They had at that time two governors, who were brothers, and reſided in the caſtle, which was ſituated at a little diſtance from the city. The names of theſe two governors, who were of very different diſpoſitions, were Youkinna and John. Their father, by the emperor Heraclius's appointment, preſided over all that tract which lay betwixt Aleppo and the Euphrates; and, after his death, the chief management of affairs devolved upon Youkinna, his brother John ſpending his time moſtly in devotion and acts of charity. He would therefore gladly have prevailed on Youkinna to purchaſe a peace from the Arabs with money, rather than make his country a ſcene of blood and ravages; but this not ſuiting the martial genius of Youkinna, he armed a conſiderable number of the citizens, among whom were ſeveral Chriſtian Arabs, and diſtributed money among them. He then told his men that he intended to act offenſively againſt the Arabs, and even to engage them if poſſible before they drew too near. To inſpire them with the greater reſolution, he obſerved, that the Moſlem army was divided into ſeveral bodies; one of which had orders to beſiege Cæſarea, another to march to Damaſcus, and the third to invade Egypt. Having thus animated his troops, he put himſelf at the head of 12,000 of them, and marched forwards to get intelligence of the enemy's motions. Abu Obeidah, in the mean time, had ſent before him Caab Ebn Damarah, with 1000 men; giving him expreſs orders not to fight till he had received information of the enemy. Youkinna's ſpies diſcovered Caab and his men reſting themſelves and watering their horſes without the leaſt apprehenſion of danger; of which the general being appriſed, he poſted one part of his troops in ambuſcade, and with the other attacked the Moſlems. The Arabs behaved with their uſual valour; and at firſt repulſed the Chriſtians, notwithſtanding their ſuperiority in numbers: but being attacked by the troops that lay in ambuſh, they were at laſt forced to retire; having 170 killed, and almoſt all the reſt wounded.

80 Aleppo ſubmits to Abu Obeidah.

81 Cruelty of Youkinna.

After Youkinna's departure, the inhabitants of Aleppo, conſidering the calamities that awaited them if their city ſhould be taken by ſtorm, ſubmitted without delay to Abu Obeidah, and were taken under the protection of the khalif. This diſagreeable news being communicated to Youkinna, he poſted home with all poſſible expedition, leſt an attempt ſhould be made on the caſtle in his abſence. On his arrival at Aleppo, he was ſo highly incenſed againſt the inhabitants, that he threatened them with death if they did not diſannul the treaty with the Arabs, and deliver up the authors of it into his hands. This demand not being immediately complied with, he fell upon the citizens with great fury, and killed 300 of them; among whom was his brother John, whoſe head he cauſed to be ſtruck off, charging him with being the author and abettor of the late pernicious ſcheme. He would have made a much greater ſlaughter, had not the Moſlem army at that inſtant arrived before the town; upon which Youkinna retired into the caſtle with a conſiderable body of troops: but before this could be effected, he was obliged to ſuſtain an attack from the Arabs, in which he loſt 3000 men. The action was no ſooner ended than the inhabitants of Aleppo brought out forty of Youkinna's men, and as a proof of their fidelity delivered them into Abu Obeidah's hands. Of theſe, ſeven embraced Mahometaniſm, and the reſt were beheaded.

82 He is beſieged in the citadel.

Immediately after Youkinna had ſhut himſelf up in the caſtle, a council of war was held in the Moſlem camp, wherein it was deliberated what meaſures were to be purſued on the preſent occaſion. Khaled gave it as his opinion, that the caſtle ought immediately to be attacked with all the Arab forces, before the emperor had time to ſend them any aſſiſtance. This advice was followed by Abu Obeidah, who cauſed the citadel to be immediately inveſted, and ſoon after he had ſurrounded it with all his forces, made a moſt vigorous aſſault. The beſieged defended themſelves with great bravery, and after a very warm diſpute drove the enemy into their camp; and as they threw a great many ſtones out of their military engines, many of the Moſlems were killed, and a much greater number wounded. This encouraged Youkinna to make a ſally with a ſtrong party of the garriſon the following night. The fires being then out in the Moſlem camp, and the beſiegers not expecting ſuch an unſeaſonable viſit, 60 of them were killed on the ſpot, and 50 taken priſoners. Youkinna, however, being briſkly attacked by Khaled, who ſoon drew together a body of troops to oppoſe him, loſt about 100 men in his retreat. The next day, he cauſed the priſoners to be beheaded in ſight of the Moſlem camp; and, receiving advice that a ſtrong party of Arabian cavalry was ſent out to forage, he ordered a body of his horſe to drive them to their camp; which they accordingly did, killed 130 of them, ſeized all their camels, horſes, &c. and then retired to the mountains. Here they propoſed to remain concealed till the following night, and then return to the caſtle; but Abu Obeidah, being informed of what had happened, detached Khaled and Derar with a body of troops to purſue the Greeks, and revenge the late affront. Khaled, being informed of the route the Chriſtians had taken, poſſeſſed himſelf of the only paſs by which they could return to the caſtle; and, having poſted there a body of his men whoſe courage he could depend upon, took 300 of the Greeks priſoners as they attempted to return, and put all the reſt to the ſword. The next morning, to retaliate Youkinna's cruelty, the priſoners were all brought out and beheaded in ſight of the garriſon.

83
His vigorous defence.

Notwithſtanding this diſaſter, Youkinna made ſeveral ſallies with good ſucceſs, wherein he killed a great number of the enemy, and harraſſed them to ſuch a degree, that Abu Obeidah found himſelf obliged, for his greater ſecurity, to remove his camp to about a mile's diſtance from the caſtle; by which manœuvre he likewiſe hoped that Youkinna would be leſs upon his guard. Herein, however, he found himſelf miſtaken: for the Greek commander, by the prudent meaſures he took, eluded all ſurprize; and tho' Abu Obeidah continued the ſiege for four months after the laſt-mentioned blow given to the garriſon by Khaled, yet he had ſcarce any hopes of making himſelf maſter of it at laſt. Having nothing material to write to the khalif, he remained a long time ſilent; at which Omar being very much concerned, wrote to him, deſiring an account of the affairs in Syria. Abu Obeidah acquainted him that the city of Aleppo had ſubmitted to him; and that the citadel was the only place which held out in all that country, before which he had loſt a great number of men, which, he ſaid, had induced him to think of raiſing the ſiege, and moving with his army in that track which lay between Antioch and Aleppo. This news was by no means agreeable to the khalif, who commanded his general to continue the ſiege at all events, and ſent him a reinforcement of Arab troops, together with 70 camels, to aſſiſt the infantry in their march.

84
The citadel taken by ſtratagem.

Among the troops ſent by Omar on this occaſion, there was an Arab of a gigantic ſize, called *Dames*, who was a man of great courage and reſolution. He obſerving the little progreſs made by the Moſlems, bethought himſelf of a ſtratagem by which that fortreſs might be reduced, which ſeemed ſo difficult to be accompliſhed by force. He therefore deſired that Abu Obeidah would aſſign him the command of a party conſiſting only of thirty men, which at Khaled's requeſt was readily granted. Then he begged the general to raiſe the ſiege, and retire to about three miles diſtance from the caſtle, which was likewiſe immediately complied with. The following night Dames, who had poſted himſelf with his party very near the citadel, found means to ſeize a Greek, from whom he learned that Youkinna, after the ſiege was raiſed, had exacted large ſums of money from the citizens, on account of the treaty they had concluded with the Arabs; and that he was one of thoſe who had endeavoured to make their eſcape from the oppreſſion of ſuch a tyrant, by leaping down from the wall. This man Dames took under his protection; but beheaded five or ſix others who fell into his hands, and could give no good account of themſelves. He then covered his head and ſhoulders with a goat's ſkin, and took a dry cruſt in his hand, creeping on the ground till he got cloſe to the foot of the wall. If he heard any noiſe, or ſuſpected any perſon to be near, he made ſuch a noiſe with his cruſt as a dog does when he is gnawing a bone; his companions ſometimes walking, and ſometimes creeping after him in the ſame manner. He had before diſpatched two of his men to Abu Obeidah, to deſire that a detachment of horſe might be ſent him by break of day, to ſupport his ſmall party, and facilitate the execution of the plan he had formed. At laſt Dames found an opportunity of raiſing ſeven men upon his ſhoulders, who ſtood one upon another's ſhoulders in ſuch a manner that the higheſt reached the top of the wall. Here he ſoon placed himſelf, ſeized a watchman whom he found aſleep, and threw him over the wall. Two others, whom he found in the ſame condition, he ſtabbed with his dagger, and threw them over likewiſe. Then he laid down his turbant, and drew up the ſecond of his brethren, as they two did the third, and by their help Dames himſelf and all the reſt were enabled to mount the wall. He then privately ſtabbed the centry at each of the gates, and put his men in poſſeſſion of every one of them. The ſoldiers of the garriſon, however, were at laſt alarmed, and ſurrounded the Arabs, who were on the point of periſhing, when Khaled appeared at the head of a detachment of cavalry. On ſight of that general, who was now grown terrible to the Chriſtians, the beſieged threw down their arms and ſurrendered at diſcretion. Youkinna and ſome of the principal officers turned Mahometans, in order to ſave their poſſeſſions; and the caſtle, being taken by ſtorm, was pillaged by the Moſlems. Dames acquired great glory by this exploit; and, out of complaiſance to him, the army did not decamp from Aleppo till he and his men were perfectly cured of their wounds.

85
Youkinna's apoſtacy.

After the reduction of the citadel of Aleppo, Abu Obeidah intended to march to Antioch; but was diverted by Youkinna, who was now become a violent enemy to the Chriſtians. He told the Moſlem general, that his conqueſt of that part of the country would not be complete without the reduction of Azaz, a place of great importance, where Theodorus, Youkinna's couſin-german, was commandant. This fortreſs he propoſed to become maſter of, by putting himſelf at the head of 100 Arab horſe dreſſed in the Greek habit, who were to attend him to Azaz. Upon his arrival there, he was to aſſure Theodorus that he was ſtill in reality a Chriſtian, and had taken that opportunity to eſcape from the Moſlem camp. But, to make his ſtory more probable, Abu Obeidah was to ſend after him a detachment of 1000 horſe, who were to purſue him as far as Morah, a village in the neighbourhood of Azaz, with orders to poſt themſelves there; from whence, if ſuch a meaſure ſhould be found neceſſary, they might eaſily advance to Azaz, to facilitate the conqueſt of that place. To this ſcheme Abu Obeidah agreed; but Youkinna with all his men were immediately taken priſoners by Theodorus, who had been informed of the whole affair by a ſpy in the Moſlem camp, who had ſent him a letter by a pigeon. The fortreſs, however, was ſoon reduced, and Youkinna regained his liberty; but was ſoon after taken priſoner a ſecond time, and brought before his old maſter Heraclius, who then reſided at Antioch. He told the emperor, that he had only pretended to embrace Mahometaniſm,

86
He is taken priſoner and brought before Heraclius.

metaniſm, in order to be able to do his Imperial Majeſty the more eſſential ſervice; and ſo far gained upon him, that he was ſoon after appointed governor of that city; the conſequence of which was, that the Arabs were put in poſſeſſion of it by his treachery.

87 ttempt to ſſinate mar miſ- rries.

The emperor being quite diſheartened at his continual bad ſucceſs, it was ſuggeſted to him by the king of Ghaſſan, who had fled to him for refuge, as we have already obſerved, that, however deſperate his affairs might be, they would be perfectly reſtored by the aſſaſſination of the khalif. This piece of ſervice he undertook to perform for the emperor; and diſpatched one Wathek Ebn Moſafer, an Arab of his tribe, and a reſolute young man, to Medina for that purpoſe. Wathek, ſome time after his arrival there, having obſerved the khalif to fall aſleep under a tree, on which he had placed himſelf ſo as not to be obſerved by any one, drew his dagger, and was upon the point of ſtabbing him; but, as the Arab writers tell us, he was deterred by a lion, who walked round the khalif, and licked his feet till he awoke, after which he inſtantly went away. This ſtruck Wathek with a profound reverence for Omar; he came down from his tree where he had been confined by the lion, confeſſed his deſign, and embraced the Mahometan religion.

88 e Greeks eated.

89 's diſ- tted.

Soon after the reduction of Antioch, Abu Obeidah ſent an account of his ſucceſs to Omar; and receiving an order to invade the mountainous parts of Syria, he aſked his general officers which of them would command the body of troops deſtined for that purpoſe. One Meiſarah Ebn Meſrouk having offered his ſervice, the general gave him a black ſtandard, with the following inſcription upon it in white letters, "There is but one God; Mahomet is the Apoſtle of God." The body aſſigned him for this purpoſe conſiſted of 300 Arabs, and 1000 black ſlaves commanded by Dames. Meiſarah, at the head of his troops, with ſome difficulty aſcended the mountains, and, with much more, advanced to that part where the emperor's forces were poſted. The cold was ſo intenſe on the ſummits of thoſe mountains, that the Arabs, who had been accuſtomed to a warm climate, could hardly bear it. For ſome time they could not meet with a ſingle perſon to give them intelligence of the enemy's motions; but at laſt they took a Greek priſoner, who informed them, that the imperial army, which conſiſted of 30,000 men, lay encamped on a ſpot not three leagues diſtant. The priſoner refuſing to profeſs Mahometaniſm, they cut off his head, and then marched towards the imperial camp. The Greeks, hearing of their approach, advanced to meet them; and the Moſlems being ſurrounded on all ſides, were on the point of being all cut off, when Khaled appeared at the head of 3000 horſe, and after him Ayab Ebn Ganem with 2000 more. At the approach of the horſe under the command of the terrible Khaled, the Greeks retired, leaving all their tents, together with their rich furniture and effects, to the Arabs. In this engagement, one of Omar's chief favourites, named *Abdallah Ebn Hodaſa*, was taken priſoner, and ſent directly to Conſtantinople. The khalif was ſo much concerned at this, that he ſent a letter to Heraclius, deſiring his releaſe; which the emperor not only complied with, but made him many valuable preſents, ſending at the ſame time a jewel of immenſe value as a preſent to the khalif. This Omar offered to the jewellers of Medina, but they were ignorant of its value: the Moſlems therefore begged him to keep it for his own uſe; but this he ſaid he could not be anſwerable for to the public. It was therefore ſold, and the money depoſited in the public treaſury.

90 Account of Toleiha the falſe prophet.

About this time alſo, Khaled advanced with a body of troops as far as the Euphrates, and took Manbij, Beraa, Bales or Balis, exacting of the inhabitants 100,000 dinars for their preſent ſecurity, and impoſing on them an annual tribute for the future. He alſo made himſelf maſter of Raaban, Dulouc, Korus, the Cyrus or Cyrrhus of the ancients, and ſeveral other fortified towns, nothing being now able to ſtand before him. Amru Ebn Al As now likewiſe prepared for the reducing ſome places in Paleſtine that ſtill held out. While he remained in this province, he had a conference with Conſtantine the emperor's ſon, who endeavoured to perſuade him to make peace with the Chriſtians; but this he not agreeing to, unleſs they would conſent to pay tribute, all hopes of an accommodation vaniſhed, and the generals on both ſides prepared to enter upon action. In the mean time an officer came from the Chriſtian camp, dreſſed in very rich apparel, who challenged the ſtouteſt man among the Moſlems to fight him in ſingle combat. The challenge was accepted by a young Arab officer of Yaman; who being animated by a notion, derived from the prophet himſelf, that "the ſpirits of the martyrs reſt in the crops of green birds, that eat of the fruits and drink of the rivers of paradiſe," diſcovered an uncommon eagerneſs to encounter his enemy. But the Chriſtian officer not only killed this youth, but two or three more of the Moſlems who came to his aſſiſtance. He was then attacked by Serjabil Ebn Hoſanah, one of the generals, but a man ſo weakened by faſting, that he could ſcarce ſtand before him, and would therefore have been undoubtedly killed, had not a Greek horſeman very opportunely interpoſed, and with one blow of his ſcymitar cut off the Chriſtian's head. Serjabil, greatly ſurprized at this deliverance, aſked the horſeman who he was, and from whence he came; to which he replied in the following terms: "I am the unfortunate Toleiha Ebn Khowaid, who ſet up for a prophet, and, lying againſt God, pretended to inſpiration." In conſequence of having ſaved his life, Serjabil introduced him to Amru; and writing a letter to Omar, wherein he acquainted him with the ſignal proof Toleiha had given of his repentance, he obtained his pardon from the khalif.

91 Youkinna takes Tripoli.

Though the two armies did not come to a general engagement, yet they had frequent ſkirmiſhes, in which the Arabs always got the better, and in ſome the Greeks ſuffered very conſiderably. This, together with the ſeverity of the ſeaſon, which was then uncommonly cold, ſo dejected the ſoldiery, that they began to deſert in great numbers. Conſtantine therefore, finding his troops to diminiſh daily, and the Arabs to grow ſtronger and ſtronger, took the advantage of a tempeſtuous night to eſcape to Cæſarea, which Yezid had not been able to take, leaving his camp to be plundered by the enemy. This city was ſoon after inveſted by Amru; and at the ſame time Youkinna, having made himſelf maſter of Tripoli by treachery, ſeized 50 ſhips from Cyprus and Crete, which carried a ſupply of arms and proviſions for the emperor's troops, and had entered the port without knowing that the Arabs were maſters of the town. With theſe ſhips he undertook an expedition againſt Tyre; and, telling the inhabitants that he brought a ſupply of arms and proviſions for Conſtantine's army, he was admitted into the town, and received with great kindneſs. Here, however, he had not been long before he was diſcovered by one of his own ſoldiers, and put under arreſt, with 900 of his men. He was however ſet at liberty by thoſe to whoſe care he was committed; and then opened the gates of the town to Yezid, by whom it had been inveſted. Conſtantine, having got intelligence at Cæſarea of the loſs of Tripoli and Tyre, was ſo diſheartened, that he ſet ſail from that city with all his family and the greateſt part of his wealth; and the citizens then thought proper to make the beſt terms they could with Amru. The ſurrender of this city was followed by that of all the other cities and fortreſſes in the province; and thus the Arabs drove the Greeks out of the whole country of Syria extending from the Mediterranean to the Euphrates. This conqueſt was completed in the 18th year of the Hegira, ſix years after it had been undertaken.

92
Tyre and Cæſarea reduced.

93
Violent ſtorms, plague, &c.

This year, there happened ſuch violent ſtorms of hail in the peninſula of the Arabs, that a conſiderable extent of territory was laid waſte by them, and a great number of animals of various kinds deſtroyed. An epidemical diſtemper likewiſe raged at Medina, which ſpread itſelf all over the neighbouring territory, and ſwept away great numbers of people. Syria alſo was viſited by a dreadful plague; ſo that the Moſlems loſt there 25,000 men, among whom were Abu Obeidah himſelf, Yezid Ebn Abu Sofian, Serjabil, and many other perſons of diſtinction. In ſhort, ſo great was the mortality occaſioned by the plague, both in Arabia and Syria, that the Arabs ſtile the 18th year of the Hegira the *year of deſtruction*.

94
Egypt reduced.

Amru Ebn Al As, having now executed the khalif's orders in Syria, ſet out on his expedition againſt Egypt. His firſt attempt was on Tarma, a town ſituated on the iſthmus of Suez. This he reduced after a month's ſiege; and having narrowly viewed its ſituation, he formed a deſign of cutting through the iſthmus, and thus joining the Mediterranean and Red ſea: but this project was not well reliſhed by the khalif, who apprehended that it would facilitate the entrance of the Chriſtians into the peninſula of Arabia. From Tarma he marched to Meſr, the Memphis of the ancient geographers; which, after a ſiege of ſeven months, was delivered up to him by the treachery of Al Mokawkas the governor. From Meſr he continued his march towards Alexandria, and, having defeated the emperor's army, cloſely inveſted that city. While his army lay before this capital, Amru himſelf had the misfortune to be taken priſoner and carried into the town. Being brought before the governor, he aſked him why he committed ſuch ravages and depredations in the Chriſtian territories? To this Amru reſolutely anſwered, "We are come hither to oblige you either to profeſs Mahometaniſm, or pay an annual tribute to the khalif; to one of which conditions you muſt ſubmit, or be all of you put to the ſword." A Greek who ſtood by, hearing this, told the governor, that Amru was certainly the Moſlem general, and therefore deſired him to cut off his head. Upon this, Werdan, one of Amru's ſlaves, perceiving the extreme danger his maſter was in, gave him a box on the ear, exclaiming againſt his impudence for talking in ſuch a manner. The governor, being impoſed upon by this ſhallow artifice, not only ſaved his life, but, to ſhew his generoſity, diſmiſſed him without ranſom. This was ſoon followed by the loſs of Alexandria, and that by the conqueſt of the whole kingdom: after which, Amru diſpatched Okba Ebn Nafe, with a body of troops, to penetrate farther into Africa; and that general made himſelf maſter of all the country lying between Barka and Zoweilah, reducing under his dominion alſo that part of the continent which now forms the piratical kingdom of Tripoli in Barbary.

95
Together with Barc and Tripo

Soon after the Moſlems had made themſelves maſters of Alexandria, a grievous famine raged in Arabia, particularly at Medina, then the reſidence of the khalif. This obliged Omar to write to Amru to ſend him a ſupply of corn, with which Egypt at that time abounded. In compliance with this order, Amru ſent a train of camels laden with corn, in a continued line from Egypt to Medina, the firſt of which were entering Medina when the laſt were leaving Alexandria. But this method of conveying corn proving too tedious and expenſive, he ordered him to clear the Amnis Trajanus of Ptolemy, now the Khalis, which runs from one end of Cairo to the other, of the ſand and gravel with which it was choked. This he accordingly did, and by that means rendered the communication between Egypt and Arabia much more eaſy than it had formerly been.

96
The Per ſians def ed.

While the Arabs thus extended their conqueſts in the weſt, they were no leſs ſucceſsful in the eaſt. We have already taken notice of Khaled's having been ſent into Irak to reduce the kingdom of Hira, and of his being recalled to aſſiſt in the conqueſt of Syria. As the kings of Hira were under the protection of the Perſian monarchs, the deſtruction of that kingdom neceſſarily brought on a war with the Perſians. After the departure of Khaled, the command of the forces was left with Abu Obeid Ebn Maſud, together with Al Mothanna Ebn Haretha, Amru Ebn Haſem, and Salit Ebn Kis. Abu Obeid having paſſed a river, contrary to the advice of the other generals, was killed, and his troops in great danger; however, Al Mothanna made an excellent retreat, and repaſſed the river without any conſiderable loſs. After this he fortified himſelf in his camp till he received a conſiderable reinforcement from the khalif; when the Moſlem army marched to Dir Hind, and thence continued to make frequent excurſions, ravaging that part of Irak that lay next to the Euphrates. A body of 12,000 choſen horſe was now diſpatched againſt thoſe invaders, under the command of one Mahran. At firſt the Perſians had the advantage, and obliged the Arabs to retire; but they were ſoon brought back by Al Mothanna, and the battle laſted from noon till ſunſet. At laſt Al Mothanna, engaging Mahran in ſingle combat, laid him dead at his feet; upon which the Perſians fled to Al Madayen, a town ſituated on the Tigris, about a day's journey from Bagdad. After this a powerful army was diſpatched by the Perſians under the command of one Ruſtam; but he alſo was killed, and his troops were entirely diſperſed. At the ſame time, Abu Muſa, another Moſlem general, defeated a formidable body of troops under the command of Al Harzaman, a noble Perſian, at Ahwaz.

97
Incredible treaſure taken from them.

Not content with thoſe victories, ſoon after the reduction of Damaſcus, the khalif diſpatched Saad Ebn Abu Wakkas, to diſlodge the Perſians from ſome diſtricts they poſſeſſed in the neighbourhood of the Euphrates. Saad having drawn together a body of 12,000 men, advanced to Kadeſia, a city bordering upon the deſarts of Irak; where having utterly defeated an army of 120,000 Perſians, he made himſelf maſter of the opulent city of Al Madayen, and poſſeſſed himſelf of Yezdejerd's treaſure; which was ſo rich, if we may believe the Arabian writers, that Saad took out of it three thouſand millions of dinars, amounting to two thouſand and twenty-five millions of pounds ſterling, an enormous and almoſt incredible ſum. From thence Saad went to that part of the palace where the king's plate was depoſited, which he carried off, as well as an immenſe quantity of camphire with which another part of the palace was entirely filled. This laſt the Arabs ſeem to have carried off merely for the ſake of plundering, as they were ſo much unacquainted with the nature of it, that they mixed it with their bread, which gave it a bitter and diſagreeable taſte. Afterwards the Arab general carried off the crown and royal garments, adorned with gold and jewels of ineſtimable value. He alſo plundered his armoury, which was well ſtored with all ſorts of weapons; after which he cauſed the roof of his porch to be opened, where he found another treaſure equal in value to ten millions of crowns. He alſo found among the furniture of the palace, a piece of ſilk tapeſtry, 60 cubits ſquare, which was adorned with a great variety of beautiful flowers, herbs, and plants, formed of gold, ſilver, and jewels the moſt valuable that could be procured. This being brought to Omar, he cut it in pieces, and diſtributed it among the Moſlems; and that part which fell to Ali's ſhare, and which was yet none of the beſt, he ſold for 20,000 crowns.

98
Meſopotamia reduced.

99
Omar murdered.

In the twentieth or twenty-firſt year of the Hegira, the Arabs, ſtill unſated with conqueſt, invaded Meſopotamia under Aiyad Ebn Ganem, where the city of Edeſſa ſubmitted on the firſt ſummons. From Edeſſa he marched to Conſtantia, or Conſtantina, ſuppoſed to be the Nicephorium of the ancients. This he took by ſtorm, as likewiſe Daras, where he maſſacred all the people he found in the place; and theſe repeated ſucceſſes ſo terrified the reſt of the fortified towns, that they all ſubmitted without reſiſtance. At the ſame time Al Mogheirah Ebn Shaaba, one of the khalif's commanders, made himſelf maſter of Shiz, a place famous for the birth of Zerduſht the Perſian philoſopher, and over-ran the whole province of Aderbijan. He alſo poſſeſſed himſelf of all the country of Armenia bordering on mount Taurus; nay, he in a manner obliged the whole region to own the authority of the khalif, and penetrated into Cappadocia. The ſame year alſo Saad made himſelf maſter of Ahwaz, the capital of Khuzeſtan (the ancient Suſiana); in conſequence of which he became maſter of the greateſt part, if not the whole, of that province; at the ſame time that Al Nooman conquered the greateſt part of Khoraſan. But while Omar's troops were thus irreſiſtibly over-running the fineſt countries in the known world, a period was put to his conqueſts and his life, by a Perſian named *Abu Lulua*, who ſtabbed him thrice in the belly, while he was performing his devotions at Medina. The reaſon of this was becauſe the khalif refuſed to remit him ſome part of the tribute which according to the Mahometan cuſtom he was obliged to pay for the free exerciſe of his religion. The Arabs, perceiving that he had killed their ſovereign, immediately ruſhed upon him; but the aſſaſſin defended himſelf ſo deſperately, that he killed ſeven of them and wounded 13: but at laſt one of the khalif's attendants threw his veſt over him, and ſeized him; upon which he ſtabbed himſelf, and ſoon after expired.

100
Succeeded by Othman.

Omar, having languiſhed three days after the wounds given him by the Perſian, expired in the 10th, 11th, or 12th year of his reign, and after his death Othman Ebn Affan was choſen; though Ali had a better title, and ſeems indiſputably to have been the moſt virtuous, if not the only virtuous perſon, as well as the braveſt warriour among them. He was inaugurated in the 24th year of the Hegira, nearly coincident with the year of our Lord 645.

Othman was no ſooner ſettled on the throne, than he commanded Al Mogheirah to complete the conqueſt of the territory of Hamadan; which he eaſily accompliſhed, and at the ſame time reduced Bira, a ſtrong caſtle in Meſopotamia, which either had never ſubmitted, or had revolted on the departure of the Moſlem troops out of that province. Another army, under Abdallah Ebn Amar, was alſo diſpatched into Perſia, to deprive Yezdejerd of the poor remains of his dominions; and this was done ſo effectually, that the unhappy monarch was obliged to fly to Sijeſtan and abandon Perſia altogether.

10
Coloſſus of Rhodes deſtroyed.

In the 27th year of the Hegira, the iſland of Cyprus was reduced by Moawiyah; who ſoon after conquered the iſland of Aradus, and took Ancyra; after which he reduced the iſland of Rhodes, broke in pieces the famous Coloſſus, and ſold the metal of it to a Jew of Edeſſa. In the mean time, another of the Arab commanders entered Iſauria, where he committed dreadful depredations, plundering many towns and villages, putting a great number of people to the ſword, and carrying off 5000 priſoners. In the 31st year of the Hegira, one Habib, having made an irruption into that part of Armenia which was ſtill unconquered, defeated a body of the emperor's troops, purſuing them as far as mount Caucaſus, and laying waſte all the neighbouring territory. About the ſame time alſo, Abul Abar, who had been conſtituted admiral by Moawiyah, gave the emperor Conſtans a ſignal defeat by ſea, on the coaſt of Lycia, in which ſuch a number of Chriſtians were killed, that the neighbouring ſea was dyed with their blood.

102
Inſurrections againſt the khalif.

But while Othman was thus carrying every thing irreſiſtibly before him abroad, he neglected to ſecure the affections of his ſubjects at home, which ſoon proved his ruin. Sedition was induſtriouſly propagated through all the provinces of the empire, and articles of accuſation brought againſt the khalif. The chief of theſe were, That he had recalled one who had been baniſhed by the prophet; that he had removed Saad, an officer of diſtinguiſhed bravery, and ſupplied his place by one who drank wine, and was otherwiſe of a ſcandalous life; that he had ſquandered away vaſt ſums among his favourites; that he had removed Amru from the government of Egypt, to which he had preferred his own foſter-brother; and, laſtly, that he had preſumed to ſit on the top of Mahomet's pulpit, whereas Abu Becr had always ſat on the higheſt ſtep, and Omar on the loweſt. To this formidable accuſation the poor khalif pleaded guilty, and promiſed to make all the reparation in his power; but his condeſcenſion only ſerved to increaſe the inſolence of the rebels. They were however appeaſed by Ali; and public tranquillity had undoubtedly been reſtored, had it not been for Ayeſha, one of Mahomet's widows, who procured the deſtruction of the khalif by a ſcheme truly worthy of the wife of ſuch an huſband. That traitreſs, being deſirous of raiſing one of her favourites named Telha to the dignity of khalif, prevailed on Merwan the ſecretary of ſtate to write a letter to the prefect of Egypt, enjoining him to put to death Mahomet Ebn Abu Becr, with whom it was ſent, and who was to be his ſucceſſor. This letter Merwan took care ſhould be diſcovered; and Mahomet taking it for a genuine order of the khalif, publiſhed the ſuppoſed injury all over the neighbouring countries. He then marched with a body of rebels to Medina, where the innocent khalif was beſieged in his palace; and, notwithſtanding all his proteſtations, nothing leſs than his death could ſatisfy the enraged multitude. In this deplorable ſituation, Othman ſent to Ali for aſſiſtance, who commanded his two ſons Haſan and Hoſein to defend the palace-gates. This they did for ſome time with fidelity enough, till finding the khalif reduced to great ſtraits for want of water, they abandoned their poſts; upon which the rebels eaſily made themſelves maſters of the palace, and cruelly murdered the khalif, in the 82d year of his age, after he had reigned 12 years. His body remained three days unburied; and was at laſt thrown into a hole made for it, without the uſual ablution, or the leaſt funeral ſolemnity.

103
He is murdered.

The arms of the Moſlems had hitherto been ſo ſucceſsful, and their conqueſts ſo rapid, that they may ſeem not only to have vied with Alexander, but to have bid fairer for univerſal monarchy than any nation either before or ſince.—The ruin of mighty empires always originates from the impoſſibility of keeping them united. Diviſions ariſe; civil wars break out; and the kingdom being weakened by theſe inteſtine feuds, the common enemies take advantage of them to ruin the whole fabrick.—If we conſider Mahomet, as in truth he was, not as an enthuſiaſt, but as a politician, and the founder of an empire; we ſhall find him, in that capacity, ſuperior perhaps to any that ever exiſted. The empire of Alexander the great, which aroſe with ſtill more rapidity than that of the Arabs, had no ſupport but from his own ambition and perſonal qualifications. While he lived, he was without a rival, becauſe all were afraid of him; but when he died, the bands of union, whereby his empire had been held together, were immediately diſſolved. His captains were not inſpired with the ſame veneration for his ſon, who was unborn at the time of his death, that they had for his father; and therefore they ſought not to conquer for him, but for themſelves; and the conſequence was, that the kingdom fell to pieces the moment that he died. The ſame thing happened to the empires of Jenghiz Khan, Tamerlane, and others, who made vaſt conqueſts in a ſhort time. They erected mighty empires indeed; but their duration, we may ſay, was but momentary. The empire of the Romans was founded on a kind of enthuſiaſtic deſire of aggrandizing the city of Rome: patriotiſm became faſhionable; and as the city never ceaſed to exiſt, thoſe who conquered always had the ſame end in view, namely to exalt the republic more and more. This empire therefore was not only very extenſive, but very durable; though, as it was impoſſible that mankind could always continue to venerate a city, the ſame diviſions that ruined other empires, at laſt brought this to an end.—The foundation of Mahomet's empire ſeemed to be ſtill more firm. He was not only the king, but, we may ſay, the God of his people. Whatever enthuſiaſm people may ſhew in defending their country, nay even their neareſt relations, experience has taught us, that it is greatly inferior to what is ſhewn by thoſe who fight in defence of religion. This enthuſiaſm Mahomet had taken care, not only to bring over to his ſide, but to exalt to its higheſt pitch, by inculcating upon his followers, that their rewards in the next world ſhould be proportionable to the fury with which they fought in this. To live at peace, except with thoſe who ſubmitted to his will, did not at all enter into his plan; and he who made no conqueſts, or at leaſt did not ſtrive to make them, was no true believer. By this means, let his empire be ever ſo much extended, the temptation to making freſh conqueſts was ſtill equally ſtrong; and not only the commanders of armies, but every private perſon, had the moſt powerful motives to urge him towards the conqueſt of the whole world, had that been poſſible.—The only thing Mahomet ſeems to have failed in, was the appointment of the ſucceſſion to the apoſtleſhip; and why he was deficient in this, is inconceivable. From this one ſource proceeded the diviſions which ruined his empire when it was ſcarce erected, and of which we are now to give the hiſtory.

104
Cauſes of the declin of the M lem empi

Tho' the prophet had been ſo deficient in providing for the ſafety of his kingdom as not to name a ſucceſſor at his death; yet his ſon-in-law Ali was always of opinion, that the ſucceſſion belonged of right to him; and that it ought to be, like that of other kingdoms, hereditary. This diſpoſition to render the apoſtleſhip hereditary in his family, was, in all probability, what diſguſted the Moſlems with Ali; againſt whom they could otherwiſe have no objection: for he was endowed with every amiable quality; a firm believer in Mahomet; and of ſuch unparallelled ſtrength and courage, that he never declined a combat to which he was challenged, nor ever failed to come off victorious; for which reaſon he was ſtiled by his countrymen, "the Lion of God."

105
Characte Ali.

On the death of Othman, however, notwithſtanding the prejudices againſt Ali, as none could pretend ſo good a right to the khalifat as he, the Arabs immediately took the oath of allegiance to him, tho' with an intention to break it as ſoon as poſſible, as was fully evinced by the event. The diſturbances which happened immediately on Ali's acceſſion were owing partly to the machinations of Ayeſha, who, having got Othman murdered on purpoſe to raiſe Telha to the dignity of khalif, and now finding Ali unanimouſly choſen, reſolved to deſtroy him alſo. She therefore pretended great concern for the death of the late khalif, and accuſed Ali of being his murderer: but being reproved by one of the Moſlems for endeavouring to blacken an innocent perſon, when ſhe could not but

106
He is choſ khalif.

know herſelf guilty; ſhe replied, that Othman's infidelity had indeed made her his enemy, but that ſhe had forgiven him upon his repentance. At the time of Ali's inauguration ſhe was at Mecca, where ſhe enjoyed a very conſiderable ſhare of influence and authority.

107 Diſturbances raiſed by Ayeſha.

At her inſtigation, Telha Ebn Obeidallah, and Zobeir Ebn Al Awam, began to repreſent to Ali, that the murderers of Othman ought to be brought to condign puniſhment; offering themſelves at the ſame time for that purpoſe. This they did purely to ſow diſſenſion, for they themſelves had been deeply concerned in the murder; and Ali, ſufficiently aware of their intention, told them it was impoſſible till the empire ſhould be more ſettled. Finding themſelves diſappointed in this attempt, they next begged the government of Cufa and Baſra, that they might with the greater facility extinguiſh any rebellion that ſhould happen. Here again Ali was aware of their intention; and refuſed their requeſt, under pretence that he ſtood in need of perſons of their great capacity, as counſellors, about his perſon. Then they deſired leave to perform a pilgrimage to Mecca, which the khalif could not refuſe; and they were no ſooner got there, than they ſet about raiſing an army againſt him without any provocation at all.

108 nd Moawiyah.

This, however, was not the only ſource of diſcord at preſent. Ali had been diſpleaſed with the governors of provinces appointed by Othman; and therefore diſmiſſed them immediately upon his acceſſion. This was very impolitic; but he was prompted to it by that raſhneſs and want of prudence which is inſeparable from, or rather is the very eſſence of, great courage. The conſequence of this was, that Moawiyah, governor of Syria, was, immediately upon his diſmiſſion by Ali, proclaimed khalif by the troops under his command.—Thus the Moſlems were divided into two factions; the one, under Moawiyah and Ayeſha, who adhered to the houſe of Ommiyah, to which Othman and Moawiyah belonged; and the other, to Ali. The adherents of the houſe of Ommiyah were called *Motazalites*, or *ſeparatiſts*.

109 li raiſes an my.

Ali finding how matters were ſituated, and that a very ſtrong party was formed againſt him, endeavoured to ingratiate himſelf as much as poſſible with the Koreiſh; and to raiſe an army againſt Ayeſha, who had now taken the field, and even reduced the city of Baſra. He made a formal ſpeech to the people on hearing this bad news, and deſired their aſſiſtance. But tho' he was very much beloved on account of his perſonal merit, and the beſt orator of the age, he could not with all his eloquence for ſome time prevail on them to give a deciſive anſwer in his favour. At laſt Ziyad Ebn Hantelah ſtept to Ali of his own accord, and ſaid, "Whoſoever retreats, we will advance." Upon this two Anſars, doctors of the law, ſtood up, and pronounced Ali innocent of the death of Othman; which deciſion ſoon induced the Anſars and the body of the people to eſpouſe his quarrel. He then left Medina with a body of 900 men, and advanced to Arrabah, where he was joined by ſeveral other parties. From this place he wrote to the people of Cufa and Medina, preſſing them to ſend him farther aſſiſtance, and to diſpoſe the Motazalites to an accommodation. From Medina he very ſoon obtained a large ſupply of horſes, arms, and other neceſſaries; and from Cufa he obtained with difficulty a reinforcement of 8000 men.

Being greatly animated by this ſeaſonable ſupply, Ali advanced towards Baſra, where the troops of Ayeſha were ready to receive him. Both parties ſeemed averſe to an engagement; and Ayeſha began to be very much intimidated at the ſight of Ali's army, which, however, was inferior to her own: but, by ſome means or other, a battle was at laſt brought about, in which Ayeſha was defeated and taken priſoner. The only remarkable effort that was made by the troops of Ayeſha in this engagement, was in defence of her perſon. It is ſaid, that no fewer than 70 men who held her camel by the bridle, had their hands cut off ſucceſſively; and that the pavilion in which ſhe ſat was ſo full of darts and arrows, that it reſembled a porcupine. Ayeſha was treated very kindly by Ali, who at firſt ſet her at liberty, but afterwards confined her to her houſe at Medina, and commanded her to interfere no more with ſtate-affairs, though he ſtill allowed her to perform the pilgrimage to Mecca.

110 He defeats and takes Ayeſha priſoner.

After this victory, Ali had no enemies to contend with either in Arabia, Irak, Egypt, Perſia, or Khoraſan. A ſtrong party, however, ſtill remained in Syria, headed by Moawiyah, who founded his claims to the khalifat on a pretended declaration of Othman that he ſhould be his ſucceſſor. In this defection he was joined by Amru Ebn Al As, who had obtained a promiſe of the government of Egypt, provided Moawiyah could be advanced to the dignity of khalif.

Ali, with his uſual good-nature, endeavoured to bring the rebels to a ſenſe of their duty, and often ſent propoſals of accommodation to Moawiyah; but he ſtill remained inflexible. Perceiving, therefore, that it would be neceſſary to invade Syria, he entered that country with an army of 70,000 men, while Moawiyah advanced to meet him with 80,000; and by repeated reinforcements Ali's army at laſt amounted to 90,000, and and Moawiyah's to 120,000. The two armies came in ſight of each other towards the cloſe of the 36th year of the Hegira, when they ſeemed ready to enter upon action; but only ſome ſkirmiſhes happened between them, wherein neither party ſuſtained any conſiderable loſs. The firſt month of the 37th year was ſpent in fruitleſs negociations; but in the ſecond month they began to fight in different parties, without ever hazarding a general engagement. Theſe battles continued, according to ſome, for forty days, and according to others, an hundred and ten. Moawiyah's loſs amounted to 45,000 men, and Ali's to 25,000, among whom were 26 who had been intimately acquainted with Mahomet himſelf, and were dignified with the title of *The companions*. The moſt famous of theſe was Ammar Ebn Yaſer, Ali's general of horſe, who was upwards of 90 years of age, and was highly eſteemed by both parties. The loſs of this general ſo exaſperated Ali, that he charged the Syrians with a body of 12,000 men, broke them, and challenged Moawiyah to fight him in ſingle combat. This challenge Moawiyah declined, inſiſting that it was not a fair one, as Ali could not but be ſenſible of his ſuperiority in ſtrength. As the challenge was given in the hearing of both armies, Amru inſiſted that Moawiyah could not in honour refuſe it; but the coward made no other reply than that Amru aſpired to the khalifat himſelf, and wanted to enjoy it after his death. The

111 Moawiyah challenged to a ſingle combat by Ali.

battle

112
Amru's ſtratagem.

battle being now renewed with great fury, Moawiyah's forces were puſhed to their camp; which had certainly been taken, had not Amru bethought himſelf of the following ſtratagem to retrieve Moawiyah's affairs, when he ſeemed on the very brink of deſtruction. He ordered ſome of his men to fix copies of the Koran to the points of their lances, and carry them to the front of the battle, crying out at the ſame time, "This is the book that ought to decide all differences between us; this is the book of God between us and you, that abſolutely prohibits the effuſion of Moſlem blood."—This produced the deſired effect. The khalif's troops threw down their arms, and even threatened him with death if he did not ſound a retreat; which he therefore found himſelf obliged to do, and thus had a deciſive victory wreſted out of his hands.

113
Ali depoſed.

According to this new mode of deciſion, the two parties were each to chooſe their arbitrator; but even this was not allowed to Ali, though Moawiyah had liberty to chooſe Amru Ebn Al As. The troops of Irak, not content with offering ſo groſs an affront to the khalif, inſiſted on naming for his arbitrator Abu Muſa Al Aſhavi; a very weak man, and one who had already betrayed him. The conſequence of this appointment was, that Ali was depoſed by both the arbitrators; and he accordingly dropt his title to the khalifat, but without laying down his arms, or putting himſelf in Moawiyah's power.

114
He defeats the Kharejites.

After this deciſion, Ali retired to Cufa; where he was no ſooner arrived, than 12,000 of theſe troops who had themſelves forced him to accept of the arbitration, pretending to be offended with the ſtep he had taken, revolted from him. Theſe were called *Kharejites*, that is, rebels or revolters; and *Mohakkemites*, or judiciarians, becauſe they affirmed that Ali had referred to the judgment of men what ought to have been only referred to the judgment of God; and, therefore, that inſtead of keeping the peace he had made with Moawiyah; he ought to purſue his enemies, who were likewiſe the enemies of God, without mercy. To this Ali replied, That as he had given his word, he ought to keep it; and, in ſo doing, he only followed what was preſcribed by the law of God. The Kharejites replied, That God was the only judge between him and Moawiyah, and that conſequently he had committed an enormous ſin, of which he ought ſincerely to repent. This irritating Ali, he with ſome warmth replied, That if any ſin had been committed on this occaſion, it was by themſelves, who had forced him to take the ſteps of which they now complained. This anſwer not proving agreeable, they choſe for their general Abdallah Ebn Waheb, who appointed for their rendezvous Naharwan, a town ſeated between Waſet and Bagdat, about four miles to the eaſtward of the Tigris. Here they aſſembled an army of 25,000 men; and Ali, having tried gentle methods ineffectually, at laſt marched againſt them in perſon. Before he attacked them, however, he planted a ſtandard without the camp, and made proclamation by ſound of trumpet, that whoever would repair to it ſhould have quarter, and whoever would retire to Cufa ſhould find a ſanctuary there. This had ſuch an effect, that Abdallah's army was ſoon reduced to 4000 men, with whom he ruſhed upon the khalif's forces; but all of them were cut in pieces, except nine who eſcaped.

115
They at- tempt t murder Amru a Moawiy

116
Ali aſſaſ nated.

Had Ali marched againſt Moawiyah immediately after the defeat of the Kharejites, and while his troops were fluſhed with victory, he had probably reduced him entirely: but by allowing his troops to refreſh themſelves, they all deſerted him, and Mowiyah's party had an opportunity of gathering ſtill more ſtrength; and though Moawiyah's troops often made incurſions into the territories of Ali, the latter ſeems afterwards to have acted only on the defenſive. At laſt the Kharejites, imagining that it would be for the good of the Moſlem affairs that Moawiyah, Ali, and Amru, were dead, diſpatched aſſaſſins to murder all the three. Moawiyah was wounded, but recovered; Amru's ſecretary was killed by miſtake; but Ali was wounded with a poiſoned ſword, which occaſioned his death. The aſſaſſin was taken, and Ali would have pardoned him had he recovered, but ordered him to be put to death if he died, that he might, as he ſaid, "have an immediate opportunity of accuſing him before God." Even in this order he ſhewed his uſual clemency, as he ordered the aſſaſſin to be diſpatched at one blow, and without torture of any kind.

117
Succeed by Haſa

118
Who re the kha to Moa yah.

Thus fell Ali, the moſt virtuous of all the Mahometan khalifs, after he had reigned near five years, and lived ſixty-three. He was preſſed by thoſe about him to nominate a ſucceſſor before he died; but this he declined, ſaying, he would follow the example of the Apoſtle of God, who had not named any: however, as his ſon Haſan inherited his father's piety, though not his courage, he was declared khalif without any ſcruple. Moawiyah, however, behaved in ſuch a manner towards him, as ſhewed his hoſtile intentions; and thoſe about Haſan preſſed him to declare war immediately. This Haſan, who was of an exceeding mild and peaceable diſpoſition, could hardly be perſuaded to do; and tho' he at laſt took the field, yet he immediately perceived his incapacity to diſpute the empire with Moawiyah; and therefore reſigned it, in ſpite of all the remonſtrances of his friends, to a traitor, who cauſed him after ſome years to be poiſoned by his wife.

119
Conſtan nople b ſieged out ſu

Moawiyah, being thus left ſole maſter of the Moſlem empire, found himſelf under a neceſſity of reducing the Kharejites, who were his enemies as well as Ali's, and had now gathered together a conſiderable army. Againſt theſe rebels the khalif would have diſpatched Haſan, but that prince refuſed; upon which he ſent the Syrian troops againſt them, who were defeated: however the Cufans, being at laſt perſuaded to take up arms, ſoon extinguiſhed the rebellion, and ſettled Moawiyah more firmly than ever on the Moſlem throne. In the 48th year of the Hegira, the khalif ſent his ſon Yezid with a powerful army to beſiege Conſtantinople. In this expedition he was attended by three or four of the *Companions*, who, notwithſtanding their age, were prompted by zeal to undergo incredible fatigues. The Moſlem forces too, though they ſuffered extremely, were animated to ſurmount all difficulties by a tradition, according to which the prophet in his lifetime declared, "That the ſins of the firſt army that took the city of Cæſarea ſhould be forgiven." Concerning the particulars of this expedition we are in the dark: only, in general, that it proved unſucceſsful; and in it Abu Ayub, who had been with Mahomet at the battles of Bedr and Ohod, loſt his life. His tomb is held in ſuch veneration by the Moſlems, that the Sultans of the Ottoman family gird their ſwords on at it, on their acceſſion

Arabia. ſion to the throne. In the 54th year of the Hegira, the Arabs made an irruption into Bukharia, and defeated a Turkiſh army that oppoſed them. The Turks loſt

120 orks de- eated. a great number of men; and the queen, who commanded in perſon, with great difficulty made her eſcape. She had only time to put on one of her buſkins; the other fell into the hands of the Arabs, who valued it at no leſs than 2000 dinars. About this time alſo, according to the Greek hiſtorians, a treaty was concluded between the emperor and the Moſlems, whereby the latter were allowed to keep the territories they had ſeized; in conſideration of which they were to pay 3000 pounds weight of gold, 50 ſlaves, and as many choice horſes. To theſe diſhonourable conditions they were obliged to ſubmit, in conſequence of their late unſucceſsful expedition to Conſtantinople, and ſome other defeats they had received. This peace was to continue for 30 years. The next year, Moawiyah, having conferred the government of Khoraſan upon Saad, Othman's grandſon, that general, ſoon after his promotion, paſſed the Jihun, or Amu, the Oxus of the ancients, and advanced with a body of troops to Samarkand, which opened its gates to him on his approach; ſoon after which he defeated an army of Uſbeck Tartars, and marched directly to Tarmud, or Tarmid, which alſo ſurrendered without oppoſition. The 57th year of the Hegira was remarkable for nothing but vaſt ſwarms of locuſts, which did incredible damage in Syria and Meſopotamia; and great diſcontents on account of the khalif's having nominated for his ſucceſſor his ſon Yezid, a perſon of ſcandalous life, and no way worthy of the throne. The 58th year of the Hegira was rendered remarkable by the death of

121 awiyah . Ayeſha, Mahomet's widow; and the 60th by that of Moawiyah, after having reigned, from Haſan's reſignation, nineteen years, three months, and five days; but concerning his age authors are not agreed. He was interred at Damaſcus, which was made the reſidence of the khalifs as long as the houſe of Ommiyah continued on the throne.

122 ceeded Yezid. Yezid was proclaimed, in conſequence of his nomination, the ſame day his father died. His inauguration was performed on the new moon of the month Rajeb, correſponding to April 7th, 680. Immediately after his election, he wrote to Al Walid, governor of Medina, to ſeize Hoſein the remaining ſon of Ali, and

123 in and dallah ſe to acknowledge Abdallah Ebn Zobeir, in caſe they refuſed to acknowledge his right. He accordingly tendered the oath of allegiance to Hoſein, who returned an evaſive anſwer, and found means to eſcape to his own houſe. As for Abdallah, he delayed waiting upon the governor, under various pretences, for 24 hours; after which he made his eſcape to Mecca: hither Hoſein followed him; but received an invitation from the people of Cufa, who promiſed to aſſiſt him in vindicating the rights of his father Ali and himſelf. In the mean time, Yezid, being informed of Al Walid's negligence in ſuffering Abdallah and Hoſein to eſcape, removed him from his employment, appointing in his room Amru Ebn Saad, at that time commandant of Mecca. The new governor immediately diſpatched againſt Abdallah Amer Ebn Zobeir, Abdallah's own brother, who mortally hated him: but Abdallah, having engaged Amer in the field, defeated and took him priſoner; which greatly raiſed his reputation at Medina, altho' Hoſein's ſuperior intereſt among them ſtill rendered him incapable of aſpiring to the khalifat by himſelf. Arabia.

While Abdallah was thus ſtrengthening himſelf at Mecca and Medina, Hoſein was doing the ſame at Cufa. On the firſt notice of their inclinations, he had ſent to them Moſlem Ebn Okail, to whom, as repreſentative of the ſon of Ali, they had taken an oath of allegiance, and were now very preſſing on Hoſein to honour their city with his preſence. Beſides this, Hoſein was ſupported by the forces of Irak, who retained a great veneration for the memory of his father, and had all along conſidered the government of Moawiyah as a downright uſurpation.

Notwithſtanding all theſe ſteps taken at Cufa in favour of Hoſein, the deliberations of the conſpirators were carried on with ſuch ſecrecy, that Al Nooman the governor continued a ſtranger to them, even after the Cufans had determined immediately to enter upon action with an army of 18,000 men. At laſt, however, he began to be rouſed from his lethargy; but Yezid being diſpleaſed with his conduct, removed him from his government, appointing for his ſucceſſor Obeidallah Ebn Ziyad. This governor entered the city in the evening, and was received with all poſſible demonſtrations of joy by the Cufans, who miſtook him for Hoſein, owing to a black turban which he had on his head, reſembling that which Hoſein uſually wore. His firſt care was to extinguiſh the ſedition that had been excited by Moſlem. In order to this, he commanded a truſty ſervant to diſguiſe himſelf, and perſonate a ſtranger come out of Syria to ſee the inauguration of Hoſein; that he might get admiſſion into Moſlem's houſe, and penetrate all his councils. This commiſſion was faithfully executed; and Obeidallah underſtanding that Moſlem lodged in the houſe of one Sharik, who was then ſick, ſent a meſſenger to Sharik, letting him know that he intended to viſit him on a certain day. Sharik immediately came to a reſolution to receive him, and appointed Moſlem a place in the corner of the room whence he might ruſh out upon Obeidallah and kill him. The viſit was accordingly made; but Moſlem's heart failing him, the governor eſcaped: Hani, however, in whoſe houſe Moſlem had firſt lodged, was impriſoned by Obeidallah. Upon the news of this, Moſlem aſſembled about 4000 men, and beſieged Obeidallah in the caſtle. The governor, however, not in the leaſt diſpirited, made a ſpeech to Moſlem's followers, which had ſuch an effect upon them, that they all deſerted him except about 30. By the favour of the night, Moſlem eſcaped to a poor woman's cottage in the neighbourhood; but being betrayed by her ſon, Obeidallah ſent a detachment of 80 horſe to ſeize him. Moſlem made a gallant reſiſtance, and thrice cleared the houſe of them; but being at laſt overpowered with numbers, and grievouſly wounded, he was taken and brought to Cufa. While on the road, he endeavoured to ſend an account of his bad ſucceſs to Hoſein, then, as he ſuppoſed, on the road to Cufa; but without ſucceſs. When arrived at the caſtle, he begged a draught of water: but thoſe who ſtood by told him he ſhould have none till he drank the hamim, or boiling liquor, which the Mahometans pretend is drunk by the damned in hell; and ſoon after this, being brought before the governor, he was beheaded along with Hani, and both their heads ſent as a preſent to Yezid.

124 Hoſein's obſtinacy.

Hoſein, in the mean time, was preparing to ſet out for Cufa, having received the moſt favourable advices from Moſlem, of whoſe fate he was ignorant, and who had ſent him a liſt of 140,000 men that were ready to obey his orders. This the wiſeſt of his friends repreſented as a deſperate enterprize, and intreated him to drop it, or at leaſt to defer his journey till he ſhould be better aſſured of ſucceſs: but Hoſein was deaf to all ſalutary counſel; nay, he could not, by the moſt earneſt intreaties, be prevailed upon to forbear taking his wives and children along with him. The conſequences of this obſtinacy may be eaſily imagined: Obeidallah diſpatched firſt 1000, and then 5000 men againſt him; with orders, however, not to offer any violence to him, provided he ſubmitted himſelf. To theſe terms the infatuated Hoſein would not agree: he offered indeed to return home, if Obeidallah would permit; but that not being granted, he deſperately engaged the troops of Obeidallah, and was after long reſiſtance cut in pieces with all his men. His head was brought to Obeidallah, who ſtruck it over the mouth with a ſtick, and treated it with great contempt. He was alſo inclined to have put his family to death; but probably feared an inſurrection, as the people of Cufa expreſſed great reſentment on account of Hoſein's death; nor was it at all agreeable to the khalif Yezid, who treated the family of the unfortunate Hoſein with the greateſt kindneſs.

125 He is defeated and killed.

This year, the 61ſt of the Hegira, Yezid appointed Salem Ebn Ziyad governor of Khoraſan; who, ſoon after entering upon the government, made an irruption into the Turkiſh territories. He took his wife along with him in this expedition, who was delivered of a child in the neighbourhood of Samarcand; on which occaſion ſhe is ſaid to have borrowed ſome jewels from the prince of Sogd's lady, which ſhe afterwards carried off with her. In the mean time, Salem detached Mohalleb with a conſiderable body of troops to Khowarazm, the principal city of the Turks or Tartars in thoſe parts, from which he extorted the immenſe ſum of 50,000,000 pieces of money; from whence advancing to Samarcand, he forced the inhabitants of that city alſo to pay him an immenſe ſum; and then retired, with little loſs, into the province he governed.

In the mean time, Abdallah Ebn Zobeir, finding himſelf, by the death of Hoſein, at the head of the partizans of the houſe of Haſhem, who were greatly oppreſſed by Yezid, began in earneſt to aſpire to the khalifat. As he had therefore never owned the authority of Yezid, he now openly declared againſt him, and was proclaimed khalif at Medina ſoon after the arrival of Hoſein's family in that place. Soon after his inauguration, to render himſelf the more popular, he expatiated on the circumſtances of Hoſein's death, which indeed were very tragical, and repreſented the Cufans as the moſt abandoned and perfidious villains upon earth. This went ſo well down with the citizens of Mecca and Medina, that they flocked to him in great numbers, ſo that he ſoon found himſelf at the head of a conſiderable force. The khalif Yezid being informed of his progreſs, ſwore he would have him in chains; and accordingly ſent a ſilver collar for him to Merwan, then governor of Medina: but the intereſt of Abdallah was now ſo ſtrong, that he laughed at the menaces both of the khalif and Merwan. Nay, the governor of Mecca, though he ſecretly hated him, thought it good policy, as matters then ſtood, to keep up a good underſtanding with Abdallah: but this coming to the ears of Yezid, he depoſed the governor; appointing in his place Walid Ebn Otbah, a man of known fidelity, and a bitter enemy of Abdallah. The new governor, therefore, immediately on his acceſſion, uſed all his art and ſkill to circumvent Abdallah; but to no purpoſe, as the latter was always on his guard. This conduct, however, giving him great diſguſt, as well as terrible apprehenſions, he wrote to the khalif, informing him that all the diſturbances were owing to the untractable diſpoſition of Walid; and that, if he would ſend a perſon of a different character, peace would ſoon be reſtored. This letter the khalif very injudiciouſly gave ear to, and diſmiſſed his faithful governor, appointing in his room one who was totally unqualified for that poſt. The people of Medina, now having freſh intelligence of Yezid's diſſolute manner of life, renounced their allegiance to him, and formally depoſed him in a very ſingular manner. After they had aſſembled in the moſque, about the pulpit there, one of them ſaid, "I lay aſide Yezid as I do this turbant," and immediately threw his turbant on the ground. Another ſaid, "I put away Yezid as I do this ſhoe," caſting away his ſhoe at the ſame time. Theſe examples being followed by others, there was a large heap of ſhoes and turbants almoſt inſtantly formed upon the ſpot. They then diſmiſſed Yezid's governor, and baniſhed from the city all the friends and dependents of the houſe of Ommiyah. Theſe, to the number of about 1000, took refuge in the houſe of Merwan Ebn Al Hakem, where they were ſo cloſely beſieged by Abdallah's party, that they found themſelves obliged to ſend to Yezid for immediate aſſiſtance; acquainting him, that if they were not ſuccoured, they muſt all inevitably periſh. The khalif, though he wondered that ſuch a number of men ſhould ſuffer themſelves to be ſo cooped up without making the leaſt reſiſtance, diſpatched Moſlem Ebn Okba to Medina, with a conſiderable body of troops, to quell the diſturbances. He ordered him to ſpare Ali the ſon of Hoſein and his family, as they had no hand at all in the diſturbances: then he was to ſummon the town of Medina to ſurrender for three days ſucceſſively; which if they refuſed, he was to take it by ſtorm, and give it up to be plundered by the ſoldiers for three whole days.

126 Abdallah proclaimed khalif at Medina.

127 Yezid fo mally dep ſed.

The inhabitants of Medina, being now ſenſible of their danger, ſuffered the friends of the houſe of Ommiyah to withdraw quietly out of the city; tho', before they departed, a promiſe was extorted from them not to appear in arms againſt the reigning faction. Moſlem, in the mean time, advanced towards the city at the head of 5000 foot and 12,000 horſe; and having ſummoned it according to his inſtructions, upon its refuſal, made the neceſſary preparations for an attack. The garriſon, however, for a conſiderable time, made a vigorous defence; but at laſt, moſt of the Anſars and principal officers being killed, the Arabs propoſed a capitulation. Moſlem, however, would hearken to no terms, and inſiſted on their ſurrendering at diſcretion; which being refuſed, he entered the city after a faint reſiſtance. Ali was treated with great reſpect; but all the men that had carried arms were put to the ſword,

128 Medina ken and plunder by the lif's for

ſword, and Moſlem ſuffered his troops to raviſh 1000 women, and to pillage the city for three days ſucceſſively. Thoſe that eſcaped the ſlaughter he forced to acknowledge themſelves the ſlaves and vaſſals of Yezid. For this extreme ſeverity he was ſurnamed by the Arabs, *Al Muſrif*, or *the Extravagant*, and ever after conſidered as an impious perſon, eſpecially as the prophet had declared that the wrath of God ſhould moſt certainly remain upon thoſe who ſacked or plundered the city of Medina.

After the reduction of Medina, Moſlem directed his courſe to Mecca, where Abdallah then reſided; but he died by the way, and the command of the troops devolved upon Hoſein Ebn Thamir Al Selwi. This general advanced to Mecca, which he beſieged for 40 days, battering the town with ſuch fury, that he beat down a great part of the famous temple there, and burnt the reſt; nor would the city itſelf have eſcaped the ſame fate, had not an end been put to the war by the arrival of certain accounts of the death of Yezid, who departed this life in the 64th year of the Hegira, anſwering to the year 684 of the Chriſtian æra, having lived 39, and reigned three years and ſix or eight months. On the news of his death, Hoſein offered to take the oath of allegiance to Abdallah; but the latter at that time durſt not truſt him, of which he had afterwards ſufficient reaſon to repent.

129
d dies.

130
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Yezid was ſucceeded by his ſon Moawiyah II. who was proclaimed khalif at Damaſcus the ſame day that his father died; but, being of a weakly conſtitution, and unable to bear the fatigues of government, reſigned the crown ſix weeks after his inauguration, and died ſoon after, without naming a ſucceſſor.

This abdication having left the Moſlem empire abſolutely without a maſter, great commotions enſued. On the death of Yezid, Obeidallah Ebn Ziyad, governor of Baſrah, repreſented to the citizens that they ought to chooſe a protector till a new khalif ſhould be choſen; and if the perſon ſo choſen ſhould be diſagreeable to them, they might then remain in a ſtate of independency under the protector whom they had choſen. The inhabitants, perceiving the drift of this ſpeech, complimented him with that honour; which he accepted with ſeeming difficulty: but, ſending a deputy to Cufa, the inhabitants of that city not only refuſed to acknowledge his authority, but threw duſt and gravel at his meſſenger. This coming to the ears of the people of Baſrah, they not only deprived Obeidallah of the dignity they had newly conferred upon him, but even expelled him the city. Nor could he prevail upon the Najari, a tribe of Anſars, to eſpouſe his quarrel, nor even upon his own relations, though he diſtributed among them great part of the ſixteen millions of pieces of money which he had found in the treaſury of Baſra, and kept the remainder to himſelf. Nay, ſo odious had he rendered himſelf to all ranks, on account of his cruelties, particularly the death of Hoſein the ſon of Ali, that his brother Abdallah was unable to protect him from the fury of the populace, though he kept him concealed in womens cloaths, and diſtributed among the mob 200,000 pieces of money. He was therefore at laſt conſtrained to leave the city, attended by a guard of 100 men. Immediately after his departure, the mob plundered his houſe, and purſued him, ſo that he was obliged to exchange his camel for an aſs, and thus with the utmoſt difficulty eſcaped into Syria.

31
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Syria.

In the mean time, Hoſein Ebn Thamir, being returned into Syria with the forces under his command, gave a faithful account of the ſituation of affairs in Arabia to Merwan Ebn Al Hakem. He alſo acquainted him of the offer he had made to Abdallah of the oath of allegiance, which the latter had refuſed, or at leaſt would not come to Damaſcus in order to be inveſted with the ſupreme authority there. On this account he adviſed Merwan to take care of himſelf and the reſt of the houſe of Ommiyah, who had fled to Damaſcus after their expulſion from Medina. On this diſcourſe, Merwan was inclined to ſubmit to Abdallah; but was diverted from it by Obeidallah, who inſiſted that no ſuperior ought to be acknowledged by Merwan, who was at the head of the Koreiſh. The people of Damaſcus had conſtituted Dahak Ebn Kais their protector, who inclined to Abdallah. The Baſrans were at this juncture entirely in tumult and confuſion, not being able to agree about a protector after the expulſion of Obeidallah; ſo that at laſt they wrote to Abdallah, offering him the government of their territory. This he accepted, but could not be prevailed upon to ſtir from Mecca; nor could Merwan be perſuaded to ſuffer any of the Syrians to perform the pilgrimage to Mecca, leſt they ſhould join Abdallah, and thereby contribute to his excluſion from the throne.

132
Merwan proclaimed khalif at Damaſcus.

In the midſt of this confuſion Abdallah might have eaſily ſecured the khalifat to himſelf, had he not with the utmoſt imprudence as well as inhumanity given orders for the extermination of the houſe of Ommiyah. This ruined his affairs; for they being now obliged to provide for their own ſafety, Merwan was proclaimed khalif at Damaſcus; and thus the whole Moſlem empire was rent into two potent factions, the one under Merwan, and the other under Abdallah.

We have already obſerved, that Dahak Ebn Kais inclined to favour Abdallah. This he continued to do after Merwan was proclaimed khalif, inſomuch that a battle ſoon enſued between his followers and thoſe of Merwan, in which Dahak was defeated and killed; and thus Merwan became maſter of all the province of Syria. Soon after this victory, Merwan advanced with a conſiderable body of troops towards Egypt; but ſent before him Amru Ebn Said with a detachment, in order to facilitate his paſſage. That general having defeated Abdalrahman, Abdallah's lieutenant, in ſeveral briſk actions, he at laſt ſurrendered the whole country to Merwan for a ſum of money, and retired with the Arabs under his command to Hejaz. The Syrian troops, therefore, immediately took poſſeſſion of that country, and obliged the inhabitants to take an oath of allegiance to Merwan, who, having appointed his ſon Abdalazziz to preſide over Egypt, returned with the greateſt part of his forces to Damaſcus. Here he was informed that Abdallah had diſpatched againſt him his brother Muſab with a conſiderable army. Againſt him Merwan diſpatched Amru Ebn Said; who, having ſoon come up with him, gave him a total defeat, and diſperſed his troops in ſuch a manner, that Muſab found it impoſſible to rally them again.

133
Abdallah's forces defeated by Merwan's.

134
The Cufans revolt.

In the 65th year of the Hegira, the inhabitants of Cufa, pretending to be ſeized with remorſe of conſcience for their treachery to Hoſein the ſon of Ali, 135 Joined by Al Mokhtar.

raiſed an inſurrection againſt both the khalifs, and therefore aſſembled a body of 16,000 men, under the command of one Soliman, who was to revenge the death of Hoſein upon Obeidallah Ebn Ziyad and his adherents. But while Soliman and his troops remained yet inactive, Al Mokhtar, who had ſerved under Abdallah, and was diſguſted at not having been promoted as he expected, arrived at Cufa, and, repreſenting the incapacity of Soliman, who indeed appears to have been totally unfit for ſuch an enterprize, offered to take the command upon himſelf. This, however, was refuſed; and as Al Mokhtar had no opinion of Soliman's military capacity, he found means to draw off 2000 of his troops; while 10,000 more choſe rather to violate the oaths they had taken, than run the riſk of being cut to pieces by a ſuperior enemy.

136 Soliman's folly and enthuſiaſm.

Soliman, however, put a good face upon the matter; and, telling his troops that they were to fight for another world and not this, ſet forward to invade Syria with the 4000 who remained with him: but being advanced as far as Ekſas upon the Euphrates, he found that he had loſt 1000 men by deſertion; nor was he joined by the Separatiſts of Baſra and Al Madayen, though they had promiſed him a reinforcement. Firmly perſuaded, however, that his cauſe was the cauſe of heaven, Soliman continued his march all night, and next day arrived at the tomb of Hoſein, where his men performed their devotions with ſuch enthuſiaſm of penitence, that one preſent ſwore he never ſaw ſuch crowding about the black ſtone in the temple of Mecca itſelf.—Continuing ſtill to advance, he received a friendly letter from Abdallah Ebn Yezid, the governor of Cufa, adviſing him to return, and repreſenting to him the folly of engaging ſo powerful an army as would be ſent againſt him, with an handful of men: but Soliman, imagining that he was only recalled in order to ſupport Abdallah Ebn Zobeir in his pretenſions to the khalifat, perſiſted in his reſolution of penetrating into Syria. He told his troops, that they would never be nearer the two Hoſeins (Hoſein, and his brother Haſan, to whom alſo the Shiites give that name) than they were at preſent; and that, ſhould they at this time meet with death, they would be in a ſtate of repentance, and conſequently could never die in a more proper time; and after

137 He is cut in pieces with all his men.

this ſpeech, continuing ſtill to advance, he was at laſt met by Obeidallah at the head of 20,000 horſe, who, after an obſtinate engagement, cut to pieces Soliman and all his troops.

138 Merwan dies.

Soon after this deciſive action died the khalif Merwan, after he had reigned eleven months. He is ſaid by ſome authors to have been poiſoned by his wife Zeinab, Moawiyah's widow. Her he had married, with a promiſe that her ſon Khaled ſhould ſucceed him; but afterwards altering the ſucceſſion in favour of his own ſon Abdalmalec, young Khaled reproached him with his breach of promiſe: upon this, Merwan calling him *baſtard*, the child complained to his mother, who, to be revenged for this affront, is ſaid to have poiſoned him, or ſmothered him with a pillow.

In the beginning of the khalifat of Abdalmalec, Al Mokhtar, who had been impriſoned by the governor of Cufa, was releaſed at the interceſſion of Abdallah Ebn Omar, who had married his ſiſter. The year following, having put himſelf at the head of the Shiite ſectaries, he ſent propoſals of alliance to Abdallah Ebn Zobeir; but he, juſtly ſuſpecting his ſincerity, by a ſtratagem cut off near 3000 of his men. Upon this diſaſter, Al Mokhtar, fearing the houſe of Ali might be intimidated, ſent a letter to Mahomet Ebn Hanifyah, one of that family, in which he offered his aſſiſtance

139 Narrow ſcape of family o Ali.

with a powerful army. This offer Mahomet declined, declaring himſelf only for pacific meaſures; but though he and all the reſt of Ali's family behaved in the moſt peaceable manner, Abdallah did not think himſelf ſafe till they owned his authority. He therefore impriſoned them, together with 17 of the principal citizens of Cufa, whom he threatened to put to death, and afterwards burn their bodies, if they did not within a limited time take an oath of allegiance to him. Al Mokhtar being informed of the diſtreſſed ſituation they were in, ſent a body of 750 horſe to Mecca, under Abu Abdallah, to releaſe them. That general not only executed his orders with great bravery, but took Abdallah himſelf priſoner, whom he would have cut to pieces on the ſpot, had he not been releaſed at the interceſſion of Mahomet, who for the preſent adjuſted the differences to the mutual ſatisfaction of all parties. After this reconciliation, Abu Abdallah, or rather Mahomet himſelf, diſtributed among 4000 of Ali's friends a ſum of money brought for that purpoſe, in order to indemnify them for the loſſes they had ſuſtained. Thus the friends of Ali were happily delivered, when only two days of the time granted them by Abdallah remained, and a ſufficient quantity of wood and other combuſtibles was collected, in order to conſume their bodies. Notwithſtanding the reconciliation, however, that had lately taken place, Mahomet Ebn Hanifyah thought proper to poſt himſelf on a mountain near Mecca with a body of 4000 men.

The Cufans having received advice before Merwan's death, that he had ſent Obeidallah with a powerful army towards their city, and even given him permiſſion to plunder it in caſe it ſhould be taken, appointed Yezid Ebn Ares, a man of undaunted courage, to oppoſe him; but Merwan dying before Obeidallah could execute his commiſſion, an end was put for the preſent to this expedition. The memory of it, however, ſtill remained; and Al Mokhtar, to whom Obeidallah was perſonally obnoxious, aſſembled a body of troops to act offenſively againſt him, and even againſt the Syrian

14 Impiet Al Mo tar.

khalif himſelf, in caſe he ſhould ſupport Obeidallah. Among other preparations for this enterprize, Al Mokhtar cauſed a kind of portable throne to be made, telling his troops, that "it would be of the ſame uſe to them that the ark was to the children of Iſrael." It was therefore carried on a mule before the troops that were to march againſt Obeidallah, and the following prayer ſaid before it: "O God! grant that we may live long in thy obedience; help us, and do not forget us, but protect us." This expedient was ſo well adapted to the hot-headed enthuſiaſts who compoſed

14 Obeida defeate killed.

Al Mokhtar's army, that they attacked Obeidallah's camp, defeated him, and gained a complete victory. Obeidallah himſelf was killed in the action, his head ſent to Al Mokhtar, and his body reduced to aſhes.—By this victory the ſectaries were rendered ſo formidable, that Niſibin or Niſibis, and ſeveral other cities, ſurrendered to them without oppoſition. They now began to entertain thoughts of depoſing both the khalifs, and placing on the Moſlem throne one of the fa-

mily

142 l Mokh- r defeated d killed Muſab.

mily of Ali; but all their towering hopes were ſoon fruſtrated by the defeat and death of Al Mokhtar by Muſab brother to Abdallah Ebn Zobeir. Al Mokhtar, after being defeated in a general engagement by Muſab, fled to the caſtle of Cufa, where he defended himſelf with great bravery for ſome time; but being at laſt killed, his men, to the number of 7000, ſurrendered at diſcretion, and were all of them put to the ſword on account of the outrages they had committed.

143 rrid elties mmitted the Aza- ites.

The next year, the 68th of the Hegira, the Azarakites, ſo denominated from Nafe Ebn Al Azarak, the author of their ſect, having aſſembled a conſiderable force, made an irruption into Irak. They advanced almoſt to the gates of Cufa, and penetrated to Al Madayen. Being ſworn enemies of the houſe of Ommiyah, and acknowledging no government ſpiritual or temporal, they committed terrible ravages in every part of the Moſlem territories through which they paſſed. They carried their exceſſes to ſuch a height as to murder all the people they met with, to rip open women with child, and commit every ſpecies of cruelty that could be invented upon the inhabitants without diſtinction. The governor of Mawſel and Meſopotamia, being informed of theſe unparallelled outrages, marched againſt them with a body of troops, and carried on a briſk war with them for eight months. During this period their leader Nafe Ebn Al Azarak died; and was ſucceeded by Katri Ebn Al Fojat, under whoſe conduct they continued their depredations. Muſab not being pleaſed with his lieutenant's management of the war, recalled him, and ſent in his place one Omar Ebn Abdallah Temimi, who gave the Azarakites a great overthrow at Naiſabur in Khoraſan, put many of them to the ſword, and purſued the reſt as far as Iſpahan and the province of Kerman. Here having received a reinforcement, they returned into the province of Ahwaz, and did incredible damage to the country through which they paſſed. But Omar advancing againſt them a ſecond time, they retired at his approach to Al Madayen, ravaging the diſtrict belonging to the city in a dreadful manner. However, Omar purſuing them thither alſo, they fled into the province of Kerman, and thence gradually diſperſed themſelves. This year there was a grievous famine in Syria, which ſuſpended all military operations.

144 y are ated and erſed.

145 arity of alma-

The next year, being the 69th of the Hegira, Abdalmalec left Damaſcus, to march againſt Muſab. In his abſence he left Amru Ebn Said governor of the city; but he immediately ſeized upon it for himſelf, which obliged the khalif to return. After ſeveral ſkirmiſhes had happened between ſome detachments of the khalif's troops with thoſe of Amru, a pacification was concluded at the interceſſion of the women: but Abdalmalec barbarouſly put Amru to death with his own hand, notwithſtanding his promiſe; and was immediately ſeized with ſuch a tremor, that he loſt the uſe of almoſt all his faculties, and was obliged to be laid in bed. In the mean time the palace was attacked by Yahyah, Amru's brother, at the head of 1000 ſlaves. After a warm diſpute, they forced open the gates, killed ſeveral of the guards, and were upon the point of entering the palace, when the people within threw Amru's head among them. This ſo cooled their ardour, that they deſiſted from the attempt; and ſome money having been afterwards diſtributed among them, they retired. So great, however, was Abdalmalec's avarice, that, after the tumult was appeaſed, he recalled all the money which had been diſtributed, and commanded it to be depoſited in the public treaſury.

146 Diſgraceful treaty with the Greeks.

In the 70th year of the Hegira, the Greeks made an irruption into Syria; and Abdalmalec having occaſion for all his forces to act againſt Abdallah Ebn Zobeir, was obliged to pay a tribute of 1000 dinars per day, according to Theophanes, and ſend every year 365 ſlaves and as many horſes to Conſtantinople. In this treaty it was alſo ſtipulated, that the revenues of Cyprus, Armenia, and Heria, ſhould be equally divided between the khalif and the Greek emperor.

147 Muſab defeated and killed by Abdalmalec.

Abdalmalec, being now at leiſure to purſue his intended expedition againſt Muſab, marched againſt him in perſon; and having arrived at Maſken, a ſmall town on the frontiers of Meſopotamia, where he was waited for by Muſab, the latter was defeated through the treachery of his troops, and himſelf killed. After the battle, Abdalmalec repaired to Cufa, where he was received with the utmoſt ſubmiſſion; and people of all ranks came in crowds to take the oath of allegiance to him. He then ordered vaſt ſums of money to be diſtributed among them, and gave a ſplendid entertainment to his new ſubjects, to which even the meaneſt of them were not refuſed admittance. During this entertainment, the unfortunate Muſab's head was preſented to the khalif; upon which one of the company took occaſion to ſay to him, "I ſaw Hoſein's head in this ſame caſtle preſented to Obeidallah; Obeidallah's to Al Mokhtar; Al Mokhtar's to Muſab; and now at laſt Muſab's to yourſelf." This obſervation ſo affected the khalif, that, either to avert the ill omen, or from ſome other motive, he ordered the caſtle to be immediately demoliſhed. Abdallah Ebn Zobeir, in the mean time, having received the melancholy news of the defeat and death of his brother, aſſembled the people of Mecca, and from the pulpit made a ſpeech ſuitable to the occaſion. He alſo did his utmoſt to put Mecca in a proper poſture of defence, expecting a ſpeedy viſit from his formidable competitor, who now gave law to Irak, Syria, and Egypt, without controul.

148 Azarakites defeated.

Soon after Abdalmalec's return to Damaſcus, he appointed his brother Baſhar governor of Cufa; and Khaled Ebn Abdallah, governor of Baſra. The latter had no ſooner entered upon his office, than he indiſcreetly removed from the command of the army Al Mohalleb, one of the greateſt generals of the age; appointing in his room Abdalaziz, who was greatly his inferior in military ſkill. Of this diſmiſſion the Azarakites being informed, they immediately attacked Abdalaziz, entirely defeated him, and took his wife priſoner. A diſpute ariſing among the victors about the price of that lady, one of them, to end it, immediately cut off her head. Upon this diſaſter, Khaled was commanded to replace Al Mohalleb, which he did; and having in conjunction with him attacked the Azarakites, forced their camp, and entirely defeated them.

In the 72d year of the Hegira, Abdalmalec having no enemy to contend with but Abdallah Ebn Zobeir, made great preparations for an invaſion of Hejaz, giving the command of the army to be employed on this occaſion to Al Hejaj, one of his moſt warlike and eloquent captains. Before that general had put his army in march for Mecca, he offered his protection to all the

Arabs there that would accept of it. Abdallah being informed of the enemy's approach, ſent out ſeveral parties of horſe to reconnoitre, and give him intelligence of their motions. Between theſe and ſome of Al Hejaj's advanced guards ſeveral ſkirmiſhes happened, in which Abdallah's men had generally the worſt. This encouraged Al Hejaj to ſend to the khalif for a reinforcement, his troops amounting to no more than 2000 men, who were inſufficient for reducing Mecca. He aſſured him at the ſame time, that Abdallah's fierceneſs was very much abated, and that his men deſerted to him daily. 149 Mecca beſieged by Al Hejaj. The khalif, upon this, ordered a reinforcement of 5000 men under the command of Tharik Ebn Amer; but, notwithſtanding this additional ſtrength, he made but little progreſs in the ſiege for ſome time. While he battered the temple of Mecca with his machines, it thundered and lightened ſo dreadfully, that the Syrians were ſtruck with terror, and refuſed to play them any longer upon that edifice. Upon this, Al Hejaj ſtuck the corner of his veſt into his girdle, and putting into it one of the ſtones that was to be diſcharged out of the catapults, ſlang it into the town, and this occaſioned the recommencement of the operations. The next morning, the Syrians were annoyed by freſh ſtorms, which killed 12 men, and quite diſpirited them. Al Hejaj, however, animated them, by obſerving that he was a ſon of Tehama; that this was the ſtorm of Tehama, and that their adverſaries ſuffered as much as they. The day following, ſome of Abdallah's men were killed by a very violent ſtorm, which gave Al Hejaj a farther opportunity of animating his troops. At laſt, Abdallah, having been deſerted by moſt of his friends, 10,000 of the inhabitants of Mecca, and even by his own ſons Hamza and Khobeib, deſired to know his mother's ſentiments as to what courſe he was to take. He repreſented to her, that he was almoſt entirely abandoned by his ſubjects and relations; that the few who perſiſted in their fidelity to him could ſcarce enable him to defend the city any longer; and that the Syrian khalif would grant him any terms he ſhould think fit to demand. His mother, however, being of an inflexible reſolution, and not able to bear the thoughts of ſeeing her ſon reduced to the rank of a private perſon, being herſelf the daughter of Abu Becr the firſt khalif, adviſed him by no means to ſurvive the ſovereignty, of which he was on the point of being deprived. This advice being agreeable to his own ſentiments, he reſolved to die in defence of the place. In purſuance of this reſolution, he defended the city, to the amazement of the beſiegers, for ten days, though deſtitute of arms, troops, and fortifications. 150 Abdallah killed. At laſt, having taken a final leave of his mother, and being animated by deſpair, he made a ſally upon the enemy, deſtroyed a great number of them with his own hand, and was at length killed fighting valiantly upon the ſpot. At the laſt interview he had with his mother, ſhe is ſaid to have deſired him to put off a coat of mail he had on for his defence; and, in order to inſpire him with the greater fortitude, ſhe gave him a draught in which a whole pound of muſk had been infuſed. Al Hejaj ordered his head to be cut off, and his body to be affixed to a croſs; and by reaſon of the muſk he had drank, the body emitted a grateful odour for ſeveral days.

By the reduction of Mecca, and the death of Abdallah Ebn Zobeir, Abdalmalec remained ſole maſter of the Moſlem empire; he ſuſtained a great loſs however next year, in having an army of 100,000 men totally cut off by the Khazarians in Armenia. 151 Khazari reduced. The governor, however, having marched in perſon againſt them at the head of only 40,000 men, but all choſen troops, penetrated into the heart of Armenia, defeated and diſperſed a large body of the Khazarians, drove them into their temples, and reduced them to aſhes. One of his generals alſo defeated an army of 80,000 Kharazians at the Iron or Caſpian gates, and deſtroyed a great number of them, obliging the reſt to embrace the Mahometan religion.

152 Cruelty Al Hej

Al Hejaj, in conſequence of his ſervices, was made governor, firſt of Medina, and then of Irak, Khoraſan, and Sijiſtan; in all which places he behaved with the greateſt cruelty. Having entered the city of Cufa muffled up in his turbant, he was ſurrounded by crowds of people who preſſed forward to ſee him. He told them their curioſity would ſoon be gratified; which he effectually did, by aſcending the pulpit, and treating them in a very coarſe manner; ſwearing that he would make the wicked bear his own burden, and fit him with his own ſhoe; and telling them, among other things, that "he imagined he ſaw the *heads* of men ripe and ready to be gathered, and turbants and beards beſprinkled with blood." At Baſra he made a ſpeech much to the ſame purpoſe; and, to give the inhabitants a taſte of his diſcipline, cauſed one of them who had been informed againſt as a rebel to be beheaded on the ſpot, without any trial. So great indeed was the abhorrence in which he was held by thoſe over whom he preſided, that having once recommended himſelf to the prayers of a religious Moſlem, the latter inſtantly prayed that it would pleaſe God to kill Al Hejaj quickly; "for nothing, ſaid he, could be more advantageous for himſelf or the people." In conſequence of theſe cruelties, rebellions were ſoon raiſed againſt him; but they were eaſily ſuppreſſed, and Al Hejaj continued in the full enjoyment of all his employments till he died.

153 Saleh an Shebib r bel.

In the 76th year of the Hegira, one Saleh Ebn Marj, a hot-headed enthuſiaſt, and Shebib Ebn Zeid, a Kharejite, took up arms againſt the khalif. They had conſpired againſt him the year before, when on a pilgrimage to Mecca; and Al Hejaj had been ordered to ſeize them: but at that time they found means to make their eſcape; and having now aſſembled about 120 men, Saleh was proclaimed emperor of the faithful at Daras in Meſopotamia. The governor ſoon received intelligence of their motions; and ordered a body of 500 men, under the command of one Adi, to march againſt them: but that general, being afraid to attack them notwithſtanding his ſuperiority in numbers, demanded a reinforcement. He therefore was ſupplied with 500 more troops, with which he advanced to Daras: but being ſtill afraid of the rebels, he entered into negotiations with them; during which they attacked him, entirely defeated his army, and made themſelves maſters of his camp. 154 Their br very. Upon this the governor ſent a detachment of 1500 horſe againſt them; but the rebels, notwithſtanding the ſmallneſs of their number, defended themſelves in ſuch a manner, that the khalif's troops were forced to diſmount, and fight on foot. The engagement continued till night; when the rebels, finding themſelves unable to contend with ſuch numbers, retired

red to Mawſel. After this, Al Hejaj being informed that they had taken poſt at Daſcara, ſent againſt them an army of 5000 men. The rebels, hearing of this formidable army, abandoned their camp; but were ſo cloſely purſued, that they found themſelves obliged to ſtand an engagement at Modbaj, a ſmall village on the Tigris.

155 Saleh killed.

Saleh's forces, conſiſting only of three companies of 30 men each, were ſoon thrown into diſorder, and himſelf killed: but Shebib made an excellent retreat to a neighbouring caſtle; from whence he ſallied out at midnight on the khalif's forces, penetrated to the very heart of the camp, where he wounded the general himſelf, and diſperſed the greateſt part of his army.

156 Al Hejaj defeated by Shebib.

After this victory, the rebels became terrible even to Al Hejaj himſelf, whom they afterwards defeated in ſeveral engagements, and, taking advantage of his being at Baſra, made themſelves maſters of Cufa with little oppoſition. Al Hejaj was now conſtrained to write to the khalif for a ſtrong detachment of the Syrian troops, with which he advanced againſt Shebib, whoſe army bearing no proportion to that of Al Hejaj, the former was totally defeated, had his wife's brother killed in the action, and was obliged to fly into Kerman. Having refreſhed his men in this province, he again advanced to Ahwaz, where he was met by one of Al Hejaj's generals at the head of the Syrian army.

157 Shebib's valour and death.

Shebib defended himſelf with incredible valour, and ſeveral times repulſed the khalif's forces; but being overpowered by numbers, as his army conſiſted of no more than 600 men, he was at laſt put to flight, and, in paſſing a bridge was thrown off by his horſe and drowned. His body was drawn up by a net, and the head ſent to Al Hejaj, who was not a little pleaſed at the ſight. After his death, the rebels quarrelled among themſelves, ſo that the khalif's troops cut off the greateſt part of them. The remainder, under Katri Ebn Fojat, fled to Tabreſtan. Here they were kindly received by Aſhid the king, who aſſigned them a part of his territories for their habitation.

158 Ingratitude of the rebels.

Here they had not been long ſettled, before they inſiſted upon Aſhid's either embracing Mahometaniſm, or paying them an annual trbute; which he refuſing, they drove him into Irak, where he implored the khalif's protection.

159 They are all deſtroyed.

Aſhid afterwards conducted a body of Moſlem troops into Tabreſtan, where they fell upon the rebels with ſuch fury, that they killed Katri himſelf, cut a great number of his men to pieces, and took all the reſt priſoners.

This year alſo (the 76th of the Hegira), money was firſt coined in Arabia. Before this time, the dinars, or gold coins, had Greek inſcriptions; and the dirhems, or ſilver ones, Perſic inſcriptions. The firſt erection of a mint in Arabia was occaſioned by the following accident. Abdalmalec added to the letters he wrote to the Greek emperor, this ſhort paſſage of the Koran, "Say, God is one," or "Say there is one God;" and then inſerted the year of the Hegira, with the name of the prophet, in ſuch a manner as gave the emperor great offence. Upon this, he wrote to Abdalmalec, deſiring him to alter that manner of writing, or he would ſend him ſome coins in which the name of Mahomet ſhould be mentioned in ſuch a manner as would not prove very agreeable.

160 Money firſt coined in Arabia.

Abdalmalec now reſolved to coin money of his own; and accordingly ſome dirhems were this year ſtamped by Al Hejaj, with the inſcription, *Allah Samad*, "God is eternal;" which gave great offence to the ſuperſtitious Moſlems, as they imagined that the name of God would be thereby profaned by the touch of unclean perſons.

161 Carthage demoliſhed.

In the 77th year of the Hegira, the Arabs made an incurſion into the imperial territories, and had Lazica and Bernucium betrayed to them; and the next year they made themſelves maſters of Africa Propria, demoliſhing the city of Carthage ſo effectually, that ſcarce a veſtige of it was left. They were ſoon driven out, however, by John the Patrician, a man of great valour and experience in war; but returning with a ſuperior force, they obliged John in his turn to fly to Conſtantinople.

162 200,000 Arabs deſtroyed by Heraclius.

The 79th year of the Hegira is remarkable for nothing but the rebellion of Abdalrahman in Perſia; who drove the *Khakan*, or emperor of the Turks, Tartars, or Moguls, out of that country: but the following year, one of the Greek generals, named *Heraclius*, penetrated into Syria as far as Samoſata, and deſtroyed 200,000 Arabs, ravaging the country in a terrible manner; and Abdalrahman was defeated and killed by Al Hejaj, after a great number of engagements, ſome ſay 81, and others 100. In the 83d year of the Hegira, the nobility of Armenia revolting, drove the Arabs out of that province; but Mahomet, one of the khalif's generals, entering the country with a powerful army, got the authors of the revolt into his hands, and cauſed them all to be burnt alive. Encouraged by this ſucceſs, the Moſlems invaded Cilicia under one Azar; but were, to the number of 10,000, cut in pieces by Heraclius; and the next year, having again entered that country, 12,000 of them were deſtroyed by the ſame general, and the reſt forced to fly into their own country.

163 Abdalmalec dies.

In the 86th year of the Hegira died the khalif Abdalmalec, after a reign of 21 years. He is ſaid to have had ſuch a ſtinking breath, that the flies which accidentally ſettled on his lips were almoſt inſtantly ſtruck dead by it. He was ſucceeded by Al Walid, who greatly extended the Moſlem dominions. The firſt year of his reign, one of his generals having paſſed the Oxus, (now the Jihum), defeated a numerous army of Turks and Tartars. He then over-ran and entirely reduced the countries of Sogd or Sogdiana, Bagraſa, Shaſh, Targana, and the whole immenſe tract going under the name of Mawaralnahr, or Great Bukharia.

164 Prodigious conqueſts of the Moſlems.

He alſo conquered the Khan of Khowarazm, obliging him to pay an annual tribute of two millions of dinars. About the ſame time another general, called *Mahomet*, made an irruption into India, and ſubdued a conſiderable part of that country. He alſo entirely ſubdued the kingdom of Al Sind, lying between Perſia and India. In this expedition, Derar king of Al Sind was defeated and killed, and had his head cut off by Mahomet.

In the 90th year of the Hegira, the Moſlems made an irruption into Cappadocia, defeated the emperor's army who oppoſed them, and took the city of Tyana. The next year they made another incurſion into the imperial territories, whence they carried off vaſt numbers of ſlaves; and the year following, one Othman penetrated into the heart of Cilicia, where he made himſelf maſter of ſeveral cities, but does not appear to have long kept his conqueſts.

165 They make a deſcent on Spain.

In the 93d year of the Hegira, anſwering to that of Chriſt 712, Tarek Ebn Zarka made a deſcent in

Spain, defeated Roderic the laſt king of the Goths, reduced the city of Toledo, and over-ran a conſiderable part of the kingdom. Being afterwards joined by Muſa, commander of the African Moſlems, the two generals made themſelves maſters of moſt of the fortreſſes, ſubjugating in a manner the whole country, and obliging it to pay tribute to the khalif. In theſe expeditions the Moſlems acquired ſpoils of immenſe value; and, amongſt other things, an exceeding rich table, called by the Arab writers "the table of Solomon the ſon of David." According to theſe writers, this table conſiſted entirely of gold and ſilver, and was adorned with three borders of pearls; but Roderic of Toledo, a Spaniſh hiſtorian, ſays it conſiſted of one entire ſtone, of a green colour, and of an immenſe ſize, having no leſs than 365 feet. He adds, that it was found in a certain village or town, near the mountain called in his days *Jibal Soliman*, or "the mountain of Solomon."

166 And over-run the whole country.

After Muſa and Tarik had committed dreadful depredations in Spain, they were both recalled by the khalif; but the next year, Tarik having undertaken another expedition into the ſame country, landed a body of 12,000 men at Gibraltar, with which he plundered the whole province of Bætica, and over-ran the greateſt part of Luſitania. Roderic hearing of theſe depredations, ſent againſt him an army of raw undiſciplined troops, who were eaſily defeated, and moſt of them left dead on the ſpot; which ſo animated the Arab commander, that he reſolved not to lay down his arms till he had made an abſolute conqueſt of Spain. About the ſame time that Tarif made ſuch progreſs in Spain, another Moſlem general entered Piſidia with a powerful army, took the city of Antioch, and, after having ravaged the country, retired into the khalif's territories with very little loſs.

167 Al Hejaj dies.

In the 95th year of the Hegira, died Al Hejaj governor of Irak, *&c.* after he had preſided over that country 20 years. He exerciſed ſuch cruelties upon thoſe who were in ſubjection to him, that he is ſaid to have killed 120,000 men, and to have ſuffered 50,000 men and 30,000 women to periſh in priſon. To excuſe this cruelty, he uſed frequently to ſay, That a ſevere, or even violent government, is better than one too weak and indulgent; as the firſt only hurts particular perſons, but the latter the whole community. This year alſo the Arabs gained a complete victory in Spain over Roderic king of the Goths, who periſhed in the action. In this campaign, Tarif poſſeſſed himſelf of immenſe treaſures; by which means he was enabled to reward not only his officers, but common ſoldiers alſo. In the eaſtern parts of the world alſo, the Arabs were this year very formidable; Moſlema, an Arab general, having entered the imperial territories, ravaged the whole province of Galatia, carrying off with him many rich ſpoils, and a vaſt number of priſoners. The Greek emperor, hearing that Al Walid deſigned to attack him both by ſea and land, ſent ſome of his nobles to treat of a peace; and, among other things, deſired them to bring him a particular account of the force with which the khalif deſigned to invade the Greek empire. This they repreſented as ſo terrible, that it would be next to impoſſible to oppoſe it. The emperor therefore cauſed a great number of light ſhips to be built, the walls to be repaired, and ordered ſuch of the citizens as had not laid up proviſions for three years to depart the city. Al Walid, in the mean time, continued his warlike preparations with the utmoſt vigour, being determined to make himſelf maſter of Conſtantinople in a ſingle campaign.

168 Al Walid dies and is ſucceeded by Soliman.

169 Conſtantinople unſucceſsfully beſieged.

170 Death of Soliman.

In the 96th year of the Hegira died the khalif Al Walid, and was ſucceeded by his brother Soliman. This year the Moſlem conqueſts on the eaſt ſide were increaſed by the reduction of Tabreſten and Jurjan or Georgiana. In Spain alſo, the city of Toledo which had revolted was reduced, and Cæſar-Auguſta, now Saragoſſa, as well as ſeveral others. The next year Moſlema ſet out for Conſtantinople, which he beſieged without ſucceſs till the 99th year of the Hegira; at which time he was obliged to return, after having loſt before it 120,000 men. The ſoldiers were reduced to the greateſt extremities of hunger, being forced to live upon hides, the roots and bark of trees, the moſt noiſome animals, and even the dead bodies of their companions. This year alſo (the 99th of the Hegira) is remarkable for the death of the khalif Soliman. According to ſome, he was poiſoned by Yezid his brother, governor of Perſia, who was diſpleaſed with his having appointed his couſin-german Omar Ebn Abdalaziz as his ſucceſſor, to the excluſion of himſelf. According to others, he died of an indigeſtion; which is not greatly to be wondered at, if, as thoſe authors ſay, he uſed to devour 100 pounds weight of meat every day, and dine very heartily after eating three lambs roaſted for breakfaſt. In the latter part of his reign, the Moſlems were by no means ſucceſsful in Spain; the kingdom of Navarre being founded at this time by Pelagius, or Pelayo, whom the Arabs were never able to reduce.

171 New khalif poiſoned.

The new khalif Omar Ebn Abdalaziz was by no means of a martial character; but is ſaid to have been very pious, and poſſeſſed of very amiable qualities. He ſuppreſſed the uſual malediction, which was ſolemnly pronounced by the khalifs of the houſe of Ommiyah, againſt the houſe of Ali; and always ſhewed great kindneſs to the latter. He was poiſoned by Yezid, after a ſhort reign of two years and five months. It is related, as an inſtance of this khalif's humility, that when Moſlema viſited him in his laſt ſickneſs occaſioned by the poiſon, he lay upon a bed of palm-tree leaves, ſupported by a pillow formed of beaſts ſkins, and covered with an ordinary garment. He had alſo on a dirty ſhirt; for which Moſlema blamed his ſiſter Fatima, Omar's wife; but ſhe excuſed herſelf, by telling, him that the emperor of the faithful had not another ſhirt to put on.

Concerning Yezid the ſucceſſor of Omar we find very little worth mentioning. He did not long enjoy the dignity he had ſo iniquitouſly purchaſed, dying after a reign of little more than four years. He died of grief for a favourite concubine, named *Hababah*, who was accidentally choked by a large grape which ſtuck in her throat.

172 The Turks defeated.

Yezid was ſucceeded by his brother Heſham, who aſcended the throne in the 105th year of the Hegira. In the ſecond and third year of his reign, ſeveral incurſions were made into the imperial territories, but generally without ſucceſs. In the 109th year of the Hegira, Moſlema drove the Turks out of Armenia and Aderbijan, and again confined them within the Caſpian

173
France invaded by the Arabs.

174
They are utterly defeated by Charles Martel.

gates. The next year, he obliged them to take an oath that they would keep their own country; but this they ſoon violated, and were again driven back by Moſlema. About this time alſo the Arabs, having paſſed the Pyrenees, invaded France to the number 400,000, including women and ſlaves, under the command of one Abdalrahman. Having advanced to Arles upon the Rhone, they defeated a large body of French that oppoſed them; and having alſo defeated count Eudo, they purſued him through ſeveral provinces, waſted the whole country with fire and ſword, making themſelves maſters of the city of Tours, moſt of which they reduced to aſhes. Here however a ſtop was put to their devaſtations by Charles Martel; who, coming up with them near the abovementioned city, engaged them for ſeven days together, and at laſt gave them a total overthrow. The French general made himſelf maſter of all their baggage and riches; and Abdalrahman, with the ſhattered remains of his army, reached the frontiers of Spain with the utmoſt difficulty. The following year alſo, according to ſome hiſtorians, the Arabs were overthrown at Illiberis, ſcarce any of them making their eſcape. To make amends for this bad fortune, however, the khalif's arms were ſucceſsful againſt the Turks, who had again invaded ſome of the eaſtern provinces.

175
Reign of Merwan.

In the 125th year of the Hegira died the khalif Heſham, after a reign of 19 years, ſeven months, and eleven days. He was ſucceeded by Al Walid II. who is repreſented as a man of a moſt diſſolute life, and was aſſaſſinated the following year on account of his profeſſing *Zendiciſm*, a ſpecies of infidelity nearly reſembling Sadduciſm. He was ſucceeded by Yezid the ſon of Al Walid I. who died of the plague after a reign of ſix months; and was ſucceeded by Ibrahim Ebn Al Walid, an imprudent and ſtupid prince. He was depoſed in the 127th year of the Hegira by Merwan Ebn Mahomet, the governor of Meſopotamia; who gave out as an excuſe for his revolt, that he intended to revenge the murder of the khalif Al Walid II. He was no ſooner ſeated on the throne, than the people of Hems rebelled againſt him. Againſt them the khalif marched with a powerful army; and, aſking them what could excite them to this rebellion, ſummoned them to ſurrender. They aſſured him that they were diſpoſed to admit him into their city; and, accordingly, one of the gates being opened, Merwan entered with about 300 of his troops. The men that entered with him were immediately put to the ſword; and the khalif himſelf eſcaped with great difficulty. However, he afterwards defeated them in a pitched battle, put a great number of them to the ſword, diſmantled the city, and crucified 600 of the principal authors of the revolt.

This however was far from quieting the commotions in different parts of the empire. The inhabitants of Damaſcus ſoon followed the example of thoſe of Hems, and depoſed the khalif's governor; but Merwan, immediately after the extinction of the former rebellion, marched to Damaſcus with great celerity, entered the city by force, and brought to condign puniſhment the authors of the revolt. Peace, however, was no ſooner eſtabliſhed at Damaſcus, than Soliman Ebn Heſham ſet up for himſelf at Baſra, where he was proclaimed khalif by the inhabitants. Here he aſſembled an army of 10,000 men, with whom he marched to Kinniſſin, where he was joined by vaſt numbers of Syrians who flocked to him from all parts. Merwan, receiving advice of Soliman's rapid progreſs, marched againſt him with all the forces he could aſſemble, and entirely defeated him. In this engagement Soliman loſt 30,000 men, ſo that he was obliged to fly to Hems, where 900 men took an oath to ſtand by him to the laſt. Having ventured however to attack the khalif's forces a ſecond time, he was again defeated, and forced to fly to Hems. But being cloſely purſued by Merwan, he conſtituted his brother Said governor of the city, leaving with him the ſhattered remains of his troops, and himſelf fled to Tadmor. Soon after his departure Merwan appeared before the town, which he beſieged for ſeven months; during which time he battered it inceſſantly with 80 catapults. The citizens being reduced to the laſt extremity, ſurrendered, and delivered Said into the khalif's hands. In conſideration of this ſubmiſſion Merwan pardoned the rebels, and took them all under his protection. About the ſame time, another pretender to the khalifat appeared at Cufa; but Merwan took his meaſures ſo well, that he extinguiſhed this rebellion before it could come to any height.

176
A party formed againſt him in Khoraſan.

Notwithſtanding the ſucceſs, however, that had hitherto attended Merwan, a ſtrong party was formed againſt him in Khoraſan by the houſe of Al Abbas. The firſt of that houſe that made any conſiderable figure was named *Mahomet*, who flouriſhed in the reign of Omar Ebn Abdalaziz. He was appointed chief of the houſe of Al Abbas, about the 100th year of the Hegira; and is ſaid to have propheſied, that, after his death, one of his ſons named *Ibrahim* ſhould preſide over them till he was killed, and that his other ſon Abdallah, ſurnamed *Abul Abbas Al Saffah*, ſhould be khalif, and exterminate the houſe of Ommiyah. Upon this, Al Saffah was introduced as the future ſovereign, and thoſe preſent kiſſed his hands and feet.

177
Merwan's forces defeated.

After the deceaſe of Mahomet, his ſon Ibrahim nominated as his repreſentative in Khoraſan one Abu Moſlem, a youth of 19 years of age; who, beginning to raiſe forces in that province, Merwan diſpatched againſt him a body of horſe under the command of Naſr Ebn Sayar: but that general was entirely defeated by Abu Moſlem, and the greateſt part of his men killed. The next year (the 128th of the Hegira), Merwan made vaſt preparations to oppoſe Abu Moſlem, who after the late victory began to grow formidable to ſeveral parts of the empire. According to ſome authors, Merwan gained two victories over ſome of Ibrahim's generals: but the year following, Abu Moſlem brought ſuch a formidable army into the field, that the khalif's troops could not make head againſt them; his officers in Khoraſan therefore were obliged either to take an oath of allegiance to Ibrahim, or to quit the province within a limited time.

178
Ibrahim put to death.

In the 130th year of the Hegira, the khalif's general Naſr, having drawn together another army, was again defeated by Kahtaba another of Ibrahim's generals, and forced to fly to Raya, a town of Dylam, according to ſome, or of Khoraſan, according to others. The next year Ibrahim, having fooliſhly taken it into his head to go on a pilgrimage to Mecca, attended by a numerous retinue ſplendidly accoutred, was ſeized and put to death by Merwan; and the year following, Abul Abbas was proclaimed khalif at Cufa. As ſoon as the ceremony was ended, he ſent his uncle Abdallah with a powerful army to attack Merwan's forces that were encamped near Tubar, at a ſmall diſtance from Moſul, where that khalif was then waiting for an account of the ſucceſs of his troops under Yezid governor of Irak againſt Khatahba, one of Al Saffah's generals. Khatahba, receiving advice of Yezid's approach, immediately advanced againſt him, and entirely defeated him; but, in croſſing the Euprates, the waters of which were greatly ſwelled, he was carried away by the current, and drowned. The purſuit, however, was continued by his ſon Hamid, who diſperſed the fugitives in ſuch a manner that they could never afterwards be rallied.

179 Merwan himſelf defeated.

At the news of this diſaſter, Merwan was at firſt greatly diſpirited; but ſoon recovering himſelf, he advanced to meet Abdallah. In the beginning of the battle, the khalif happened to diſmount; and his troops perceiving their ſovereign's horſe without his rider, concluded that he was killed, and therefore immediately fled; nor was it in the power of the knalif himſelf to rally them again,. ſo that he was forced to fly to Damaſcus: but the inhabitants of that city, ſeeing his condition deſperate, ſhut their gates againſt him.

180 And killed.

Upon this he fled to Egypt, where he maintained himſelf for ſome time; but was at laſt attacked and killed by Saleh, Abdallah's brother, in a town of Thebair, called *Buſir Kuridas*. The citizens of Damaſcus, tho' they had ſhamefully deſerted Merwan, refuſed to open their gates to the victors; upon which Saleh entered the city by force, and gave it up to be plundered for three days by his ſoldiers.

By the total defeat and death of Merwan, Al Saffah remained ſole maſter of the Moſlem throne; but we hear of no very remarkable events that happened during his reign: only that he maſſacred great numbers of the partiſans of the houſe of Ommiyah; and that Conſtantine Copronymus, taking advantage of the inteſtine diviſions among the Moſlems, ravaged Syria. The khalif died of the ſmall-pox in the 136th year of the Hegira, in the 33d year of his age; and was ſucceeded by his brother Al Manſur.

181 Reign of Al Manſur.

In the beginning of Al Manſur's reign, hoſtilities continued againſt the houſe of Ommiyah, who ſtill made reſiſtance, but were always defeated. Abdallah, however, the khalif's uncle, cauſed himſelf to be proclaimed khalif at Damaſcus; and having aſſembled a powerful army in Arabia, Syria, and Meſopotamia, advanced with great expedition to the banks of the Maſius near Niſibis, where he encamped. Al Manſur, being informed of this rebellion, diſpatched Abu Moſlem againſt Abdallah. This general, having harraſſed him for five months together, at laſt brought him to a general action; and, having entirely defeated him, forced him to fly to Baſra.

182 He murders Abu Moſlem.

Notwithſtanding all his ſervices, however, Abu Moſlem was ſoon after ungratefully and barbarouſly murdered by Al Manſur, on ſome ridiculous pretences of being deficient in reſpect towards him.

After the death of Abu Moſlem, one Sinan a Magian, or adorer of fire, having made himſelf maſter of that general's treaſures, revolted againſt the khalif; but he was ſoon defeated by Jamhur Ebn Morad, who had been ſent againſt him with a powerful army. In this expedition Jamhur having acquired immenſe riches, the covetous diſpoſition of the khalif prompted him to ſend a perſon expreſs to the army to ſeize upon all the wealth. This ſo provoked Jamhur, that he immediately turned his arms againſt his maſter; but was ſoon defeated, and entirely reduced.

183 Abdalrahman proclaimed khalif in Spain.

The following year (the 139th of the Hegira), one Abdalrahman, of the houſe of Ommiyah, after the entire ruin of that family in Aſia, arrived in Spain, where he was acknowledged khalif; nor did he or his deſcendants ever afterwards own ſubjection to the Arabian khalifs.

184 Attempt to aſſaſſinate the khalif.

The 140th year of the Hegira is remarkable for an attempt to aſſaſſinate the khalif. This attempt was made by the Rawandians; an impious ſect, who held the doctrine of metempſychoſis or tranſmigration.—They firſt offered Al Manſur divine honours, by going in proceſſion round his palace, as the Moſlems were wont to do round the Caab; but the khalif, highly incenſed at this impiety, ordered 100 of the principal of them to be impriſoned. Theſe however were ſoon releaſed by their companions; who then went in a body to the palace with an intention to murder their ſovereign: but he being a perſon of uncommon bravery, though he was ſurprized with very few attendants, mounted a mule, and advanced towards the mutineers with an intention to ſell his life as dear as poſſible. In the mean time, Maan Ebn Zaidat, one of the chiefs of the Ommiyan faction, who had concealed himſelf in order to avoid the khalif's reſentment, ſallied out of his retreat, and putting himſelf at the head of Al Manſur's attendants, charged the rebels with ſuch fury, that he entirely defeated them. This generoſity of Maan was ſo remarkable, that it afterwards paſſed into a proverb. On this occaſion 6000 of the Rawandians were killed on the ſpot, and the khalif delivered from inſtant death: he was, however, ſo much diſguſted with the Arabs on account of this attempt, that he reſolved to remove the capital of his empire out of their peninſula; and accordingly founded a new city on the banks of the Tigris, which from that time to this has been known by the name of *Bagdad*.

185 He removes the ſeat of empire to Bagdad.

The foundations of it were laid in the 145th year of the Hegira, and finiſhed four years after.

On the removal of the ſeat of government to Bagdad, the peninſula of the Arabs ſeems all at once to have loſt its conſequence, and in a ſhort time the inhabitants ſeem even to have detached themſelves from the juriſdiction of the khalifs: for, in the 156th year of the Hegira, while Al Manſur was yet living, they made irruptions into Syria and Meſopotamia, as if they had deſigned to conquer theſe countries over again for themſelves; and though the Arabs, properly ſo called, continued nominally ſubject to the khalifs of Bagdad till the abolition of the khalifat by Hulaku the Tartar, yet they did not become ſubject to him when he became maſter of that city.

186 Arabs never ſubdued by any foreign power.

Nay, we have the ſtrongeſt reaſon to believe that the Arabs (i. e. the inhabitants of the peninſula properly called *Arabia*) have remained independent, not only of Hulaku, but of every other conqueror that the world hath yet produced. To prove this will require no long time: for no governor of Arabia is mentioned in hiſtory but what was choſen by the Arabs themſelves; which abundantly ſhews the futility of the pretences to conqueſts of Arabia made by Trajan, Severus, the Turks, &c. From the character of the Arabs in all ages, it is certain that no nation ever had more occaſion for governors than they have; and if the princes who pretended to conquer them did not appoint

point governors over thoſe unruly ſubjects, we can only ſuppoſe it to have been becauſe they were not able, *i. e.* becauſe their pretended conqueſts were never made. As the hiſtory of *Arabia*, properly ſo called, therefore, is not to be found in the hiſtory of the khalifs of Bagdad, we muſt refer our readers for the hiſtory of thoſe khalifs to the article BAGDAD, and conclude this long article with ſome account of the manners, cuſtoms, &c. of the Arabs, and which, according to all accounts, ſeem now to be much the ſame with what they have always been.

187 haracter of e ancient rabs.

With regard to the diſpoſition of the ancient Arabs, it will be proper to remark, that they had their good and bad qualities, their excellencies and defects, as well as other nations. Hoſpitality was ſo habitual to them, that in this they ſeem to have exceeded all their neighbours. Agatharchides repreſents them as the moſt hoſpitable people in the world to all nations, but particularly ſome of the Greeks. Hatem of the tribe of Tay, and Haſn of that of Fezarah, were principally famous on this account: the latter of theſe, we are told, fell into as great a tranſport of joy when he conferred any ſignal favour upon a petitioner, as others did when they received ſuch a favour. Nay, the contrary vice was ſo much in contempt among the Arabs, that a certain poet upbraids the inhabitants of Waſet, as with the greateſt reproach, that none of their men had the heart to give, nor their women to deny. As a mark of their hoſpitable diſpoſition, the Arabs uſed to light fires on the tops of hills, which in the night conducted travellers to their tents, and aſſured them of a kind reception. Every one of theſe fires they called *the fire of hoſpitality;* and the larger and higher it was, the greater honour and glory it reflected on the perſon or perſons concerned in lighting it. The higheſt compliment that could be paid a man was to paſs an encomium upon his munificence; as that moſt acceptable to a woman was, to celebrate her parſimony, and her beauty. The ancients likewiſe commend the Arabs for being exact to their words, and reſpectful to their kindred; and they have always been celebrated for their quickneſs of apprehenſion and penetration, as well as the vivacity of their wit; eſpecially thoſe of the Deſert.

On the other hand, that the Arabs had a natural inclination to war, bloodſhed, cruelty, and rapine, is acknowledged by their own writers. They had always been ſo much addicted to bear malice, that they ſcarce ever forgot an old grudge; which vindictive temper, ſome phyſicians ſay, ought to be attributed to their frequent feeding on camels fleſh, that creature being moſt malicious, and tenacious of anger. This account, according to Mr Sale, ſuggeſts a good reaſon for diſtinction of meats.

88 nt A- eſcri-

The preſent Arabs are of a middle ſtature, thin, and of a ſwarthy complexion, with black hair and black eyes, which however are common to them with other people in the ſame climate. Their voices are rather effeminate than ſtrong. They are very ſwift of foot, and excellent horſemen; and are ſaid to be a brave people, expert at the bow and lance, and, ſince they became acquainted with fire-arms, good markſmen.

The habit of the roving Arabs is a kind of blue ſhirt, tied about them with a white ſaſh or girdle; and ſome of them have a veſt of furs, or ſheep-ſkins, over it. They wear alſo drawers, and ſometimes ſlippers, but no ſtockings, and have a cap or turban on their heads. Many of them go almoſt naked; but the women are ſo wrapped up, that nothing can be diſcerned but their eyes.

Except thoſe that live in the cities and towns on the ſea-coaſts, they have no ſettled habitation, but rove from place to place, with their flocks and herds, for the conveniency of water and paſture. While they continue in any particular ſpot, they live and ſleep in tents. They frequently rob or impoſe a tribute upon the caravans between Turky and Perſia; and the king of Muſcat is little better than a pirate, having generally a ſquadron of cruizers, with which he takes all the defenceleſs ſhips he can meet with in the Perſian and Arabian ſeas. They pretend, that God gave permiſſion to Iſhmael and his poſterity to take whatever they could, eſpecially from the Jews.

The food of the Arabs is chiefly rice, fiſh, herbs, veniſon, fowl, and moſt other ſorts of fleſh: but camels fleſh is moſt admired; and they take care to drain the blood from the fleſh, as the Jews do, and, like them, abſtain from ſuch fiſh as have no ſcales. Their drink is chiefly water or ſherbet; they have no ſtrong liquors.

Dr Shaw ſays, the wild Arabs (by which we ſuppoſe he means the wandering Arabs) are a very fierce, rapacious, unpoliſhed race, without the leaſt literature among them: that Europeans have little or no converſe with them; and, if they had, could learn but little of them.

Though the far greater part of the nation deſerves the character given of them above, yet there are many of them, eſpecially ſuch as live in towns, that apply themſelves to trades and commerce, arts and ſciences, in which they often make a great progreſs; being naturally ingenious, ſubtile, and witty; and great admirers of poetry, muſic, and rhetoric. Many of the Arabian performances in phyſic, aſtronomy, and mathematics, ſhew the authors to have been men of great genius and application. Figures, and the curious diſpoſition of them, ſo as to expreſs any number whatſoever with eaſe and expedition, is allowed to be an invention of the Arabians. To conclude their character, both ſexes are ſaid to be very vindictive, and exceſſively given to luſt, as the natives of hot climates generally are. How ſtrong the Arab genius is tinctured with enthuſiaſm and ſuperſtition, and conſequently inclined to fable and romance, appears eminently in moſt of their compoſitions.

189 Their language.

As the Arabs are one of the moſt ancient nations in the world, having inhabited the country they at preſent poſſeſs almoſt from the deluge, without intermixing with other nations, or being ſubjugated by any foreign power, their language muſt have been formed ſoon after, if not at, the confuſion of Babel. The two principal dialects of it were, that ſpoken by the Hamyarites and other genuine Arabs, and that of the Koreiſh, in which Mahomet wrote the Koran. The firſt is ſtyled by the Oriental writers the *Arabic* of *Hamyar*, and the other *the pure* or *defecated*. As Yarab, grandfather of Hamyar, is ſuppoſed by the Oriental writers to have been the firſt whoſe tongue deviated from the Syriac to the Arabic; the Hamyaritic dialect, according to them, muſt have approached nearer to the purity of the Syriac; and conſequently have been more remote from the true genius of the Arabic, than that of any other tribe. The dialect of the Koreiſh, termed by the Koran *the* *perſpicuous and clear Arabic*, is referred to Iſhmael as its author; who, ſay the above-mentioned writers, firſt ſpoke it; and, as Dr Pocock believes, after he had contracted an alliance with the family of Jorham by marriage, formed it of their language and the original Hebrew. As, therefore, the Hamyaritic dialect partook principally of the Syriac, ſo that of the Koreiſh was ſuppoſed to conſiſt chiefly of the Hebrew. But, according to Jallalo'ddin, the politeneſs and elegance of the dialect of the Koreiſh ought rather to be attributed to their having, from the remoteſt antiquity, the cuſtody of the Caaba, and dwelling in Mecca the centre of Arabia. The Arabs are full of the commendations of their language; which is very harmonious, expreſſive; and, as they ſay, ſo immenſely copious, that no man uninſpired can be a perfect maſter of it in its utmoſt extent. How much, in this laſt article, it is ſuperior to the Greek and Latin tongues, in ſome meaſure appears from hence, that ſometimes a bare enumeration of the Arabic names of one particular thing, and an explication of them, will make a conſiderable volume. Notwithſtanding this, the Arabs believe the greateſt part of their language to be loſt; which will not ſeem improbable, when we conſider how late the art of writing became generally practiſed among them. For though it was known to Job their countryman, to the Edomites, as well as the other Arabian nations bordering upon Egypt and Phœnicia, and to the Hamyarites many centuries before Mahomet, as appears from ſome ancient monuments ſaid to be remaining in their character; yet the other Arabs, and thoſe of Mecca in particular, unleſs ſuch of them as were either Jews or Chriſtians, were to the time of Moramer perfectly ignorant of it. It was the ancient Arabic language preceding the reign of Juſtinian, which ſo nearly reſembled the Ethiopic; for ſince that time, and eſpecially ſince the age of Mahomet, all the Arabic dialects have been not a little corrupted. This is now the learned language of the Mahometans, who ſtudy it as the European Chriſtians do the Hebrew, Greek, and Latin.

189 Letters. The character uſed by them, the moſt ancient of any peculiar to the Arabs, wherein the letters were not diſtinctly ſeparate, went by the appellation of *Al Moſnad*, from the mutual dependency of its letters or parts upon one another. This was neither publicly taught, nor ſuffered to be uſed, without permiſſion firſt obtained. Could we depend upon what Al Firauzabadius relates from Ebn Haſhem, this character muſt have been of a very high antiquity; ſince an inſcription in it, according to the laſt author, was found in Yaman, as old as the time of Joſeph. Be that as it will, Moramer Ebn Morra of Anbar, a city of Irak, who lived not many years before Mahomet, was the inventor of the preſent Arabic character, which Baſhar the Kendian, who married the ſiſter of Abu Sofian, is ſaid to have learned from the houſe of Anbar, and to have introduced at Mecca but a little time before the inſtitution of Mahometiſm. Moramer's alphabet the Oriental authors agree to have been very different from the ancient one of the Hamyarites, ſince they diſtinguiſh the Hamyaritic and Arabic pens. In Mahomet's time, the Morameric alphabet had made ſo ſmall a progreſs, that no one in Yaman could either write or read it; nay, Mahomet himſelf was incapable of doing either; for which reaſon, he was called the *illiterate prophet*. The letters of this alphabet were very rude; being either the ſame with, or very much like, the Cufic; which character is ſtill found in inſcriptions and the titles of ancient books; nay, for many years it was the only one uſed by the Arabs, the Koran itſelf being at firſt written therein. In order to perpetuate the memory of Moramer's invention, ſome authors call the Arabic letters *al Moramer*, i. e. *the progeny of Moramer*. The moſt remarkable ſpecimens of the *Cufic* character (ſo denominated from Cufa, a city of Irak, where ſome of the firſt copies of the Koran were written) are the following: Part of that book in it on vellum, brought from Egypt by Mr Greaves; ſome other fragments of the ſame book in it publiſhed by Sir John Chardin; certain paſſages of a MS. in the Bodleian library; the legends on ſeveral Saracenic coins dug up not many years ago on the coaſt of the Baltic, not far from Dantzick; and, according to Mr Profeſſor Hunt, thoſe noble remains of it that are, or were lately, to be ſeen in Mr Joſeph Ames's valuable collection of antique curioſities. As to the true origin of the ancient and modern Arabic alphabets, we muſt own ourſelves pretty much in the dark.

190 Learning, &c. The ſciences chiefly cultivated by the ancient Arabians were three; that of their hiſtory and genealogies, ſuch a knowledge of the ſtars as to foretel the changes of weather, and the interpretation of dreams. They valued themſelves extremely on account of the nobility of their families; and ſo many diſputes happened on that occaſion, that it is no wonder if they took great pains in ſettling their deſcents. Their knowledge of the ſtars was gathered from long experience, and not from any regular ſtudy or aſtronomical rules. The Arabians and Indians applied themſelves to obſerve the fixed ſtars, contrary to other nations, whoſe obſervations were almoſt confined to the planets; and they foretold their effects from their influences, not their nature. The ſtars or aſteriſms they moſt uſually foretold the weather by, were thoſe they call *Anwa*, or the houſes of the moon. Theſe are 28 in number, and divide the zodiac into as many parts, through one of which the moon paſſes every night. As ſome of them ſet in the morning, others riſe oppoſite to them, which happens every thirteenth night; and from their riſing and ſetting, the Arabs, by long experience, obſerved what changes happened in the air; and at length came to aſcribe divine power to them, ſaying, that their rain was from ſuch or ſuch a ſtar. This expreſſion Mahomet abſolutely forbad them to uſe in the old ſenſe, unleſs qualified in ſuch a manner as to make the Supreme Being the director and manager of them. We find Al Rayeſh, one of the kings of Yaman, ſurnamed *the Philoſopher*, not ſo much on account of his learning, as of his great prudence and intellectual endowments. That the Arabs underſtood ſomething of phyſic before the time of Mahomet, appears from hence, that the famous Arabian phyſician Al Harith Ebn Khalda, ſo celebrated amongſt his countrymen, was older than that impoſtor. They ſeem to have made no farther progreſs in aſtronomy, which they afterwards cultivated with ſo much ſucceſs and applauſe, than to obſerve the influence of the ſtars upon the weather, and to give them names; which it was obvious for them to do, by reaſon of their paſtoral way of life, lying night and day in the open plains. The names they impoſed on the

ſtars generally alluded to cattle and flocks; and they were ſo nice in diſtinguiſhing them, that no language has ſo many names of ſtars and aſteriſms as the Arabic.

191 Mechanical arts.

That ſome of the Arabs had a good degree of knowledge in ſeveral mechanical arts, appears from Strabo, who informs us, that the people of Tamna and the adjacent provinces had magnificent temples, and elegant houſes, built in the Egyptian taſte. The ſame author likewiſe relates, that in Arabia Felix, beſides the huſbandmen, there were many artificers; and, amongſt others, thoſe which made palm-wine, which, he intimates, was much uſed by the Arabs. As for the exerciſe of arms and horſemanſhip, they looked upon this as one of their principal accompliſhments, being obliged to practiſe and encourage it by reaſon of the independency of their tribes, whoſe frequent jarring made wars almoſt continual amongſt them, which for the moſt part ended in field-battles. Hence it became an uſual ſaying amongſt them, that God had beſtowed four peculiar things on the Arabs, viz. *turbans inſtead of diadems, tents inſtead of walls and houſes, ſwords inſtead of intrenchments, and poems inſtead of written laws.* The principal arms uſed by the ancient Arabs were bows and arrows, darts or javelins, and broad ſwords or ſcymetars. The bows and arrows were the moſt ancient of theſe; being uſed by Iſhmael himſelf, according to Scripture. It is probable alſo, that ſome of them were acquainted with every branch of the military art cultivated by their neighbours the Egyptians, Syrians, and Phœnicians.

192 Religion.

The religion of the Arabs before Mahomet, which they call the *ſtate of ignorance*, was chiefly groſs idolatry; the Sabian religion having almoſt over-run the whole nation; though there were alſo great numbers of Chriſtians, Jews, and Magians, amongſt them. The idolatry of the Arabs, as Sabians, chiefly conſiſted in worſhipping the fixed ſtars and planets, and the angels and their images; which they honoured as inferior deities, and whoſe interceſſion they begged as their mediators with God. For they acknowledged one Supreme God, the Creator and Lord of the univerſe, whom they called *Allah Taäla, the moſt high God;* and their other deities, who were ſubordinate to him, they called ſimply *Al Ilahât*, i. e. *the goddeſſes.*

Of the angels or intelligences which they worſhipped, we find only three mentioned in the Koran, viz. *Allat*, *Al-Uzzah*, and *Manah:* theſe they called *goddeſſes*, and *the daughters of God;* an appellation they gave not only to angels, but alſo to their images, which they believed either to be inſpired with life by God, or elſe to become the tabernacles of the angels, and to be animated by them; and they paid them divine honours, becauſe they believed them to intercede with God for their votaries. The Arab Sabians likewiſe, in common with thoſe of other nations, imagined that the ſun, moon, and fixed ſtars, were inhabited by intelligences of a middle nature betwixt men and the ſupreme Being, who actuated their orbs in the ſame manner as the ſoul does the human body; and that this was the true cauſe of all their motions. Theſe beings, they had a notion, became mediators between God and them: for the neceſſity of a mediator they clearly diſcovered from the beginning; and therefore to them, as God's mediators, directed divine worſhip. They firſt worſhipped them by their tabernacles, *i. e.* their orbs themſelves; but theſe, by their riſing and ſetting, being as much under the horizon as above, they were at a loſs how to addreſs themſelves to them in their abſence. To remedy this, they had recourſe to the invention of images, in which, after their conſecration, they thought theſe inferior deities to be as much preſent by their influence as in the ſtars themſelves, and therefore that all addreſſes were made as effectually before the one as before the other. Several of theſe idols were no other than large rude ſtones, the worſhip of which, according to Al Jannabius, was introduced by the poſterity of Iſhmael. Since the days of Mahomet, the only religion tolerated in the Arabian peninſula is what was invented by that impoſtor; for an account of which ſee the article MAHOMETANISM.

193 Commerce.

Before the Portugueſe interrupted the navigation of the Red Sea, the Arabs were the factors of all the trade that paſſed thro' that channel. Aden, which is ſituated at the moſt ſouthern extremity of Arabia upon the Indian ocean, was the mart in theſe parts. The ſituation of its harbour, which opened an eaſy communication with Egypt, Ethiopia, India, and Perſia, had rendered it, for many ages, one of the moſt flouriſhing factories in Aſia. Fifteen years after it had repulſed the great Albuquerque, who attempted to demoliſh it in 1513, it ſubmitted to the Turks, who did not long remain maſters of it. The king of Yaman, who poſſeſſed the only diſtrict in Arabia that merits the title of *happy*, drove them from thence, and removed the trade to Mocha, a place in his dominions which till then was only a village.

This trade was at firſt inconſiderable; conſiſting principally in myrrh, incenſe, aloes, balm of Mecca, ſome aromatics, and medicinal drugs. Theſe articles, the exportation of which is continually retarded by exorbitant impoſts, and does not exceed at preſent 30,625 l. were at that time more in repute than they have been ſince: but muſt have been always of little conſequence. Soon after, a great change enſued from the introduction of coffee.

Though this article is generally uſed in the Arabian entertainments, none but the rich citizens have the pleaſure of taſting the berry itſelf. The generality are obliged to content themſelves with the ſhell and the huſk of this valuable production. Theſe remains, ſo much deſpiſed, make a liquor of a pretty clear colour, which has a taſte of coffee without its bitterneſs and ſtrength. Theſe articles may be had at a low price at Betelfagui, which is the general market for them. Here likewiſe is ſold all the coffee which comes out of the country by land. The reſt is carried to Mocha, which is 35 leagues diſtant, or to the nearer ports of Lohia or Hodeida, from whence it is tranſported in ſmall veſſels to Jodda. The Egyptians fetch it from the laſt mentioned place, and all other nations from the former.

The quantity of coffee exported may be eſtimated at twelve millions five hundred and fifty thouſand weight. The European companies take off a million and a half; the Perſians three millions and a half; the fleet from Suez ſix millions and a half; Indoſtan, the Maldives, and the Arabian colonies on the coaſt of Africa, fifty thouſand; and the caravans a million.

As the coffee which is bought up by the caravans and the Europeans, is the beſt that can be procured, it coſts about 8½ d. a pound. The Perſians, who content themſelves with that of an inferior quality, pay no more than about 6½ d. a pound. The Egyptians purchaſe it at the rate of about 8 d; their cargoes being compoſed partly of good, and partly of bad coffee. If we eſtimate coffee at about 7⅛ d. a pound, which is the mean price, the profits accruing to Arabia from its annual exportation will amount to 384,343 l. 15 s. This money does not go into their coffers; but it enables them to purchaſe the commodities brought from the foreign markets to their ports of Jodda and Mocha.

Mocha receives from Abyſſinia, ſheep, elephants teeth, muſk, and ſlaves. It is ſupplied from the eaſtern coaſt of Africa with gold, ſlaves, amber, and ivory; from the Perſian gulf, with dates, tobacco, and corn; from Surat, with a vaſt quantity of coarſe, and a few fine, linens; from Bombay and Pondicherry, with iron, lead, copper, which are carried thither from Europe; from Malabar, with rice, ginger, pepper, Indian ſaffron, with coire, cardamom, and alſo with planks; from the Maldives, with gum, benzoin, aloeswood, and pepper, which theſe iſlands take in exchange; from Coromandel, with 400 or 500 bales of cottons, chiefly blue. The greateſt part of theſe commodities, which may fetch 262,500 l. are conſumed in the interior part of the country. The reſt, particularly the cottons, are diſpoſed of in Abyſſinia, Socotora, and the eaſtern coaſt of Africa.

None of the branches of buſineſs which are managed at Mocha, as well as throughout all the country of Yaman, or even at Sanaa the capital, are in the hands of the natives. The extortions with which they are perpetually threatened by the government, deter them from interfering in them. All the warehouſes are occupied by the Banians of Surat or Guzarat, who make a point of returning to their own country as ſoon as they have made their fortunes. They then reſign their ſettlements to merchants of their own nation, who retire in their turn, and are ſucceeded by others.

The European companies, who enjoy the excluſive privilege of trading beyond the Cape of Good Hope, formerly maintained agents at Mocha. Notwithſtanding it was ſtipulated by a ſolemn capitulation, that the impoſts demanded ſhould be rated at two and a quarter *per cent.* they were ſubject to frequent extortions: the governor of the place inſiſting on their making him preſents, which enabled him to purchaſe the favour of the courtiers, or even of the prince himſelf. However, the profits they obtained by the ſale of European goods, particularly clothes, made them ſubmit to theſe repeated humiliations. When theſe ſeveral articles were furniſhed by Grand Cairo, it was then impoſſible to withſtand the competition, and the fixed ſettlements were therefore given up.

The trade was carried on by ſhips that ſailed from Europe with iron, lead, copper, and ſilver, ſufficient to pay for the coffee they intended to buy. The ſupercargoes, who had the care of theſe tranſactions, ſettled the accounts every time they returned. Theſe voyages, which at firſt were pretty numerous and advantageous, have been ſucceſſively laid aſide. The plantations of coffee, made by the European nations in their colonies, have equally leſſened the conſumption and the price of that which comes from Arabia. In proceſs of time, theſe voyages did not yield a ſufficient profit to anſwer the high charges of undertaking them on purpoſe. The companies of England and France then reſolved, one of them to ſend ſhips from Bombay, and the other from Pondichery, to Mocha, with the merchandiſe of Europe and India. They even frequently had recourſe to a method that was leſs expenſive. The Engliſh and French viſit the Red Sea every year. Tho' they diſpoſe of their merchandiſe there to good advantage, they can never take in cargoes from thence for their return. They carry, for a moderate freight, the coffee belonging to the companies who lade the veſſels with it, which they diſpatch from Malabar and Coromandel to Europe. The Dutch company, who prohibit their ſervants from fitting out ſhips, and who ſend no veſſels themſelves, to the gulph of Arabia, are deprived of the ſhare they might take in this branch of commerce. They have alſo given up a much more lucrative branch, that of Jodda.

Jodda is a port ſituated near the middle of the gulph of Arabia, 20 leagues from Mecca. The government there is of a mixed kind: the grand Signior and the Xeriff of Mecca ſhare the authority and the revenue of the cuſtoms between them. Theſe impoſts are levied upon the Europeans at the rate of 8 *per cent.* and upon other nations at 13. They are always paid in merchandiſe, which the managers oblige the merchants of the country to buy at a very dear rate. The Turks, who have been driven from Aden, Mocha, and every part of the Yaman, would long ago have been expelled from Jodda, if there had not been room to apprehend that they might revenge themſelves in ſuch a manner as to put an end to their pilgrimages and commerce.

194 Coins. The coins, which are current at Mocha, the principal port of the Red Sea, are dollars of all kinds; but they abate five per cent. on the pillar dollars, becauſe they are reckoned not to be the pureſt ſilver, and the dollar weight with them is 17 drachms 14 grains. All their coins are taken by weight, and valued according to their pureneſs. The gold coins current here are ducats of Venice, Germany, Turky, Egypt, &c. The comaſſes are a ſmall coin, which are taken at ſuch a price as the government ſets on them; and they keep their accounts in an imaginary coin, called *cabeers*, of which 80 go to a dollar. For an account of the ancient coins called *dinars* and *dirhems*, ſee theſe two articles.

Gum **ARABIC**. See GUM.

ARABICI, a kind of heretics, who ſprung up in Arabia, about the year 207; whoſe diſtinguiſhing tenet was, that the ſoul died with the body, and alſo roſe again with it.

ARABIS, BASTARD TOWER-MUSTARD; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants.

Species, &c. Of this genus there are nine different ſpecies enumerated by Linnæus. None of them are at all remarkable for their beauty or other properties. Only one of theſe, the thaliana or mouſe-ear, is a native of Britain. It is a low plant, ſeldom riſing more than four or five inches high, branching on every ſide, having ſmall white flowers growing alternately, which have each four petals in form of a croſs, that are ſucceeded by long ſlender pods filled with ſmall round ſeeds. It grows naturally on ſandy ground, or old walls.

Sheep are not fond of it, and ſwine refuſe it. The other ſpecies are, the alpina, grandiflora, bellidifolia, lyrata, halleri, Canadenſis, pendula, and turrita; they are not at all ſuperior to the thaliana abovementioned, are all very hardy, and require no other culture than to be kept clear of weeds.

ARABLE LANDS, thoſe which are fit for tillage, or which have been formerly tilled.

ARACAN, the capital of a ſmall kingdom to the north-eaſt of the bay of Bengal, ſituated in E. Long. 93. 0. N. Lat. 20. 30. It has the conveniency of a ſpacious river, and a harbour large enough to hold all the ſhips in Europe. It is ſaid by Schouten to be as large as Amſterdam; but the houſes are ſlight, being made with palm-trees and bamboo-canes, and covered with leaves of trees. They are ſeldom above ſix feet high, but have many windows or air-holes. But the people of the higheſt rank are much better accommodated. They have no kitchens, chimneys, or cellars, which oblige the women to dreſs the victuals out of doors. Some of the ſtreets are on the ridges of rocks, wherein are a great many ſhops. Their orchards and gardens contain all the fruit common to the Indies, and their trees are green all the year. Their common drink is toddy; which is the ſap of the cocoa-tree, and when new will intoxicate like wine, but ſoon grows ſour. Elephants and buffaloes are very numerous here, and are made uſe of inſtead of horſes. They have plenty of proviſions, and but little trade: for when Mr Channoch was here in 1686, with ſix large ſhips, there was nothing to be had in the way of commerce; and yet the country produces lead, tin, ſtick-lac, and elephants teeth. The Mogul's ſubjects come here to purchaſe theſe commodities; and ſometimes meet with diamonds, rubies, and other precious ſtones. They were formerly governed by a king of their own, called the king of the *White Elephant*; but this country has been conquered by the king of Pegu. They pay little or no regard to the chaſtity of their women, and the common ſailors take great liberties among them. Their religion is Paganiſm; and the idols, temples, and prieſts are very numerous. The dreſs of the better ſort is very ſlight, for it conſiſts chiefly of a piece of white cotton over their arms, breaſt, and belly, with an apron before. The complexion of the women is tolerable; they wear thin flowered gauze over their breaſt and ſhoulders, and a piece of cotton, which they roll three or four times round their waiſt, and let it hang as low as their feet. They curl their hair, and put glaſs rings in their ears, and ſtretch them of a monſtrous length. On their arms and legs they have hoops of copper, ivory, ſilver, &c. The country produces great quantities of rice, and the water is good. Their flocks of ſheep and herds of cattle are alſo numerous near Aracan; but what they ſay of the towns and villages, with which the country is pretended to be overſpread, may be doubted. Captain Hamilton affirms, that there are but few places inhabited, on account of the great number of wild elephants and buffaloes, which would deſtroy the fruits of the ground; and that the tigers would deſtroy the tame animals. There are ſome iſlands near the ſea, inhabited by a few miſerable fiſhermen, who can juſt keep themſelves from ſtarving, tho' they are out of the reach of oppreſſion. The rich burn the dead bodies; but the poor, who are not able to buy wood, throw them into the river.

ARACHIS, in botany, a genus of the diadelphia decandria claſs. There is only one ſpecies, *viz.* the hypogæa, a native of America. The calix is divided into two parts; and the capſule or pod is cylindrical, and contains two ſeeds.

ARACHNE, in fabulous hiſtory, a young maid of Lydia, ſaid to have been the inventreſs of ſpinning. She is fabled to have been ſo ſkilful in this art, as to challenge Minerva at it; who tore her work, and ſtruck her; which diſgrace driving her to deſpair, ſhe hanged herſelf. Pallas, from compaſſion, brought her to life, and transformed her into a ſpider, which ſtill employs itſelf in ſpinning.

ARACHNOIDES, in anatomy, an appellation given to ſeveral membranes; as the tunic of the cryſtalline humour of the eye, the external lamina of the pia mater, and one of the coverings of the ſpinal marrow.

ARACK, ARRACK, OR RACK, a ſpirituous liquor imported from the Eaſt Indies, uſed by way of dram and in punch. The word *arack* is an Indian name for ſtrong waters of all kinds; for they call our ſpirits and brandy *Engliſh arack*. But what we underſtand by the name *arack*, is really no other than a ſpirit procured by diſtillation from a vegetable juice called *toddy*, which flows by inciſion out of the cocoa-nut tree, like the birch juice procured among us.

The toddy is a pleaſant drink by itſelf, when new, and purges thoſe who are not uſed to it; and, when ſtale, it is heady, and makes good vinegar. The Engliſh at Madraſs uſe it as leaven to raiſe their bread with.

Goa and Batavia are the chief places for arack. At Goa there are different kinds; ſingle, double, and treble diſtilled. The double diſtilled, which is that commonly ſent abroad, is but a weak ſpirit in compariſon to Batavia arack: yet, on account of its peculiar and agreeable flavour, it is preferred to all other aracks of India. This is attributed to the earthen veſſels, which alone they uſe at Goa to draw the ſpirit; whereas at Batavia they uſe copper ſtills. The Parier arack made at Madraſs, and the Columbo and Quilone arack at other places, being fiery hot ſpirits, are but little valued by the Europeans, and therefore ſeldom imported, though highly prized among the natives.

ARÆ PHILÆNON, or PHILÆNORUM, (Strabo); to the ſouth of the Syrtis Major; but in Peutinger, more weſterly, to the ſouth almoſt of the Syrtis Minor. In Strabo's time, the altars were not extant, but a village of the ſame name ſtood on the ſpot. On a diſpute about limits, between the Cyreneans and Carthaginians, it was agreed that two of each people ſhould ſet out on the ſame day, and that where they ſhould happen to meet, there the limits of both ſhould be fixed. The Philæni, two brothers, Carthaginians, undertook it for Carthage: theſe, after having advanced a great many miles into the territory of the Cyreneans, were met by their antagoniſts; who, enraged at their being before-hand with them ſo far, gave them the option of either returning back, or of being buried alive on the ſpot: like zealous patriots, they choſe the latter; and there the Carthaginians raiſed two altars in honour of the Philæni. (Salluſt, Valerius Maximus).

ARÆOMETER, an inſtrument to meaſure the gravity of liquors; which is uſually made of a thin glaſs ball, with a taper neck, ſealed at the top, there being firſt as much mercury put into it as will keep it ſwimming in an exact poſture. The neck is divided into two parts, which are numbered, that ſo, by the depths of its deſcent into any liquor, its lightneſs may be known by theſe diviſions.

ARÆOSTYLE, in architecture, a term uſed by Vitruvius, to ſignify the greateſt interval which can be made between columns.

ARÆOTICS, in medicine, remedies which rarify the humours, and render them eaſy to be carried off by the pores of the ſkin.

ARAF, among the Mahometans. See ALARAF.

ARAFAH, the ninth day of the laſt month of the Arabic year, named *Dhoulhegiat;* on which the pilgrims of Mecca perform their devotions on a neighbouring mountain, called *Arafat*. The Mahometans have a very great veneration for this mountain, becauſe they believe that Adam and Eve, after they were baniſhed out of Paradiſe, having been ſeparated from each other during 120 years, met afterwards on this mountain.

ARAFAT, or GIBEL EL ORPHAT, *the mountain of knowledge*, a mountain in Arabia, near Mecca. The Mahometans ſay this was the place where Adam firſt met with and knew his wife Eve after their expulſion from Paradiſe. This mountain not being large enough to contain all the devotees that come annually in pilgrimage to Mecca, ſtones are ſet up all round it to ſhow how far it reaches. The pilgrims are clad in robes of humility and mortification, with their heads uncovered. They ſeem to be very much affected; for the tears flow down their cheeks, and they ſob and ſigh moſt bitterly, begging earneſtly for remiſſion of ſins, and promiſing to lead a new life. They continue here about four or five hours, and at half an hour after ſun-ſet they all decamp to perform a religious duty called *Aſham nomas*. After this, they all receive the honourable title of Hadgees, which is conferred upon them by the imam or prieſt. This being pronounced, the trumpet ſounds, and they all return to Mecca.

ARAGON, a province of Spain, bounded on the north by the Pyrenæan mountains, which ſeparate it from France; on the weſt, by Navarre and the two Caſtiles; on the ſouth, by Valencia; and on the eaſt, by Catalonia. It is in length about 180 miles, and in breadth 149; but the land is mountainous, dry, ſandy or ſtony, badly cultivated, and worſe peopled. However, it does not want rivers; for beſides the Ebro, which croſſes it in the middle, there are the Xalo, the Cinea, the Galego, and the Aragon. The air is pure and wholeſome; and there are mines of iron, and ſome ſay of gold. The moſt fertile parts are about the rivers: for there the land produces corn, wine, oil, flax, hemp, various fruits, and a ſmall quantity of ſaffron, beſides large flocks of ſheep, and plenty of game in the woods.

The Aragoneſe are bold, courageous, and well-bred; but poſitive in their opinions, and bigotted in their religion. Theſe were the firſt of the Spaniards that threw off the Mooriſh yoke. Saragoſſa is the capital of this province; and the other chief towns are Balbaſtro, Jaca, Sarazona, Haeſca, Calatajud, Albarrazin, Trevel, Daroca, and Boria.

ARAL, a great lake, in the kingdom of Khowarazm, lying a little to the eaſtward of the Caſpian ſea. Its length from north to ſouth is ſaid to be near 150 miles, and its breadth from eaſt to weſt about 70. The ſhore on the weſt ſide is high and rocky, and deſtitute of good water: yet there are abundance of wild horſes, aſſes, antelopes, and wolves; as alſo a fierce creature called a *jolbart*, which the Tartars ſay is of ſuch a prodigious ſtrength as to carry off a horſe. It is ſurpriſing that this lake ſhould be quite unknown to geographers, till within theſe few years. Several great rivers, which were ſuppoſed to run into the Caſpian ſea, are now known to fall into this lake, particularly the Sihun or Sirr, and the Gihun or Amo, ſo often mentioned by the Oriential hiſtorians. This lake, like the Caſpian ſea, has no viſible outlet. Its water is alſo very ſalt; and for that reaſon is conveyed by the neighbouring inhabitants by ſmall narrow canals into ſandy pits, where the heat of the ſun, by exhaling the water, leaves them a ſufficient quantity of ſalt. The ſame kinds of fiſh are found in Aral that are found in the Caſpian ſea. The former is alſo called the *Lake of Eagles*.

ARALIA, BERRY-BEARING ANGELICA, a genus of the pentagynia order, belonging to the pentandria claſs of plants.

Species. Of this genus ſome authors enumerate five ſpecies; but none of them merit deſcription, except one called *nudicaulis*, having a naked ſtalk. This grows three or four feet high; the leaves have two large trifoliate lobes, which are ſawed on their edges. The flower-ſtalks ariſe between theſe, immediately from the root, and are terminated by round umbels of ſmall four-leaved flowers of a whitiſh colour. What is remarkable of this ſpecies is, that its roots were brought over from North America where it grows, and ſold here for ſarſaparilla, and it is ſtill uſed as ſuch by the inhabitants of Canada; though it is very different from the true ſort. All the ſpecies of this plant are hardy, except one called the *ſpinoſa*, which requires an hot-bed; but is deſtitute of the little beauty poſſeſſed by the others, ſo is very ſeldom cultivated except in botanic gardens for variety.

ARAMONT, a town of Languedoc, in France, ſeated on the river Rhone. E. Long. 4. 52. N. Lat. 43. 54.

ARANEA, the SPIDER, a genus of inſects belonging to the order of aptera, or inſects without wings. All the ſpecies of ſpiders have eight legs, with three joints in each, and terminating in three crooked claws; eight eyes, two before, two behind, and the reſt on the ſides of the head. The mouth conſiſts of two claws or talons, denticulated like a ſaw. A little below the point of the claw, there is a ſmall hole, through which the ſpider emits a kind of poiſon. Theſe claws are the weapons with which they kill flies, *&c.* for their food. The belly or hinder part is ſeparated from the head and breaſt by a ſmall thread-like tube. The ſkin or outer ſurface is a hard poliſhed cruſt. Spiders have five tubercles or nipples at the extremity of the belly, whoſe apertures they can enlarge or contract at pleaſure. It is through theſe apertures that they ſpin a gluey ſubſtance with which their bellies are full. They fix the end of their threads by applying theſe nipples to any ſubſtance, and the thread lengthens in proportion as the animal recedes from it. They can ſtop the iſſuing of the threads by contracting the nipples, and re-aſcend by means of the claws on their feet, much in the ſame manner as ſome men warp up a rope. When the common houſe-ſpider begins her web, ſhe generally chuſes a place where there is a cavity, ſuch as the corner of a room, that ſhe may have a free paſſage on each ſide, to make her eſcape in caſe of danger. Then ſhe fixes one end of her thread to the wall, and paſſes on to the other ſide, dragging the thread along with her (or rather the thread follows her as ſhe proceeds), till ſhe arrives at the other ſide, and there fixes the other end of it. Thus ſhe paſſes and repaſſes, till ſhe has made as many parallel threads as ſhe thinks neceſſary for her purpoſe. After this, ſhe begins again and croſſes theſe by other parallel threads, which may be named the *woof*. Theſe are the toils or ſnares which ſhe prepares for entangling flies, and other ſmall inſects, which happen to light upon it. But, beſides this large web, ſhe generally weaves a ſmall cell for herſelf, where ſhe lies concealed watching for her prey. Betwixt this cell and the large web ſhe has a bridge of threads, which, by communicating with the threads of the large one, both give her early intelligence when any thing touches the web, and enables her to paſs quickly in order to lay hold of it. There are many other methods of weaving peculiar to different ſpecies of ſpiders. But, as they are all intended for the ſame purpoſe, it is needleſs to give particular deſcriptions of them.

Linnæus enumerates 47 ſpecies of ſpiders: But it will be ſufficient here to mention only the moſt remarkable and uncommon; as,

1. The calycina, with a round pale yellow belly, and two hollow points. It lives in the cups of flowers, after the flower-leaves have fallen off; and catches bees, and other flies, when they are in ſearch of honey.

2. The avicularia, has a convex round breaſt, hollowed tranſverſely in the middle. It is a native of America, and feeds upon ſmall birds, inſects, &c. The bite of this ſpider is as venomous as that of the ſerpent.

3. The ocellata, has three pair of eyes on its thighs. It is about the ſame ſize with the tarantula, of a pale colour, with a black ring round the belly, and two large black ſpots on the ſides of the breaſt. It is a native of China.

4. The ſaccata, has an oval belly of a duſky iron colour. It lives in the ground, and carries a ſack with its eggs where-ever it goes. This ſack it glues to its belly, and will rather die than leave it behind.

5. The aquatica, is of a livid colour, with an oval belly, and a tranſverſe line, and two hollowed points. It frequents the freſh waters of Europe. But it is in ſome ſort amphibious: for it can live on the earth as well as in the water, and comes often to land for its food; yet it ſwims well in water, both on its belly and back: it is diſtinguiſhable by its brightneſs. In the water its belly appears covered with a ſilver varniſh, which is only a bubble of air attached to its belly by means of the oily humours which tranſpire from its body, and prevent the immediate contact of the water. This bubble of air is made the ſubſtance of its dwelling, which it conſtructs under water: for it fixes ſeveral threads of ſilk, or ſuch fine matter, to the ſtalks of plants in the water; and then aſcending to the ſurface, thruſts the hinder part of its body above water, drawing it back again with ſuch rapidity, that it attaches underneath a bubble of air, which it has the art of detaining under water, by placing it underneath the threads above mentioned, and which it binds like a covering almoſt all round the air-bubble. Then it aſcends again for another air-bubble; and thus proceeds until it has conſtructed a large aerial apartment under water, which it enters into or quits at pleaſure. The male conſtructs for himſelf one near to the female; and when love invites, he breaks through the thread walls of the female's dwelling, and the two bubbles attached to the bellies of both unite into one, forming one large nuptial chamber. The female is ſometimes laid for a whole day together ſtretched on her back, waiting for the arrival of the male, without motion, and ſeemingly as if dead. As ſoon as he enters and glides over her, ſhe ſeems to be brought to life again, gets on her legs and runs after the male, who makes his eſcape with all poſſible ſpeed: the female takes care of the young, and conſtructs ſimilar apartments on purpoſe for them. The figure of this ſpider has nothing remarkable, and would be overlooked among a crowd of curioſities, if the ſpectator be unacquainted with its ſingular art of conſtructing an aerial habitation under water, and thus uniting together the properties of both elements.

6. The tarantula, Plate XXV. fig. 10. The breaſt (1) and belly (2) are of an aſh-colour; the legs (3) are likewiſe aſh-coloured, with blackiſh rings on the under part; the fangs, or nippers (4), are red on the inner ſide, the reſt being blackiſh; (5) is the antennæ or feelers: Two of its eyes are larger than the other, red, and placed in the front; four other eyes are placed in a tranſverſe direction towards the mouth; the other two are nearer the back. It is a native of Italy, Cyprus, Barbary, and the Eaſt Indies. The breaſt and belly are about two inches long, terminated by two ſhort tails. This figure was taken from the life, in the iſland of Cyprus, by Alex^{r} Drummond, Eſq; late conſul at Aleppo.

The bite of the tarantula is ſaid to occaſion an inflammation in the part, which in a few hours brings on ſickneſs, difficulty of breathing, and univerſal faintneſs. The perſon afterwards is affected with a delirium, and ſometimes is ſeized with a deep melancholy. The ſame ſymptoms return annually, in ſome caſes, for ſeveral years; and at laſt terminate in death. Muſic, it has been pretended, is the only cure. A muſician is brought, who tries a variety of airs, till at laſt he hits upon one that urges him to dance; the violence of which exerciſe produces a proportionable agitation of the vital ſpirits, attended with a conſequent degree of perſpiration, the certain conſequence of which is a cure. Such are the circumſtances that have been generally related, and long credited, concerning the bite of this animal. Kircherus, in his *Muſurgia*, gives a very particular account of the ſymptoms and cure, illuſtrated by hiſtories of caſes. Among theſe, he mentions a girl, who, being bitten by this inſect, could be cured only by the muſic of a drum. He then proceeds to relate that a certain Spaniard, truſting to the efficacy of muſic in the cure of the frenzy occaſioned by the bite of the tarantula, ſubmitted to be bitten on the hand by two of theſe creatures, of different colours, and poſſeſſed of different qualities. The venom was no ſooner diffuſed about his body, than the ſymptoms of the diſorder began to appear; upon which harpers, pipers, and other muſicians, were ſent for, who by various kinds of muſic endeavoured to rouſe him from that ſtupor into which he was fallen: but here it was obſerved that the bites of the two inſects had produced contrary effects; for by one he was incited to dance, and by the other he was reſtrained therefrom; and in this conflict of nature the patient expired. The ſame account is given in his *Phonurgia Nova*, with the addition of a cut repreſenting the inſect in two poſitions, the patient in the action of dancing, together with the muſical notes of the tune or air by which in one inſtance the cure was effected.

In his *Muſurgia*, this author, attempting mechanically to account for the cure of the bite of the tarantula by muſic, ſays of the poiſon, That it is ſharp, gnawing, and bilious; and that it is received and incorporated into the medullary ſubſtance of the fibres. With reſpect to the muſic, he ſays, That the ſounds of chords have a power to rarify the air to a certain harmonical pitch; and that the air thus rarified, penetrating the pores of the patient's body, affects the muſcles, arteries, and minute fibres, and incites him to dance, which exerciſe begets a perſpiration, in which the poiſon evaporates.

Unſatiſfactory as this theory appears, the belief of this ſtrange phenomenon has prevailed among the ableſt of modern phyſicians. Sir Thomas Brown, ſo far from diſputing it, ſays, That ſince many atteſt the fact from experience, and that the learned Kircherus hath poſitively averred it, and ſet down the ſongs and tunes ſolemnly uſed for the cure of the diſeaſe, and ſince ſome alſo affirm that the tarantula itſelf will dance at the ſound of muſic, he ſhall not at all queſtion it *.

Farther, that eminent Italian phyſician of the laſt century, Baglivi, a native of Apulia, the country where the tarantula is produced, has written a diſſertation *De anatomia, morſu, et effectibus tarantulæ*. In this he deſcribes the region of Apulia where the tarantula is produced, with the anatomy and figure of the inſect and its eggs, illuſtrated by an engraving; he mentions particularly the ſymptoms that follow from the bite, and the cure of the diſeaſe by muſic, with a variety of hiſtories of cures thus wrought, many of them communicated by perſons who were eye-witneſſes of the proceſs.

Ludovicus Valetta, a Celeſtine monk of Apulia, publiſhed at Naples, in the year 1706, a treatiſe upon this ſpider, in which he not only anſwers the objections of thoſe who deny the whole thing, but gives, from his own knowledge, ſeveral inſtances of perſons who had ſuffered this way, ſome of whom were of great families, and ſo far from being diſſemblers, that they would at any rate, to avoid ſhame, have concealed the misfortune which had befallen them.

The honourable Mr Robert Boyle, in his treatiſe of Languid and Unheeded Motions, ſpeaking of the bite of the tarantula, and the cure of the diſeaſe which follows it by means of muſic, ſays, That, having himſelf had ſome doubts about the matter, he was, after ſtrict inquiry, convinced that the relations in the main were true.

Laſtly, Dr Mead, in his Mechanical Account of Poiſons, has given an eſſay on the tarantula, containing the ſubſtance of the above relations, which he endeavours to confirm by his own reaſoning thereon.

Notwithſtanding the number and weight of theſe authorities, and the general acquieſcence of learned and ingenious men in the opinion that the bite of the tarantula is poiſonous, and that the cure of the diſorder occaſioned by it is effected by muſic, we have reaſon to apprehend that the whole is a miſtake.

In the Philoſophical Tranſactions for the year 1672, p. 406. is an extract of a letter from Dr Thomas Cornelio, a Neapolitan phyſician, to John Doddington, Eſq; his majeſty's reſident at Venice, communicated by the latter, in which, ſpeaking of his intention to ſend to Mr Doddington ſome tarantulas, he ſays, "Mean while I ſhall not omit to impart to you what was related to me a few days ſince by a judicious and unprejudicate perſon; which is, that being in the country of Otranto, where thoſe inſects are in great numbers, there was a man who, thinking himſelf ſtung by a tarantula, ſhewed in his neck a ſmall ſpeck, about which in a very ſhort time there aroſe ſome pimples full of a ſerous humour; and that, in a few hours after, the poor man was ſorely afflicted with very violent ſymptoms, as ſyncopes, very great agitations, giddineſs of the head, and vomiting; but that, without any inclination at all to dance, and without all deſire of having any muſical inſtruments, he miſerably died within two days. The ſame perſon affirmed to me, that all thoſe that think themſelves bitten by tarantulas, except ſuch as for evil ends feign themſelves to be ſo, are for the moſt part young wanton girls, whom the Italian writers call *Dolce di Sale*; who, by ſome particular indiſpoſition falling into this melancholy madneſs, perſuade themſelves, according to the vulgar prejudice, to have been ſtung by a tarantula."

Dr Serao, an Italian phyſician, as it ſeems, has written an ingenious book, in which he has effectually exploded this opinion as a popular error; and in the Philoſophical Tranſactions, N° LX. for the year 1770, p. 236. is a letter from Dominico Cirillo, M. D. profeſſor of natural hiſtory in the univerſity of Naples, wherein, taking notice of Serao's book, he ſays, That, having had an opportunity of examining the effects of this animal in the province of Taranto, where it is found in great abundance, he finds that the ſurpriſing cure of the bite of the tarantula by muſic has not the leaſt truth in it; and that it is only an invention of the people, who want to get a little money by dancing when they ſay the tarantiſm begins. He adds, "I make no doubt but ſometimes the heat of the climate contributes very much to warm their imaginations, and throw them into a delirium, which may be in ſome meaſure cured by muſic; but ſeveral experiments have been tried with the tatantula, and neither men nor animals after the bite have had any other complaint than a very trifling inflammation upon the part, like that produced by the bite of a ſcorpion, which goes off by itſelf without any danger at all. In Sicily, where the ſummer is ſtill warmer than in any part of the kingdon of Naples, the tarantula is never dangerous; and muſic is never employed for the cure of the pretended tarantiſm."

ARANJUEZ, a palace of the king of Spain, in the province of New Caſtile, ſeated on the river Tagus, in W. Long. 3. 3. N. Lat. 41. 40. This edifice tho' much inferior to the eſcurial in ſize and elegance of ſtructure, greatly exceeds it in the many delicious gardens, and ſurpriſing water-works, which are here in the higheſt perfection. The gardens, being in an iſland in the middle of the Tagus, are ſo well ſupplied with water by the immenſe quantity and variety of theſe water-works, which are ſet in motion with the ſtream, that they are never ſcorched with the ſun's heat, but enjoy a conſtant bloom and delicious verdure.

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* *Inquiries into Vulgar Errors, book III. chap.* 28.

ARAR, (Cæſar, Strabo); *Araris*, (Dio Caſſius); *Saucona*, (Ammian); a river of Celtic Gaul, now the *Saone*; which riſes out of mount Vogeſus on the confines of Lorrain, runs through the Franche Comte and Burgundy, and below Lyons falls into the Rhone. It is ſo incredibly ſlow, that the eye cannot diſtinguiſh which way it moves, (Cæſar); and therefore Pliny calls it the *Sluggiſh river*. Its courſe is from north to ſouth. It is famous for a bridge of Cæſar, which was built by the ſoldiers in one day. It is navigable equally with the Rhone.

ARARAT, the name of the mountain on which Noah's ark reſted, after the abatement of the waters of the univerſal deluge. Concerning this mountain there are various conjectures; though it is almoſt univerſally allowed to be in Armenia Major. Some are of opinion that it is one of the mountains which divide Armenia on the ſouth from Meſopotamia and that part of Aſſyria inhabited by the *Curds*; from whom theſe mountains took the name of *Curdu* or *Cardu*, by the Greeks turned into *Gordyæi*, &c. Others, that it lies towards the middle of Armenia, near the river Araxes, above 280 miles diſtant from the abovementioned mountains, making it belong to mount Taurus; but the Armenians are poſitive that Noah's Ararat is no other than a mountain to which they now give the name of *Maſis*, which lies about 12 leagues to the eaſt of Erivan, and four leagues from the Aras. It is encompaſſed by ſeveral petty hills: on the tops of them are found many ruins, thought to have been the buildings of the firſt men, who were, for ſome time, afraid to deſcend into the plains. It ſtands by itſelf, in form of a ſugar-loaf, in the midſt of a very large plain, detached, as it were, from the other mountains of Armenia, which make a long chain. It conſiſts, properly ſpeaking, of two hills; the leſſer of which is the more ſharp and pointed: the higher, on which it is ſaid the ark reſted, lies to the north-weſt of it, and riſes far above the neighbouring mountains. It ſeems ſo high and big, that, when the air is clear, it may be ſeen four or five days journey off; yet travellers think the height is not extraordinary. Chardin is of opinion that he paſſed a part of mount Caucaſus which is higher; and Poullet thinks the height of mount Maſis, or Ararat, not above twice as great as that of mount Valerian near Paris. They therefore think that its being viſible at ſuch a great diſtance is owing to its lonely ſituation in a vaſt plain, and upon the moſt elevated part of the country, without any mountains before it to obſtruct the view. Nor is the ſnow with which it is always covered from the middle upwards any argument of its height; for, in this country, ice hath often been obſerved in the mornings of the middle of July *. Certain it is, however, that this mountain hath never yet been aſcended; which the Armenians pretend was owing to the interpoſition of angels, in order to diſappoint the curioſity of thoſe who wanted to advance to ſuch a ſacred place as that whereon the ark reſted: but the exceſs of cold may very reaſonably be ſuppoſed able to fruſtrate all ſuch attempts, without any ſupernatural interpoſition. The moſt diſtinct account we have of this mountain is that given by Mr Tournefort; which, however, being much ſwelled with immaterial circumſtances, it is needleſs to trouble our readers with at length. He tells us, that this mountain is one of the moſt diſagreeable ſights upon earth, without either houſes, convents, trees, or ſhrubs; and ſeems as if continually waſting and mouldering away. He divides it into three regions: The lowermoſt, he ſays, is the only one which contains any human creatures, and is occupied by a few miſerable ſhepherds that tend ſcabby flocks; and here are alſo found ſome patridges: the ſecond is inhabited by crows and tigers; and all the reſt is covered with ſnow, which half the year is involved in thick clouds. On the ſide of the mountain that looks towards Erivan, is a prodigious precipice, from whence rocks of an immenſe ſize are continually tumbling down with a hideous noiſe. This precipice ſeems quite perpendicular; and the extremities are rough and blackiſh, as if ſmutted with ſmoke. The ſoil of the mountain is looſe, and on the ſandy parts it is impoſſible to take a firm ſtep; ſo that our traveller encountered great difficulties in his aſcent and deſcent of this mountain; being often obliged, in order to avoid the ſand, to betake himſelf to places where great rocks were heaped on one another, under which he paſſed as through caverns, or to places full of ſtones, where he was forced to leap from one ſtone to another. If we may believe Struys, a Dutch writer, however, all theſe difficulties may be ſurmounted. He aſſures us, he went five days journey up mount Ararat, to ſee a Romiſh hermit: that he paſſed through three regions of clouds; the firſt dark and thick, the next cold and full of ſnow, and the third colder ſtill: that he advanced five miles every day; and when he came to the place where the hermit had his cell, he breathed a very ſerene and temperate air: that the hermit told him, he had perceived neither wind nor rain all the 25 years he had dwelt there; and that on the top of the mountain there ſtill reigned a greater tranquillity, whereby the ark was preſerved uncorrupted. He farther pretends, that the hermit gave him a croſs made out of the wood of the ark, together with a certificate, a formal copy of which the author has given in his ſham relation.

* Arme-

ARASSI, a maritime, populous, and trading town of Italy, in the territory of Genoa. E. Long. 7. 20. N. Lat. 44. 3.

ARATUS, general of the Achæans, conquered Niocles tyrant of Sicyon. Two years after, he ſurpriſed the caſtle called *Acrocorinthus*, and drove out the king of Macedonia: he delivered Argos from its tyrants, and was poiſoned by Philip II. king of Macedonia, whom he had newly reſtored: he was about 62 when he died, the ſecond year of the 141st Olymp. He was interred at Sicyon, and received the greateſt honours from his countrymen. His ſon, who had alſo been prætor, was poiſoned by king Philip. Polybius gives us ſo great a character of Aratus the father's Commentaries or Hiſtory, that the loſs of ſo valuable a work is highly to be regretted.

ARATUS, a Greek poet, born at Soli, or Solæ, a town in Cilicia, which afterwards changed its name, and was called *Pompeiopolis*, in honour of Pompey the Great. He flouriſhed about the 124th, or, according to ſome, the 126th Olympiad, in the reign of Ptolemy Philadelphus king of Egypt. He diſcovered in his youth a remarkable poignancy of wit, and capacity for improvement; and having received his education under Dionyſius Heracleotes, a Stoic philoſopher, he eſpouſed the principles of that ſect. Aratus was phyſician to Antigonus Gonatus, the ſon of Demetrius Poliorcetes, king of Macedon: this prince, being a great encourager of learned men, ſent for him to court, admitted him to his intimacy, and encouraged him in his ſtudies. The *Phænomena* of Aratus, which is ſtill extant, gives him a title to the character of an aſtronomer, as well as a poet; in this piece he deſcribes the nature and motion of the ſtars, and ſhews the particular influences of the heavenly bodies, with their various diſpoſitions and relations. He wrote this poem in Greek verſe: it was tranſlated into Latin by Cicero; who tells us, in his firſt book *De oratore*, that the verſes of Aratus are very noble. This piece was tranſlated by others as well as Cicero; there being a tranſlation by Germanicus Cæſar, and another into elegant verſe by Feſtus Avienus. An edition of the *Phænomena* was publiſhed by Grotius, at Leyden, in quarto, 1600, in Greek and Latin, with the fragments of Cicero's verſion, and the tranſlations of Germanicus and Avienus, all which the editor has illuſtrated with curious notes. He was certainly much eſteemed by the ancients, ſince we find ſo great a number of ſcholiaſts and commentators upon him. There are ſeveral other works alſo aſcribed to Aratus. Suidas mentions the following: Hymns to Pan; Aſtrology and Aſtrotheſy; a compoſition of Antidotes; an Επιθυτικον on Theopropus; an Ηθοποια on Antigonus; an Epigram on Phila, the daughter of Antipater, and wife of Antigonus; an Epicedium of Cleombrotus; a Correction of the Odyſſey; and ſome Epiſtles, in proſe. Virgil, in his Georgics, has imitated or tranſlated many paſſages from this author; and St Paul has quoted a paſſage of Aratus. It is in his ſpeech to the Athenians (Acts xvii. 28.) wherein he tells them, that ſome of their own poets have ſaid, "Του γαρ και γενος εσμεν: For we are alſo his offspring." Theſe words are the beginning of the fifth line of the *Phænomena* of Aratus.

ARAVA, a fortreſs of Upper Hungary, in a county and on a river of the ſame name. E. Long. 20. 0. N. Lat. 49. 20.

ARAUCO, a fortreſs and town of Chili, in South America; ſituated in a fine valley, on a river of the ſame name. The natives are ſo brave, that they drove the Spaniards out of their country, though they had no fire-arms. W. Long. 51. 20. S. Lat. 42. 30.

ARAUSIO, or *Civitas Arauſienſis*, or *Arauſicorum*, (Notitiæ); *Colonia Secundanorum*, (Mela, Pliny, Coins), ſo called becauſe the veterans of the ſecond legion were there ſettled: The capital of the Cavares, in Gallia Narbonenſis; now *Orange*, in the weſt of Provence, on an arm of the rivulet Egue, which ſoon after falls into the Rhone, from which it is diſtant a league to the eaſt, at the foot of a mountain. Here is an ancient amphitheatre to be ſtill ſeen. E. Long. 4. 46. Lat. 44. 10.

ARAW, a town of Swiſſerland, in Argow, ſeated on the river Aar. It is handſome, large, and remarkable for its church, its fountain, and the fertility of the ſoil. E. Long. 18. 0. N. Lat. 47. 25.

ARAXES, now the ARAS, a river of Armenia Major, which takes its riſe in a mountain called *Albos*, where the Euphrates alſo hath its origin. From this mountain it runs eaſtward with a ſerpentine courſe, diſcharging itſelf into the Caſpian ſea, after a run of upwards of 500 miles, during which it receives ſome conſiderable rivers. Some have imagined that it hath its riſe in mount Ararat; but Tournefort aſſures us that it comes no nearer that mountain than 12 miles. The Araxes is a very rapid river, and is ſuppoſed to be the Gihon mentioned by Moſes. Beſides this extreme rapidity, it is very apt to overflow after rains; ſo that they have in vain endeavoured to build bridges over it; tho' ſome of them appear, from the few arches remaining, to have been built of the beſt materials, and in the ſtrongeſt manner. Such is the vehemence of its current after the thawing of the adjacent ſnows, or ſome fierce rains, that neither banks nor dykes can reſiſt it; ſo that nothing can be more terrible than the noiſe and violence of its waves at ſuch times: but in winter, when its waters are low, it is fordable in ſome places on camels.

ARBACES governed Media under Sardanapalus. Seeing him ſpinning among a company of his women, he ſtirred up his people to revolt, and dethroned Sardanapalus; who thereupon burnt himſelf in his palace. Arbaces being crowned, began the monarchy of the Medes, which laſted 317 years under nine kings, till Aſtyages was expelled by Cyrus. Arbaces reigned 22 years, and died A. M. 3206.

ARBELA, now IRBIL, a city of Aſſyria, lying in E. Long. 44. 5. N. Lat. 35. 15. It is famous for the laſt and deciſive battle fought in its neighbourhood between Alexander the Great and Darius Codomannus. This battle was fought 331 years before Chriſt, and the event of it determined the fate of the Perſian empire. Arrian relates, that Darius's army conſiſted of a million of foot, and 40,000 horſe; according to Diodorus, there were 200,000 horſe, and 800,000 foot; Plutarch relates, that the horſe and foot together made up a million; and Juſtin gives us exactly half Diodorus's number. The Macedonian army, according to Arrian, conſiſted of 40,000 foot, and 7000 horſe. To prevent the endeavours of Darius to ſurround them, Alexander cauſed his front to be extended as wide as poſſible without weakening the centre. Darius's front was covered with 200 chariots armed with ſcythes, whoſe appearance was very terrible, and threatened deſtruction to the whole army; but Alexander's light-armed troops killed many of the horſes and drivers, ſo that few reached the Macedonian line, which opening as Alexander had directed, they only paſſed thro', and were then either taken or diſabled by his bodies of reſerve. Some ancient writers deſcribe this battle very particularly: but as the Macedonians loſt only 300 men, while the Perſians had 30,000 killed, according to Arrian; 40,000, according to Curtius; and 90,000, according to Diodorus; it is impoſſible the Perſians could have made any great reſiſtance. Indeed, as the compilers of the Univerſal Hiſtory obſerve, "had the 7 or 800,000 men which Darius brought into the field thrown each one dart, or one ſtone, the Macedonians could never have bought the empire of the eaſt at ſo eaſy a rate." Darius, on ſeeing his numerous army ſo ſhamefully put to flight, was ſome time in ſuſpence whether or not he ſhould put an end to his life; but, being perſuaded by his friends, or probably hurried away by the multitude who fled, he was obliged to fly with the reſt; and arrived at Arbela the ſame night. After he had paſſed the river Lycus, he was adviſed to break down the bridge, in order to ſtop Alexander's purſuit: but, conſidering how many of his own ſubjects had yet to paſs, he could not be prevailed upon to do ſo; anſwering, that he had rather leave an open way to a purſuing enemy, than ſhut it to a flying friend. This battle is likewiſe called the battle of *Gaugamela*, a village nearer the ſcene of action; but as Arbela is the place of greateſt conſequence, its name is moſt uſually retained.

ARBERG, a town of Swiſſerland, in the canton of Bern, with a handſome caſtle, where the bailiff reſides. It is ſeated on the river Aar, in a kind of iſland. E. Long. 17. 15. N. Lat. 47. 0.

ARBITER, in the civil law, implies a judge nominated by the magiſtrate, or choſen voluntarily by the two contending parties, in order to decide their differences.

The civilians make a difference between *arbiter* and *arbitrator*, though both found their power on the compromiſe of the parties; the former being obliged to judge according to the cuſtoms of the law, whereas the latter is at liberty to uſe his own diſcretion, and accommodate the difference in the manner that appears to him moſt juſt and equitable.

ARBITRARY, that which is left to the choice or arbitration of men, or not fixed by any poſitive law or injunction.

ARBITRARY *Puniſhment*, in law, denotes ſuch puniſhments as are by ſtatute left to the diſcretion of the judge. It is a general rule in arbitrary puniſhments, that the judge cannot inflict death. Hence all puniſhments that are not capital have acquired the name of *arbitrary puniſhments*, even although they be expreſsly pointed out by ſtatute.

ARBITRATION is where the parties, injuring and injured, ſubmit all matters in diſpute, concerning any perſonal chattels or perſonal wrong, to the judgment of two or more arbiters or arbitrators; who are to decide the controverſy: and if they do not agree, it is uſual to add, that another perſon be called in as umpire, *(imperator* or *impar)*, to whoſe ſole judgment it is then referred; or frequently there is only one arbitrator originally appointed. This deciſion, in any of theſe caſes, is called an *award*. And thereby the queſtion is as fully determined, and the right transferred or ſettled, as it could have been by the agreement of the parties or the judgment of a court of juſtice. See alſo LAW, Part III. N° clxxxv. 15, &c.

ARBITRATOR, a private extraordinary judge, choſen by the mutual conſent of parties, to determine controverſies between them. See ARBITER and ARBITRATION.

ARBOIS, a ſmall populous town of France, in the Franche Compte, famous for its wines. E. Long. 5. 40. N. Lat. 46. 55.

ARBON, an ancient town in Swiſſerland, on the ſouth banks of the lake Conſtance, in Thurgaw. It has a caſtle built by the Romans, and is under the juriſdiction of the biſhop of Conſtance. In the time of war, the Swiſs have a right to put in a garriſon. The Popiſh and Proteſtant religions are equally tolerated in this town. E. Long. 9. 30. N. Lat. 4. 38.

ARBOR, in botany, a tree. Trees are by Linnæus claſſed in the ſeventh family of the vegetable kingdom, and are diſtinguiſhed from ſhrubs in that their ſtems come up with buds on them; but this diſtinction holds not univerſally, there being rarely any buds on the large trees in India.

ARBOR, in mechanics, the principal part of a machine, which ſerves to ſuſtain the reſt; alſo the axis or ſpindle on which a machine turns, as the *arbor* of a crane, windmill, &c.

ARBOR *Dianæ*. See CHEMISTRY, n° 198.

ARBORESCENT, an epithet applied to ſuch objects as reſemble trees.

ARBORESCENT *Star-fiſh*, in zoology, a ſpecies of aſterias. See ASTERIAS.

ARBORIST, a perſon ſkilled in that part of botany which treats of trees.

ARBOUR, in gardening, a kind of ſhady bower, formerly in great eſteem; but of late rejected, on account of its being damp and unwholſome.

Arbours are generally made of lattice-work, either of wood or iron; and covered with elms, limes, hornbeams; or with creepers, as honey-ſuckles, jaſmines, or paſſion-flowers; either of which will anſwer the purpoſe very well, if rightly managed.

ARBROATH. See ABERBROTHIC.

ARBURG, a town of Swiſſerland, in the canton of Bern, on the river Aar. It is ſmall, but very ſtrong, being ſeated on a rock, and defended by a good fortreſs cut out of the rock. E. Long. 17. 55. N. Lat. 47. 10.

ARBUTHNOT (Alexander), principal of the univerſity of Aberdeen in the reign of James VI. of Scotland, was born in the year 1538. He ſtudied firſt at Aberdeen; and was afterwards ſent over to France, where, under the famous Cujacius, he applied himſelf to the ſtudy of the civil law. In the year 1563, he returned to Scotland, and took orders. Whether he was ordained by a biſhop, or by preſbyters, is a matter of uncertainty. In 1568, he was appointed miniſter of Arbuthnot and Logy-Buchan; and in the following year, Mr Alexander Anderſon being deprived, our author was made principal of the king's college at Aberdeen, in his room. In the general aſſembly which met at Edinburgh in the years 1573 and 1577, he was choſen moderator; and to the end of his life was an active ſupporter of the reformed religion. He died in 1583, in the 45th year of his age; and was buried in the college church of Aberdeen. We are told in the Biographia, that he was eminent as a poet, a philoſopher, a mathematician, a lawyer, a divine, and a phyſician. He wrote, *Orationes de origine & dignitate juris*, printed Edinb. 1572, 4to. His cotemporary, Thomas Maitland, wrote a copy of Latin verſes on the publication of this book: they are printed in the *Delic. Poetar. Scot.* He publiſhed Buchanan's hiſtory of Scotland in the year 1582.

ARBUTHNOT (Dr John), was born in Kincardinſhire, near Montroſe, and was educated at Aberdeen, where he received his degree in phyſic. The difficulties in which his family was involved on account of their political principles making it neceſſary that he ſhould court preferment in another country than his own, he went to London. The firſt character in which he acted there was, a teacher of the mathematics; and while he was employed in this manner, he had occaſion to publiſh his *Examination of Dr Woodward's account of the deluge*. This tract, which abounded with learning and good ſenſe, ſerved to make him known. He publiſhed, ſoon after, his *Eſſay on the uſefulneſs of mathematics*. In the profeſſion of phyſic, he advanced by ſlow but ſure degrees; and his reputation in it was at length fully eſtabliſhed, by a ſucceſsful cure which he performed on Prince George of Denmark. Queen Anne, in conſequence of it, appointed him one of her phyſicians in ordinary in 1709; and, ſome years before this, his extenſive knowledge had procured his admiſſion into the Royal Society. His talents and worth were the ſtrongeſt recommendations of him to the men of wit and learning of his day; and he entered into particular connection with Pope and Swift, with whom he joined in publiſhing ſeveral volumes of miſcellanies; among which are the well known *Memoirs of Martinus Scriblerus*, a ſatire of infinite humour on the abuſes of human learning. In 1715, he aſſiſted Pope and Gay in the *Three hours after marriage;* a dramatic performance, which was brought upon the ſtage without ſucceſs. In 1727, he publiſhed *Tables of ancient coins, weights, and meaſures;* a work of great uſe, and real erudition. In 1732, his valuable tract concerning *The nature and choice of aliments* appeared; which, the year after, was followed by his remarks on *The effects of air on human bodies*. A conſtitutional aſthma had diſtreſſed him at different periods of his life, and proved fatal to him in 1734.—Dr Arbuthnot appears to have been in all reſpects a moſt accompliſhed and amiable perſon. He has ſhewed himſelf equal to any of his cotemporaries in wit and learning, and he was ſuperior to moſt men in the moral duties of life, in acts of humanity and benevolence. His letter to Mr Pope, written as it were upon his death-bed, and which no one can read without the tendereſt emotion, diſcovers ſuch a noble fortitude of mind at the approach of his diſſolution, as could be inſpired only by a clear conſcience, and the calm retroſpect of an uninterrupted courſe of virtue. In 1751, came out, in two vol. 8vo. printed at Glaſgow, *The miſcellaneous works of the late Dr Arbuthnot;* which are ſaid to comprehend, with what is inſerted in Swift's miſcellanies, all the pieces of wit and humour of this admirable author.

ARBUTUS, the STRAWBERRY-TREE; a genus of the monogynia order, belonging to the decandria claſs of plants.

Species. There are ſix ſpecies of arbutus enumerated by botanical writers; of which the following are the moſt remarkable. 1. The unedo, or common ſtrawberry-tree. It is a native of Italy, Spain, and alſo of Ireland; and is now very common in the Britiſh gardens. This hath the ſingular property that its fruit doth not come to perfection till a year after it has flowered; and thus the fruit and flowers are mixed together on the ſame tree. Theſe trees flower and bear their fruit in the months of October and November; by which means they are great ornaments, the ſeaſon of moſt other flowers being then paſt. Of this ſpecies there are ſeveral varieties; particularly one with red flowers, which are very beautiful, and may be preſerved by inarching or ingrafting them on the common arbutus. Theſe turn purple before they fall off. There is alſo a variety with double flowers; but as theſe have only two rows of leaves, and bear little fruit, the former are preferable. 2. The adrachne, or oriental ſtrawberry-tree, grows naturally in the eaſt, particularly about Magneſia, where it is found in ſuch plenty as to be commonly uſed for fuel. The leaves are large and oval, ſerrated while young, but entire after they are two or three years old. The flowers are ſhaped like thoſe of the common ſort, but grow thinly on the branches. The fruit is oval, and of the ſame colour and conſiſtence with that of the common ſort; but the ſeeds of the adrachne are flat, whereas thoſe of the former ſpecies are pointed and angular. The largeneſs of the leaf of the adrachne gives it a fine appearance, and renders this ſpecies well worthy of cultivation.

Culture. The common arbutus is propagated from ſeeds; to preſerve which it is neceſſary to bury the fruit, as ſoon as it is perfectly ripe, in dry ſand. They are to be ſown about the middle or latter end of March in pots, which ought to be plunged into a moderate hot-bed; and, if properly managed, the young plants will be eight or ten inches high before winter. In ſummer, they will be greatly forwarded by being plunged into an old tan-bed. In the beginning of October, they are to be ſhaken out of the pots, and the roots carefully ſeparated. They are then to be planted ſingly in ſmall pots filled with light earth, which ſhould remain during the winter under a common frame, in an old tan-bed. The ſpring following, they may be plunged into the ground in a ſheltered ſituation, obſerving to water them frequently in dry weather; but it will be adviſeable to ſcreen them from froſt the following winter, by covering them with mats. This ſpecies thrives beſt in a wet ſoil, and is ſeldom hurt by hard winters, though the young and tender branches are often deſtroyed by froſt; but, however dead the trees may appear, they ought always to be ſuffered to remain till the following ſummer ſhews what are living and what are dead.—The adrachne muſt be preſerved in pots for three or four years, till they have obtained ſtrength; and may be then planted in a warm ſituation, and on a dry ſoil; for this ſpecies will not thrive on wet ground.

ARCADI, or ARCADIANS; the name of a learned ſociety at Rome. See ACADEMY, N° IX. par. 4. *et ſeq.*

ARCADIA, an inland diſtrict in the heart of Peloponneſus, (Strabo). It is mountainous, and fitter for paſture than corn; and therefore chiefly celebrated by bucolic or paſtoral poets, who feign Pan, the god of ſhepherds, to be the guardian of it, (Virgil). It has to the north Achaia, to the eaſt Argos and Laconia, Meſſenia to the ſouth, and Elis to the weſt. According to Pliny, the wine of this country cured barrenneſs in women, and inſpired the men with rage; and the berries of the yew gathered there were ſo ſtrong a poiſon, that whoever ſlept or took refreſhment under that tree were ſure to die. In Strabo's time there were few cities remaining in it, moſt of them being deſtroyed in the Grecian wars. Euſtathius ſays, that the country was anciently called *Pelaſgia*, from Pelaſgos, who brought the people, from roots, herbs, and leaves of trees, to feed on acorns, eſpecially beech-maſt; as Artemidorus obſerves, that the Arcadians uſually lived on acorns. It was alſo called *Lycaonia*, *Gigantis*, and *Parrhaſia*, (Stephanus).

(Stephanus). The Arcadians are greatly commended for their love of, and ſkill in, muſic, (Virgil, Polybius). To imitate the Arcadians, is to labour and toil for the benefit of others, never conquering their own, but the enemies of others, (Heſychius). This probably took its riſe from the ancient Arcadians being accuſtomed to hire themſelves out as mercenaries to foreign nations. Homer commends their martial proweſs, their paſtures, their ſheep, and their country well-watered. The gentilitious name is *Arcades;* who boaſted of their great antiquity, and that they were older than the ſun and moon: (Apollonius Rhodius, Nonnius, Plutarch, Ovid, Statius). They were the firſt who had a year of three months, and therefore called *Proceleni*, becauſe their year was prior to that adjuſted in Greece to the courſe of the moon, (Cenſorinus).

ARCANGIS, in the Turkiſh armies, an inferior kind of infantry, which ſerve as *enfans perdus*, and to harraſs and pillage the enemy's frontiers. The Arcangis are an order inferior to the Janiſaries; and, when any of them diſtinguiſh themſelves, are uſually preferred into the Janiſaries order. They have no pay, but are to ſubſiſt on their plunder.

ARCANUM, among phyſicians, any remedy, the preparation of which is induſtriouſly concealed, in order to enhance its value.

ARCBOUTANT, in building, an arched buttreſs. See BUTTRESS.

ARCESILAUS, a celebrated Greek philoſopher, about 300 years before the Chriſtian æra, was born at Pitane, in Eolis. He founded the ſecond academy, which is called the *ſecond ſchool*. He was a man of great erudition, and well verſed in the writings of the ancients. He was remarkable for the ſeverity of his criticiſms; but nevertheleſs he knew how to accommodate himſelf to the age, and purſue the allurements of pleaſure. He had a great number of diſciples. His doctrines were different in ſeveral reſpects from thoſe of the ancient ſchool: and perhaps he was led into this diverſity of opinions by many capital errors in the ancient ſchool, ſuch as the incredible arrogance of the dogmatiſts, who pretended to aſſign cauſes for all things; the myſterious air they had thrown upon the doctrine of ideas; the entirely diſcarding the teſtimony of the ſenſes; the objections of the Pyrrhoniſts, who now began to broach their opinions; the powerful oppoſition of the Stoics and Peripatetics, who diſcovered the feeble parts of the academic philoſophy. Theſe might have given cauſe to reform the ancient ſchool, and to found a new one. The middle ſchool, therefore, laid it down as a principle, that we could know nothing, nor even aſſure ourſelves of the certainty of this poſition; from whence they inferred, that we ſhould affirm nothing, but always ſuſpend our judgment. They advanced, that a philoſopher was able to diſpute upon every ſubject, and bring conviction with him, even upon contrary ſides of the ſame queſtion; for there are always reaſons of equal force both in the affirmative and negative of every argument. According to this doctrine, neither our ſenſes, nor even our reaſon, are to have any credit; and therefore, in common affairs, we are to conform ourſelves to received opinions. Arceſilaus was ſucceeded by his diſciple Lacydes.

ARCH, in geometry, any part of the circumference of a circle or curved line, lying from one point to another, by which the quantity of the whole circle or line, or ſome other thing ſought after, may be gathered.

ARCH, a concave or hollowed piece of building, conſtructed in ſuch a manner that the ſeveral ſtones of which it is compoſed keep one another in their places. The terms *arch* and *vault* properly differ only in this, that the arch expreſſes a narrower, and the vault a broader piece of the ſame kind. The principal difference in the form of arches is, that ſome are circular, and others elliptical; the former having a larger or ſmaller part of a circle, the other of an ellipſis. What are called *ſtrait arches*, are thoſe frequently uſed over doors and windows, the upper and under edges of which are ſtrait and parallel, and the ends and joints all pointing toward a centre. The ſpace between two piers of a bridge is called an *arch*, becauſe uſually arched over.

Triumphal ARCHES are magnificent entries into cities, erected to adorn a triumph, and perpetuate the memory of the action. The arches of Titus and Conſtantine make at this time a great figure among the ruins of old Rome.

ARCH, in compoſition, ſignifies *chief*, or of the *firſt* claſs; as archangel, archbiſhop, &c.

ARCHÆUS, or ARCHEUS. See ARCHEUS.

ARCHANGEL, an angel occupying the eighth rank in the celeſtial hierarchy *.

ARCHANGEL, a city of Ruſſia, in the province of Dwina, ſituated on the eaſt ſide of the river Dwina, about ſix miles from the White Sea, in E. Long. 40. 21. N. Lat. 64. 30. The city extends about two miles in length, is rich, populous, and built in the modern taſte: it is a metropolitan ſee. Archangel owed its wealth and importance originally to the Engliſh, by whom it was diſcovered in the year 1553. Richard Chancellor, maſter of one of the ſhips fitted out under the command of Sir Hugh Willoughby, who had received a commiſſion to go in queſt of the north-eaſt paſſage to China, was ſeparated from the reſt of the fleet, and obliged by ſtreſs of weather to put into the bay of St Nicholas on the White Sea. The Czar Iwan Baſilowitz, being informed of his arrival, invited him to his court, where he was hoſpitably entertained; and the Czar indulged the Engliſh with a free trade in his dominions: in conſequence of this permiſſion, a company of merchants was incorporated in London; and, being encouraged by particular privileges from the Czar, ſet on foot a conſiderable commerce, to the mutual advantage of both nations. Before this period, the Ruſſian commodities were uſually conveyed to Narva, in the gulph of Finland: but the channel of trade was ſoon turned to Archangel, and this traffic the Engliſh for ſome time enjoyed without competition. The Dutch, however, and other nations, gradually inſinuated themſelves into this commerce; which they carried on to a very great diſadvantage, as not being favoured with thoſe privileges which the Czar had granted to the Engliſh company: theſe were at laſt unhappily loſt, in the time of the great rebellion. When the Czar heard that the Engliſh nation had brought their ſovereign to the ſcaffold, he was ſo exaſperated againſt them, that he forthwith deprived them of the immunities in trade which they had hitherto enjoyed in the dominions of Ruſſia; nor could our company with all its efforts retrieve them in the ſequel; ſo that our merchants were obliged to trade at Archangel on

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* See *Angel* and *Hierarchy*.

the footing of other European nations.

The commodities chiefly imported into Archangel, were gold and ſilver ſtuffs and laces, gold wire, cochineal, indigo, and other drugs for dying; wine, brandy, and other diſtilled ſpirits. The cuſtoms ariſing to the Czar were computed at 200,000 rubles a-year, and the number of foreign ſhips at 400 annually: but ſince the ports of Peterſburg and Riga were opened, great part of the trade has been removed to the Baltic, and the commerce of Archangel is greatly decayed.

The houſes of Archangel are generally of wood, but well contrived; and every chamber is provided with a ſtove, as a fence againſt the cold, which is here exceſſive in the winter. The ſtreets are paved with broken pieces of timber and rubbiſh, diſpoſed ſo unſkilfully, that one cannot walk over it without running the riſque of falling, except when the ſtreets are rendered ſmooth and equal by the ſnow that falls and freezes in the winter. Notwithſtanding the ſeverity of the cold in this place, there is always plenty of good proviſions: butcher's meat, poultry, wild fowl, and fiſh, in great variety, are ſold ſurpriſingly cheap. A brace of partridges may be bought for 4 d. Theſe birds, as well as the hares of this country, grow white in the winter; and when the weather becomes more mild, reſume their natural colour.

The moſt remarkable edifice in Archangel is a large town-houſe, built of ſquare ſtones in the Italian manner, and divided into three parts. One of theſe conſiſts of large commodious apartments, for the accommodation of merchants, ſtrangers as well as natives: here they are permitted to reſide with their merchandiſe till the month of October, when all the foreign ſhips ſet ſail for the reſpective countries to which they belong. Then the traders are obliged to remove their quarters from the town-houſe or palace, which hath a ſpacious court, that reaches down to the river.

ARCHBISHOP, the name of a church dignitary of the firſt claſs. There are but two now in England, *viz.* thoſe of Canterbury and York.—The archbiſhop of *Canterbury* is conſidered as the firſt peer of England, next to the royal family: he writes himſelf, by *Divine Providence;* and has the title of *Grace* given him, as to dukes; and likewiſe *Moſt Reverend Father in God.* He is ſtiled *Primate of all England,* and *Metropolitan.*—The archbiſhop of *York* has precedence of dukes and great officers of ſtate, except the lord chancellor: his title is *Grace,* and *Moſt Reverend Father in God;* and writes himſelf, as other biſhops do, by *Divine Permiſſion.* He is ſtiled *Primate of England,* and *Metropolitan.*

Scotland, whilſt epiſcopacy prevailed in that country, had two *archbiſhops,* of St Andrews and Glaſgow; the former of whom was primate of all Scotland.

Ireland has four archbiſhops; of Armagh, Dublin, Caſſil, and Tuam; of whom the former is primate of all Ireland.

ARCHBISHOPRIC, in eccleſiaſtical geography, a province ſubject to the juriſdiction of an archbiſhop.

ARCHBUTLER, one of the great officers of the German empire, who preſents the cup to the emperor on ſolemn occaſions. This office belongs to the king of Bohemia.

ARCHCHAMBERLAIN, an officer of the empire, much the ſame with the great chamberlain in England. The elector of Brandenburg was appointed by the golden bull archchamberlain of the empire.

ARCHCHANCELLOR, an high officer who, in ancient times, preſided over the ſecretaries of the court. Under the two firſt races of the kings of France, when their territories were divided into Germany, Italy, and Arles, there were three archchancellors: and hence the three archchancellors ſtill ſubſiſting in Germany; the archbiſhop of Mentz being archchancellor of Germany, the archbiſhop of Cologn of Italy, and the archbiſhop of Treves of Arles.

ARCHCHANTOR, the preſident of the chantors of a church.

ARCHCOUNT, a title formerly given to the earl of Flanders, on account of his great power and riches.

ARCHDEACON, an eccleſiaſtical dignitary or officer next to a biſhop, whoſe juriſdiction extends either over the whole dioceſe, or only a part of it. He is uſually appointed by the biſhop himſelf; and hath a kind of epiſcopal authority, originally derived from the biſhop, but now independent and diſtinct from his. He therefore viſits the clergy; and has his ſeparate court for puniſhment of offenders by ſpiritual cenſures, and for hearing all other cauſes of eccleſiaſtical cognizance. There are 60 archdeacons in England.

Archdeacon's *Court*, is the moſt inferior court in the whole eccleſiaſtical polity. It is held, in the archdeacon's abſence, before a judge appointed by himſelf, and called his *official;* and its juriſdiction is ſometimes in concurrence with, ſometimes in excluſion of, the biſhop's court of the dioceſe. From hence, however, by ſtatute 24 Hen. VIII. c. 12. there lies an appeal to that of the biſhop.

ARCHDUKE, a title given to dukes of greater authority and power than other dukes. The archduke of Auſtria is among the moſt ancient: his principal privileges are, that he ſhall diſtribute juſtice in his own country, without appeal; that he cannot be deprived of his countries, even by the emperor and the ſtates of the empire; and that he have a power of creating counts, barons, &c. throughout the whole empire.

ARCHELAUS, a celebrated Greek philoſopher, the diſciple of Anaxagoras, flouriſhed about 440 years before Chriſt. He read lectures at Athens, and did not depart much from the opinions of his maſter. He taught that there was a double principle of all things, namely, the *expanſion* and *condenſation* of the air, which he regarded as infinite. Heat, according to him, was in continual motion. Cold was ever at reſt. The earth, which was placed in the midſt of the univerſe, had no motion. It originally reſembled a wet marſh, but was afterwards dried up; and its figure, he ſaid, reſembled that of an egg. Animals were produced from the heat of the earth, and even men were formed in the ſame manner. All animals have a ſoul, which was born with them; but the capacities of which vary according to the ſtructure of the organs of the body in which it reſides.—Socrates, the moſt illuſtrious of his diſciples, was his ſucceſſor.

Archelaus, the ſon of Herod the Great, was declared king of Judea the ſecond year after the birth of Chriſt. He put to death 3000 perſons before he went to Rome to be confirmed by Auguſtus. However, that emperor gave him half of what had been poſſeſſed by his father; but at length, on freſh complaints exhibited ed againſt him by the Jews, he baniſhed him to Vienne in Gaul, A. D. 6, where he died.

ARCHELAUS, the ſon of Apollonius, one of the greateſt ſculptors of antiquity, was a native of Ionia, and is thought to have lived in the time of the emperor Claudius. He executed, in marble, the apotheoſis of Homer. This maſterpiece in ſculpture was found in 1568, in a place named *Fratocchia*, belonging to the princes of Colonna, where, it is ſaid, the emperor Claudius had a pleaſure-houſe. Father Kircher, Cupert, Spanheim, and ſeveral other learned antiquaries, have given a deſcription and explication of this work.

ARCHER, in the ancient military art, one who fought with bow and arrows.

ARCHES-COURT, in Engliſh eccleſiaſtical polity, is a court of appeal, belonging to the archbiſhop of each province; whereof the judge is called the *dean of the arches*, becauſe he anciently held his court in the church of St Mary *le bow (ſancta Maria de arcubus)*, though all the principal ſpiritual courts are now holden at Doctors' Commons. His proper juriſdiction is only over the 13 peculiar pariſhes belonging to the archbiſhop in London; but the office of dean of the arches having been for a long time united with that of the archbiſhop's principal office, he now, in right of the laſt mentioned office, receives and determines appeals from the ſentences of all inferior eccleſiaſtical courts within the province. And from him there lies an appeal to the king in chancery (that is, to a court of delegates appointed under the king's great ſeal) by ſtatute 25 Hen. VIII. c. 19. as ſupreme head of the Engliſh church, in the place of the biſhop of Rome, who formerly exerciſed this juriſdiction; which circumſtance alone will furniſh the reaſon why the Popiſh clergy were ſo anxious to ſeparate the ſpiritual court from the temporal.

ARCHETYPE, the firſt model of a work, which is copied after to make another like it.—Among minters, it is uſed for the ſtandard weight by which the others are adjuſted.—The archetypal world, among Platoniſts, means the world as it exiſted in the idea of God before the viſible creation.

ARCHEUS, (from αρχη, the principal, chief, or firſt mover); a ſort of primum mobile ſet up by Helmont, to ſuperintend the animal œconomy, and preſerve it. It is akin to Plato's *anima mundi*.—Hippocrates uſes the words αρχαιη φυσις, to ſignify the former healthy ſtate before the attack of the diſeaſe.

ARCHIEROSYNES, in the Grecian antiquity, a high prieſt veſted with authority over the reſt of the prieſts, and appointed to execute the more ſacred and myſterious rites of religion.

ARCHIL, ARCHILLA, ROCELLA, ORSIELLE, is a whitiſh moſs which grows upon rocks, in the Canary and Cape Verd iſlands, and yields a rich purple tincture, fugitive indeed, but extremely beautiful. This weed is imported to us as it is gathered. Thoſe who prepare it for the uſe of the dyer, grind it betwixt ſtones, ſo as to thoroughly bruiſe, but not to reduce it into powder; and then moiſten it occaſionally with a ſtrong ſpirit of urine, or urine itſelf mixed with quicklime: in a few days it acquires a purpliſh red, and at length a blue colour. In the firſt ſtate, it is called *Archil*; in the latter, *Lacmus* or *Litmaſe*.

The dyers rarely employ this drug by itſelf, on account of its dearneſs and the periſhableneſs of its beauty. The chief uſe they make of it is, for giving a bloom to other colours, as pinks, &c. This is effected by paſſing the dyed cloth or ſilk through hot water lightly impregnated with the archil. The bloom thus communicated ſoon decays upon expoſure to the air. Mr Hellot informs us, that by the addition of a little ſolution of tin, this drug gives a durable dye; that its colour is at the ſame time changed towards a ſcarlet; and that it is the more permanent, in proportion as it recedes the more from its natural colour.

Prepared archil very readily gives out its colour to water, to volatile ſpirits, and to ſpirit of wine; it is the ſubſtance principally made uſe of for colouring the ſpirits of thermometers. As expoſure to the air deſtroys its colour upon cloth, the excluſion of the air produces a like effect in theſe hermetically ſealed tubes, the ſpirits of large thermometers becoming in the compaſs of a few years colourleſs. M. l'Abbe Nollet obſerves, (in the French Memoirs for the year 1742), that the colourleſs ſpirit, upon breaking the tube, ſoon reſumes its colour, and this for a number of times ſucceſſively; that a watery tincture of archil, included in the tubes or thermometers, loſt its colour in three days; and that, in an open deep veſſel, it became colourleſs at the bottom, while the upper part retained its colour.

A ſolution of archil in water, applied on cold marble, ſtains it of a beautiful violet, or purpliſh blue colour, far more durable than the colour which it communicates to other bodies. Mr du Fay ſays he has ſeen pieces of marble ſtained with it, which in two years had ſuffered no ſenſible change. It ſinks deep into the marble, ſometimes above an inch; and at the ſame time ſpreads upon the ſurface, unleſs the edges be bounded by wax or other like ſubſtances. It ſeems to make the marble ſomewhat more brittle.

Linnæus informs us, in the Swediſh Tranſactions for the year 1742, that the true archil moſs is to be found on the weſtern coaſts of England.

ARCHILOCHIAN, a term in poetry, applied to a ſort of verſes, of which Archilochus was the inventor, conſiſting of ſeven feet, the four firſt whereof are ordinarily dactyls, though ſometimes ſpondees, the three laſt trochees; as in Horace,

Solvitur acris hyems, grata vice veris & Favoni.

ARCHILOCHUS, a famous Greek poet and muſician, was, according to Herodotus, cotemporary with Candaules and Gyges, kings of Lydia, who flouriſhed about the 14th Olympiad, 724 years before Chriſt. But he is placed much later by modern chronologiſts; *viz.* by Blair 686, and by Prieſtly 660 years, B. C.

He was born at Paros, one of the Cyclades. His father Teleſicles was of ſo high a rank, that he was choſen by his countrymen to conſult the oracle at Delphos concerning the ſending a colony to Thaſos: a proof that he was of one of the moſt diſtinguiſhed families upon the iſland. However, he is ſaid to have ſullied his birth by an ignoble marriage with a ſlave called *Enipo*, of which alliance our poet-muſician was the fruit.

Though Archilochus ſhewed an early genius and attachment to poetry and muſic, theſe arts did not prevent his going into the army, like other young men of his birth: but in the firſt engagement at which he was preſent, Archilochus.

preſent, the young poet, like Horace, and like our own Suckling, loſt his buckler, though he ſaved his life by the help of his heels. *It is much eaſier*, ſaid he, *to get a new buckler, than a new exiſtence*. This pleaſantry, however, did not ſave his reputation; nor could his poetry or prayers prevail upon Lycambes, the father of his miſtreſs, to let him marry his daughter, though ſhe had been long promiſed to him. After theſe mortifications, his life ſeems to have been one continued tiſſue of diſgrace and reſentment.

> *Archilochum proprio rabies armavit iambo.*
> Hor. Art. Poet. 79.
>
> Archilochus, with fierce reſentment warm'd,
> Was with his own ſevere iambics arm'd. Francis.

The *rage of Archilochus* was proverbial in antiquity; which compared the provoking this ſatyriſt to the treading upon a ſerpent: A compariſon not very ſevere, if it be true that Lycambes, and, as ſome ſay, his three daughters, were ſo mortified by his ſatire, as to be driven to the conſolation of a halter.

In this piece, many adventures are mentioned, full of defamation, and out of the knowledge of the public. There were likewiſe many looſe paſſages in it; and it is ſaid to have been on account of this ſatire that the Lacedæmonians laid a prohibition on his verſes *.

However, according to Plutarch, there is no bard of antiquity by whom the two arts of poetry and muſic have been ſo much advanced, as by Archilochus. To him is attributed particularly the ſudden tranſition from one rhythm to another of a different kind, and the manner of accompanying thoſe irregular meaſures upon the lyre. Heroic poetry, in hexameter verſe, ſeems to have been ſolely in uſe among the more ancient poets and muſicians; and the tranſition from one rhythm to another, which lyric poetry required, was unknown to them: ſo that, if Archilochus was the firſt author of this mixture, he might with propriety be ſtiled the *Inventor of Lyric Poetry*, which, after his time, became a ſpecies of verſification wholly diſtinct from heroic.—To him is likewiſe aſcribed the invention of *Epodes*. See Epode.

Our poet-muſician is generally ranked among the firſt victors of the Pythic games: and we learn from Pindar, that his muſe was not always a termagant; for though no mortal eſcaped her rage, yet ſhe was at times ſufficiently tranquil and pious to dictate hymns in praiſe of the gods and heroes. One in particular, written in honour of Hercules, acquired him the acclamations of all Greece; for he ſung it in full aſſembly at the Olympic games, and had the ſatisfaction of receiving from the judges the crown of victory conſecrated to real merit. This hymn, or ode, was afterwards ſung in honour of every victor at Olympia, who had no poet to celebrate his particular exploits.

Archilochus was at laſt ſlain by one Callondax Corax, of the iſland of Naxos; who, though he did it in fight, according to the laws of war, was driven out of the temple of Delphi, by command of the oracle, for having deprived of life a man conſecrated to the Muſes.

The names of Homer and Archilochus were equally revered and celebrated in Greece, as the two moſt excellent poets which the nation had ever produced. This appears from an epigram in the Anthologia; and from Cicero, who ranks him with poets of the firſt claſs, and in his Epiſtles tells us, that the grammarian Ariſtophanes, the moſt rigid and ſcrupulous critic of his time, uſed to ſay, that the longeſt poem of Archilochus always appeared to him the moſt excellent.

ARCHIMAGUS, the high-prieſt of the Perſian Magi or worſhippers of fire. He reſided in the higheſt fire-temple; which was had in the ſame veneration with them, as the temple of Mecca among the Mahometans. Zoroaſtres firſt ſettled it at Balch; but after the Mahometans had over-run Perſia in the 7th century, the Archimagus was forced to remove from thence into Kerman, a province of Perſia, lying on the ſouthern ocean, where it hath continued to this day. Darius Hyſtaſpes took upon himſelf the dignity of Archimagus: for Porphyry tells us, he ordered before his death, that, among the other titles, it ſhould be engraven on his monument, that he had been *Maſter of the Magi*; which plainly implies that he had born this office among them, for none but the Archimagus was maſter of the whole ſect. From hence it ſeems to have proceeded, that the kings of Perſia were ever after looked on to be of the ſacerdotal tribe, and were always initiated into the ſacred order of the Magi, before they took on them the crown, and were inaugurated into the kingdom.

ARCHIMANDRITE, in eccleſiaſtical hiſtory, was a name given by the ancient Chriſtians to what we now call an *abbot*. Father Simon obſerves, that the word *mandrite* is Syriac, and ſignifies a ſolitary monk.

ARCHIMEDES, a celebrated geometrician, born at Syracuſe in the iſland of Sicily, and related to Hiero king of Syracuſe. He was remarkable for his extraordinary application to mathematical ſtudies; in which he uſed to be ſo much engaged, that his ſervants were often obliged to take him from thence by force. He had ſuch a ſurpriſing invention in mechanics, that he affirmed to Hiero, if he had another earth, whereon to plant his machines, he could move this which we inhabit. He is ſaid to have formed a glaſs ſphere, of a moſt ſurpriſing workmanſhip, wherein the motions of the heavenly bodies were repreſented. He diſcovered the exact quantity of the ſilver which a goldſmith had mixed with the gold, in a crown he had made for the king: he had the hint of this diſcovery from his perceiving the water riſe up the ſides of the bath as he went into it, and was filled with ſuch joy, that he ran naked out of the bath, crying, "I have found it! I have found it!" By the invention of machines, he, for a long time, defended Syracuſe *, on its being beſieged by Marcellus. On the city's being taken, that general commanded his ſoldiers to have a particular regard to the ſafety of this truly great man; but his care was ineffectual. "What gave Marcellus the greateſt concern (ſays Plutarch), was the unhappy Archimedes, who was at that time in his muſæum, and his mind, as well as his eyes, ſo fixed and intent upon ſome geometrical figures, that he neither heard the noiſe and hurry of the Romans, nor perceived the city was taken. In this depth of ſtudy and contemplation, a ſoldier came ſuddenly upon him, and commanded him to follow him to Marcellus; which he refuſing to do till he had finiſhed his problem, the ſoldier, in a rage, drew his ſword, and ran him through the body." Others have related the circumſtances of his death in a ſomewhat different manner. It however happened 208 years before the Chriſtian æra. Cicero, when he was quæſtor in Italy, diſ-

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* Val. Max. lib. vi. c. 3.

* See Syracuſe.

Archimedes discovered his tomb, on which was carved a cylinder and ſphere †. Some of the works of this great mathematician are loſt, but others are preſerved. His pieces which remain are, 1. Two books of the Sphere and Cylinder. 2. The Dimenſions of a Circle. 3. Of Centres of Gravity, or Æquiponderants. 4. Of Spheroids and Conoids. 5. Of ſpiral Lines. 6. The Quadrature of a Parabola. 7. Of the Number of the Sand. 8. Of Bodies that float on Fluids. The beſt edition of theſe is that publiſhed at London, in 1675, 4to. Among the works of Archimedes which are loſt, we may reckon the deſcriptions of the following inventions, which we may gather from himſelf and other ancient authors. 1. Περι της ςεφανης, or his account of the method which he uſed to diſcover the mixture of gold and ſilver in the crown. 2. His deſcription of the Κοχλια, or Κοχλιον, an engine to draw water out of places where it is ſtagnated. Athenæus, ſpeaking of the prodigious ſhip built by the order of Hiero, tells us, that Archimedes invented the cochlion, by means of which the hold, notwithſtanding its depth, could be drained by one man. (Δειπνοσοφιςων, lib. v.) Diodorus Siculus informs us (lib. v.) that he contrived this machine to drain Egypt, and that by a wonderful mechaniſm it would empty the water from any depth. 3. The Ελιξ, by means of which (according to Athenæus, Δειπνοσ. lib. v.) he launched Hiero's great ſhip. 4. The Τρισπαςον, of the power of which Tzetzes gives a hyperbolical relation, Chil. ii. hiſt. 35. 5. The machines he uſed in the defence of Syracuſe againſt Marcellus. Of theſe we have an account in Polybius, Livy, and Plutarch. 6. His burning-glaſſes, with which he is ſaid to have ſet fire to the Roman galleys. Galen, Περι κρασεων, lib. iii. 7. His pneumatic and hydraulic engines, concerning which he wrote books, according to Tzetzes, Chil. ii. hiſt. 35.

† Tuſcul. Quæſt. lib. v.

ARCHIPELAGO, in geography, a general term ſignifying a ſea interrupted with iſlands; it is however more eſpecially applied to that lying between Europe and Aſia, which contains the iſlands anciently called *Cyclades* and *Sporades*. See theſe two words.

ARCHPRESBYTER, or ARCH-PRIEST, a prieſt eſtabliſhed in ſome dioceſes with a ſuperiority over the reſt. He was anciently choſen out of the college of preſbyters, at the pleaſure of the biſhop. Theſe archpreſbyters were much of the ſame nature with deans in the cathedral churches, as the college of preſbyters anſwers to the chapter. See PRESBYTER.

ARCHISYNAGOGUS, the chief of the ſynagogue; the title of an officer among the Jews, who preſided in their ſynagogues and aſſemblies. The number of theſe officers was not fixed, nor the ſame in all places; there being 70 in ſome, and in others only one. They are ſometimes called *princes* of the ſynagogue, and had a power of excommunicating ſuch as deſerved that puniſhment.

ARCHITECT, a perſon ſkilled in architecture.

ARCHITECTURE,

IN the utmoſt latitude of the word, ſignifies the art of building in general; but the term is moſt frequently applied only to the conſtruction of ſuch buildings as are for the purpoſes of civil life, ſuch as houſes, halls, churches, bridges, porticos, *&c.*

Hiſtory of Architecture.

THE origin of this art, like that of moſt others, is totally unknown. We are aſſured, however, that it is as old as Cain: for Moſes tells us that he built a city; tho' what were the materials, or how the buildings were conſtructed, we are entirely ignorant. It is commonly ſaid, that the firſt materials employed in building were branches and twigs of trees, wherewith men conſtructed huts, ſuch as the *wigwams* in uſe among the American Indians at preſent. This, however, appears diſputable. The natural ſhelter afforded by hollows in the ſides of mountains or rocks, it may be ſuppoſed, would much more readily ſuggeſt the idea of uſing ſtones and earth as materials for building houſes. Indeed, conſidering that tents were not invented before the days of Jabal, Tubal-Cain's brother, it is very probable that ſuch temporary houſes as the Indian wigwams were not originally known; otherwiſe the method of covering poles with the ſkins of beaſts, inſtead of ſmall branches or twigs, muſt very ſoon have taken place. Theſe temporary houſes ſeem to have come into uſe only when men began to lead an idle wandering life, like the Tartars, and could not be at the trouble of conſtructing durable habitations in every place where they were obliged to wander with their cattle; and Jabal no doubt from them took the hint of making portable houſes, or tents. Accordingly we ſee, that no nations, except thoſe who are in a perpetually unſettled ſtate, make uſe of ſuch wretched materials. Even in America, where the human race have appeared in the moſt deſpicable form, they were no ſooner collected into great bodies under the emperors of Mexico and Peru, who forced them to leave off their wandering way of life, than ſtone-buildings began to be erected.

1 erials uſed in ding.

We are not, therefore, to look for the origin of architecture in any ſingle nation; but in every nation, when the inhabitants began to leave off their ſavage way of life, and to become civilized; and if there is any nation to be found which hath been always in a civilized ſtate, we may be aſſured that architecture hath always had an exiſtence there. But whatever may be in this, the origin of regular buildings hath been deduced from the conſtruction of the meaneſt huts in a very natural and plauſible manner by ſeveral authors. "Anciently (ſays Vitruvius), men lived in woods, and inhabited caves; but in time, taking perhaps example from birds, who with great induſtry build their neſts, they made themſelves huts. At firſt they made theſe huts, very probably, of a conic figure; becauſe that is a figure of the ſimpleſt ſtructure; and, like the birds, whom they imitated, compoſed them of branches of trees, ſpreading them wide at the bottom, and joining them in a point at the top; covering the whole with reeds, leaves, and clay, to ſcreen them from tempeſts and rain.

2 Primitive huts. Plate XXV. (B.) fig. 1.

"But finding the conic figure inconvenient on account of its inclined ſides, they changed both the form and conſtruction of their huts, giving them a cubical figure,

3 Their improvement.

Plate XXV. (B). fig. 2.

figure, and building them in the following manner: "Having marked out the ſpace to be occupied by the hut, they fixed in the ground ſeveral upright trunks of trees to form the ſides, filling the intervals between them with branches cloſely interwoven and covered with clay. The ſides being thus completed, four large beams were placed on the upright trunks; which, being well joined at the angles, kept the ſides firm, and likewiſe ſerved to ſupport the covering or roof of the building, compoſed of many joiſts, on which were laid ſeveral beds of reeds, leaves, and clay.

"Inſenſibly mankind improved in the art of building, and invented methods to make their huts laſting and handſome, as well as convenient. They took off the bark, and other unevenneſſes, from the trunks of trees that formed the ſides; raiſed them, probably, above the dirt and humidity, on ſtones; and covered each of them with a flat ſtone or ſlate, to keep off the rain. The ſpaces between the ends of the joiſts were cloſed with clay, wax, or ſome other ſubſtance; and the ends of the joiſts covered with thin boards cut in the manner of triglyphs. The poſition of the roof was likewiſe altered: for being, on account of its flatneſs, unfit to throw off the rains that fell in great abundance during the winter ſeaſon, they raiſed it in the middle; giving it the form of a gable roof, by placing rafters on the joiſts, to ſupport the earth and other materials that compoſed the covering.

Fig. 3.

"From this ſimple conſtruction the orders of architecture took their riſe. For when buildings of wood were ſet aſide, and men began to erect ſolid and ſtately edifices of ſtone, they imitated the parts which neceſſity had introduced into the primitive huts; in ſo much that the upright trees, with the ſtones at each end of them, were the origin of columns, baſes, and capitals; and the beams, joiſts, rafters, and ſtrata of materials that formed the covering, gave birth to architraves, frizes, triglyphs, and cornices, with the corona, the mutules, the modillions, and the dentils.

"The firſt buildings were in all likelihood rough and uncouth; as the men of thoſe times had neither experience nor tools: but when, by long experience and reaſoning upon it, the artiſts had eſtabliſhed certain rules, had invented many inſtruments, and by great practice had acquired a facility in executing their ideas, they made quick advances towards perfection, and at length diſcovered certain manners of building, which ſucceeding ages have regarded with the higheſt veneration."

4
State of architecture among the Egyptians.

Among the ancient Egyptians, Aſſyrians, and Perſians, this art was carried to an incredible length. The pyramids of Egypt are ſuch ſtructures as would exceed the power of the moſt potent monarch on earth to raiſe at this day. The largeſt of theſe, according to the account of M. Goguet, is near 500 feet high, and contains 313,590 ſolid fathoms. It is compoſed of ſtones enormouſly large; many of them being 30 feet long, four feet high, and three in breadth; and all this huge maſs of building was coated over with ſquare flags of marble—The ſtructure called the *labyrinth*, in the ſame country, according to Herodotus, who ſaw it, excelled every thing which he could have conceived from the imagination either of himſelf or others. Within the ſame circuit of walls they had incloſed 3000 halls, 12 of which were of a ſingular form and beauty; and of theſe, half were above, and half below ground; and the whole was terminated by a pyramid 40 fathoms high. All this prodigious maſs of building was compoſed of white marble, and the walls were adorned with engravings.—The obeliſks were not leſs aſtoniſhing; the largeſt of them being entire pieces of granite, no leſs than 180 feet high.—Near Andera, in upper Egypt, are the ruins of a palace of gray granite, the cielings of which are ſupported by columns of ſuch thickneſs, that four men can ſcarcely fathom them. The cielings themſelves are compoſed of ſtones of the ſame kind, ſix or ſeven feet in breadth, and 18 feet in length. The grand hall is 112 feet long, 60 high, and 58 broad. The roof of the whole edifice is a terrace, on which the Arabs formerly built a very large village, the ruins of which are ſtill viſible.

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Babylonia
and Perſia

Among the Babylonians and Perſians, too, ſuch immenſe piles of building have been raiſed, as appear utterly inconceivable, and incredible to many modern authors where their former grandeur is not demonſtrable by ruins viſible at this day. The ruins of Perſepolis, the ancient capital of Perſia, were ſo ſtupendous in the time of Avicenna the Arab phyſician, that his countrymen could not believe ſuch ſtructures poſſible to be erected but by evil ſpirits. Of their extraordinary magnificence, indeed, we may have ſome idea from the account of the ſtair-caſes belonging to the palace. The remains, ſome time ago, conſiſted of 95 ſteps of white marble, ſo broad and flat, that 12 horſes might conveniently go up abreaſt.

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legance.

In theſe vaſt ſtructures, however, the nations of whom we ſpeak ſeem to have regarded the greatneſs, rather than the elegance or uſefulneſs, of their works. In the pyramids and obeliſks of Egypt this is exceedingly conſpicuous; but whether it was ſo in the labyrinth, or in the palace at Thebes above-mentioned, it is impoſſible to determine, unleſs the buildings were entire, and we knew for what purpoſe they had been deſigned. If the kings who built the pyramids deſigned to immortalize their memories by building, they certainly could not have fallen upon any thing more proper for this purpoſe; though even in this they have ſome how or other failed, the names of thoſe who erected them not being certainly known even in the time of Herodotus.—It is certain, however, that neither the ancient Aſſyrians nor Babylonians knew the method of conſtructing arches. The roofs of all their halls were flat, and covered with prodigiouſly large ſtones, ſome of them ſo big as to cover a whole room ſingly. Their manner of building was alſo quite deſtitute of what is now called *taſte*; the columns were ill-proportioned, and their capitals executed in the pooreſt manner imaginable. This was obſerved by the Greeks, who improved upon the proportions formerly uſed, and were the inventors of three of the five orders of architecture, *viz.* the Doric, Ionic, and Corinthian. "Anciently, (ſays Vitruvius), they were ignorant of the art of proportioning the various parts of a building: they uſed columns; but they cut them at hazard, without rules, without principles, and without having any attention to the proportions which they ought to give them: they placed them likewiſe without any regard to the other parts of the edifice. Dorus, ſon of Helen and grandſon of Deucalion, having cauſed a temple to be built at Argos in honour of Juno, that edifice was found by chance to be conſtructed according to the taſte and proportions of the

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the order which afterwards they called *Doric*. The form of this building having appeared agreeable, they conformed to it for the conſtruction of edifices which they afterwards had to build.

"About the ſame time, the Athenians ſent into Aſia a colony under the conduct of Ion, nephew of Dorus: this undertaking had very good ſucceſs. Ion ſeized on Caria, and there founded many cities: theſe new inhabitants thought to build temples. They propoſed for a model that of Juno at Argos; but, ignorant of the proportion which they ought to give to the columns, and in general to the whole edifice, they ſought for rules capable of regulating their operation. Theſe people wanted, in making their columns ſufficiently ſtrong to ſupport the whole edifice, to render them at the ſame time agreeable to the ſight. For this purpoſe, they thought to have given it the ſame proportion that they found between the foot of a man and the reſt of his body. According to their ideas, the foot made a ſixth part of the human height: in conſequence, they gave at firſt to a Doric column, taking in its chapiter, ſix of its diameters; that is to ſay, they made it ſix times as high as it was thick: afterwards they added to it a ſeventh diameter.

10 f the Ionic.

"This new order of architecture was not long in giving birth to a ſecond: they would immediately go beyond their firſt invention. The Ionians tried to throw ſtill more delicacy and elegance into their edifices. They employed the ſame method which they had before put in practice for the compoſition of the Doric order: but inſtead of taking for a model the body of a man, the Ionians were regulated by that of a woman. With a view to make the columns of this new order more agreeable and more pleaſing, they gave them eight times as much height as they had diameter. They alſo made channelings all along the trunk to imitate the folds of the robes of women: the volutes of the chapiter repreſented that part of the hair which hung in curls on each ſide of the face. The Ionians added, laſtly, to theſe columns a baſe, which was not in uſe in the Doric order." According to Vitruvius, theſe baſes were made in the manner of twiſted cords, as a kind of caſe for the columns. This order of architecture was called *Ionic*, from the name of the people who had invented it.

Such is the account given by Vitruvius of the origin of improvements in the proportion of columns. Had theſe improvements, however, exiſted in ſuch early times, Homer, who was greatly poſterior to them, would certainly have made mention of ſomething of that kind; but in all his writings he gives us no account of any thing like columns of ſtone, but uſes a word which would rather incline us to think that his columns were nothing more than bare poſts.

11 s of im- ement ably ta- from mon's le.

It is remarkable, that improvements in architecture did not take place in any nation till after, or about, the time that Jeruſalem was taken by Nebuchadnezzar. The grandeſt buildings erected among the Aſſyrians ſeem to have owed their exiſtence to this monarch; and it can ſcarce be imagined that he would not endeavour to imitate the architecture of Solomon's temple, to which, by his conqueſt of Jeruſalem, he had full acceſs.—It is alſo remarkable, that the dimenſions of the two pillars, Jachin and Boaz, ſet up by Solomon, very nearly correſpond with thoſe of the Doric order, firſt invented by the Greeks, and which originally came from their colonies ſettled in Aſia Minor. The height of Solomon's pillars, without the chapiter, was 18 cubits; that of the chapiter itſelf was five cubits; the circumference was 12 cubits; from whence, according to the Scripture language, we may reckon the diameter to have been exactly four cubits. Had they been a ſingle cubit higher, they would have been preciſely of the ſame height with columns of the original Doric order. We do not indeed mean to aſſert, that this famous temple gave a model of architecture to the whole world; although it is ſcarce conceivable, but imitations of it, as far as it could be known, muſt have taken place among many nations.

12 Egyptian banqueting room deſcribed.

Notwithſtanding all their defects, however, the Egyptian buildings undoubtedly had an air of vaſt grandeur and magnificence, if we may credit the deſcription given of one of their banqueting rooms by Vitruvius. The uſual ſize of one of theſe rooms was from 100 to 150 feet in length, and its breadth ſomewhat more than half its length. At the upper end, and along the two ſides, they placed rows of pillars tolerably well proportioned to one another, though not of any regular order; and at the lower part they made a magnificent and ſpacious entrance: this, with its ornaments, ſeems to have taken up one end of the building entire. We are not told that there were any pillars there; tho' perhaps they placed two or more toward the angles on each ſide, for uniformity, the central ſpace being enough for an entrance in the grandeſt and moſt auguſt manner. Theſe rows of columns were ſet at a diſtance from the wall, forming a noble portico along the two ſides and upper end of the building. Upon the pillars was laid an architrave; and from this was carried up a continued wall with three quarter columns, anſwering directly to thoſe below, and in proportion one fourth ſmaller in all their parts. Between theſe three quarter columns were placed the windows for enlightening the building. From the tops of the lower pillars to the wall was laid a floor: this covered the portico overhead within, and made on the outſide a platform, which was ſurrounded by a corrider with rails and balluſters. This was terraced, and ſerved as a plain for people to walk on; and from this they could look through the windows down into the room. To this terrace there was no covering required, as the Egyptians were in no fear of rain. The Egyptians decorated this ſort of building with ſtatues; and no kind of ornament could anſwer it ſo well, as the light cannot fall upon ſtatues to ſuch advantage in any direction, as when it comes from above, in ſuch a regular, proportioned, and uninterrupted manner.

13 Ancient architecture ſuperior in grandeur to the modern.

We have already taken notice, that among the ancient Egyptians, Perſians, and Babylonians, the vaſt ſtrength and extent of their buildings ſeems to have been what they chiefly valued; and in this they certainly as much excelled the Greeks and modern nations, as the latter excel them in the beautiful proportion and elegance of their ſtructures. There are not wanting, however, ſome modern authors, who endeavour to deprive the ancients of what is juſtly their due, and will have every thing to be exaggerated which ſeems beyond the power of modern princes to accompliſh. In this way M. Goguet remarkably diſtinguiſhes himſelf, and that without giving any reaſon at all, but merely that he takes it into his head. Speaking of the wonders of ancient Babylon, “ All theſe works (ſays he), ſo marvellous in the judgment of antiquity, appear to me to have been extremely exaggerated by the authors who have ſpoken of them. How can we conceive, in effect, that the walls of Babylon could have been 318 feet high, and 81 in thickneſs, in a compaſs of near ten leagues?” To this we may eaſily reply, that the pyramids of Egypt, and the immenſe wall which divides China from Tartary, ſhew us, that even ſuch a work as the wall of ancient Babylon is ſaid to have been is not altogether incredible. The loweſt computation of the dimenſion of the Chineſe wall is, that it extends in length 1200 miles, is 18 feet high at a medium, and as many thick ; according to which computation, it muſt contain 9,504,000 ſolid fathoms; and yet, if we may credit the Chineſe hiſtorians, this immenſe maſs of building was finiſhed in five years. If therefore we can ſuppoſe Nebuchednezzar, or whoever fortified the city of Babylon, to have been capable of employing as many men for ten years as were employed in raiſing the Chineſe wall, we may ſuppoſe him able to have fortified the city of Babylon as ſtrongly as it is ſaid to have been ; for the maſs of building is not quite double that of the Chineſe wall, though nearly ſo, amounting to 18,189,600 ſolid fathoms. When our author afterwards gaſconades about the works of the French king, it is difficult to avoid laughter at hearing him declare, that “ infinitely more money has been expended, and much more genius required, as well as more power, taſte, and time, to finiſh Verſailles, with all its defects, than to conſtruct a pyramid, or erect an obeliſk.” The genius, taſte, and time, we ſhall not diſpute ; but as the ſame author confeſſes that 100,000 men were employed for 30 years together in the conſtruction of the largeſt pyramid, we think the power may juſtly be doubted. This doubt will appear ſtill the more reaſonable, when we conſider what time the abovementioned number of men would have taken to accompliſh ſome of the works of which M. Goguet boaſts ſo much. The canal of Languedoc, he tells us, extends in length upwards of 70 leagues, and required the removal of two millions of cubic fathoms of earth. This was no doubt a great work ; but had 100,000 men been employed upon it at once, they muſt have removed this quantity of earth in three weeks, ſuppoſing each to have removed only a ſingle fathom a-day. Nor can we imagine, that any modern work will at all ſtand in competition with the works of the ancients as to greatneſs, whatever they may do in other reſpects.

14 Architecture improved by the Greeks.

As to the improvements in architecture, the Greeks were undoubtedly the firſt European nation who began to diſtinguiſh themſelves in this way. Whence they took the firſt hint of improvement, we have no means of knowing : though, as we have already hinted, it is ſcarce credible but that Solomon's temple muſt have ſomewhat contributed thereto ; eſpecially as we learn from Scripture, that the capitals of the columns there were ornamented in the richeſt manner. The origin of the Doric and Ionic orders we have already given an account of from Vitruvius ; to which we may add, that the volutes, which are the peculiar ornament of the Ionic capital, are by ſome ſaid to repreſent the natural curling down of a piece of bark from the top of a beam, which is ſuppoſed to have been the firſt kind of column.—The Corinthian order was not invented till long after the others, and is ſaid to have taken its riſe from the following accident : A baſket had been ſet upon the ground, and covered with a ſquare tile ; there grew near it a plant of acanthus or bears-breech ; the leaves ſhot up and covered the outer ſurface of the baſket ; and as the ſtalks roſe up among them, they ſoon reached the tile which overhung the edges of the baſket at the top ; this ſtopping their courſe upwards, they curled and twiſted themſelves into a kind of volutes. In this ſituation a ſculptor, Callimachus, ſaw it; the twiſted part of the ſtalk repreſented to him the volutes of the Ionic capital, which, as they were here ſmaller, and more numerous, appeared in a new form : he ſaw the beauty of raiſing them among leaves, and was ſtruck with the repreſentation of a noble and lofty capital; which being afterwards put into execution, has been univerſally admired.

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The Romans borrowed their architecture from the Greeks, but did not imitate them in the modeſty of their private dwellings. They placed the principal front of their houſe towards the ſouth, and on this they beſtowed all the decoration of expenſive ornament. They had here lofty galleries and ſpacious rooms, and every thing carried an air of greatneſs and ſhew. In their country houſes they preſerved the ſame ſituation, and the ſame front; but the inner diſtribution was different. At the entrance they placed the meaner and more offenſive offices, after the manner of the Greeks. The firſt gallery, which received the ſtranger at his entrance, had on one ſide a paſſage to the kitchen, and on the other to the ſtalls where they kept cattle, that their noiſe or ſmell might not be offenſive within, while yet they were in readineſs for all ſervices. Theſe ſtalls were placed to the left, as in the Greek houſes; on the right was the kitchen, which had its light from above, and its chimney in the middle. Farther within the building were placed on one ſide bathing rooms, and on the other family-conveniences, in the manner of our butteries and ſtore-rooms: the bathing rooms were on the left, and the others on the right. Backwards, and full to the north, they placed their cellars, for fear of the ſun; and over theſe were other ſtore-rooms. From this part of the ſtructure one came into the court; for in theſe there generally was only one court: this was taken up by ſervants, and thoſe who had the care of the cattle; and on each ſide there were ſtalls for the cattle. In front from the entrance, but very far from all theſe annoyances, ſtood the nobler apartments for the maſter of the family.

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How magnificent the Romans were in their temples and public buildings, is yet to be ſeen in what remains of them, and which are not only models for all modern architects, but have never been ſurpaſſed or even equalled to this day. But though the art of architecture continued almoſt at its higheſt pitch among the Romans for two centuries, it declined exceedingly as the empire began to fail. Tacitus relates, that after the battle of Actium no men of genius appeared; and after the reign of Alexander Severus, a manner of building altogether confuſed and irregular was introduced, wherein nothing of the true graces and majeſty of the former was preſerved.

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When the empire was entirely over-run by the Goths, the conquerors naturally introduced their own method of building. Like the ancient Egyptians, the Goths ſeem to have been more ſtudious to amaze people with the greatneſs of their buildings, than to pleaſe the eye with the regularity of their ſtructure, or the propriety of their ornaments. They corrected themſelves, however, a little by the models of the Roman edifices which they ſaw before them: but theſe models themſelves were faulty; and the Goths being totally deſtitute of genius, neither architecture, nor any other art, could be improved by them.

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When the Arabs conquered Spain, they introduced a mode of architecture which was juſt the reverſe of the Gothic. This was as remarkable for its lightneſs as the Gothic was for its clumſineſs; and the fantaſtic genius of the Arabs diſplayed itſelf in the great number of ſuperfluous and unnatural ornaments wherewith it was loaded. Examples of this kind of building are extant in ſome cathedrals in Spain built by the Moors, particularly that of Burgos. It is falſely, though commonly, called the *modern Gothic*.

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In the 15th and 16th centuries, when learning of all kinds began to revive, architecture ſeemed as it were to be recalled into life. The firſt improvements in it began in Italy, and owed their exiſtence to the many ruins of the ancient Roman ſtructures that were to be found in that country, from whence an improved method of building was gradually brought into the other countries of Europe: and though the Italians for a long time retained the ſuperiority as architects over the other European nations; yet, as men of genius travelled from all quarters into Italy, where they had an opportunity of ſeeing the originals from whence the Italians copied, architects have ariſen in other nations equal, if not ſuperior, to any that ever appeared in Italy. Of this we have a recent inſtance in our own countryman Mr Mylne, who lately gained the prize in architecture at Rome, where it would no doubt be diſputed by ſuch natives of Italy as were beſt ſkilled in that art.

We ſhall conclude this hiſtory with an account of the mode of architecture followed by thoſe nations who never had any connection either with the Jews, Greeks, or Romans, and whoſe manner of building muſt conſequently be reckoned quite original, and peculiar to themſelves. Theſe nations are the Chineſe, the Americans, and the ancient Celtes; by the laſt of which the iſland of Britain moſt probably was firſt peopled. The firſt are a very ingenious people, and pretend to very high antiquity; but their architecture is univerſally allowed to be much inferior to that of the Greeks and Romans.

22 Chineſe bridges.

It is true, they excelled the ancient Egyptians in knowing the method of conſtructing arches; but though they make uſe of arches in conſtructing bridges, and build ſome of theſe of a prodigious height and length, they ſeem ſtrangely deficient in the knowledge of finiſhing them with propriety. Their method of building them is as follows. As ſoon as they finiſh the ſides of the arch next to the land, or, if there are more arches than one, as ſoon as they finiſh the piers that ſtand between them, they proceed to lay on the ſtones (which are commonly about four or five feet long, and half a foot broad) alternately upright and croſſwiſe, ſo that the key-ſtones always lie horizontally. The top of the arch is uſually no thicker than theſe ſtones; and becauſe the bridges, eſpecially thoſe that have but one arch, are ſometimes 40 or 50 feet between the piers, and conſequently much higher than the cauſeway, they make an aſcent on both ſides by ſteps about three inches thick; the inconvenience of which for horſes and carriages is very evident. In other reſpects, however, the Chineſe bridges are well built, and ſome of them exceedingly beautiful. One in particular, near Pekin, was built of white marble curiouſly wrought and poliſhed. It had 70 pillars on each ſide, divided by cartridges of fine marble, beautifully carved with flowers, foliage, birds, beaſts, and a variety of other ornaments. On each ſide of the entrance on the bridge, at the eaſt end, ſtood two lions of an extraordinary ſize, on two marble pedeſtals, with ſeveral other ſmaller lions in different attitudes. At the other end of the bridge ſtood likewiſe two curious pedeſtals, on which were ſkilfully carved two children; and all the reſt of the that he takes it into his head. Speaking of the wonders of ancient Babylon, "All theſe works (ſays he), ſo marvellous in the judgment of antiquity, appear to me to have been extremely exaggerated by the authors who have ſpoken of them. How can we conceive, in effect, that the walls of Babylon could have been 318 feet high, and 81 in thickneſs, in a compaſs of near ten leagues?" To this we may eaſily reply, that the pyramids of Egypt, and the immenſe wall which divides China from Tartary, ſhew us, that even ſuch a work as the wall of ancient Babylon is ſaid to have been is not altogether incredible. The loweſt computation of the dimenſion of the Chineſe wall is, that it extends in length 1200 miles, is 18 feet high at a medium, and as many thick; according to which computation, it muſt contain 9,504,000 ſolid fathoms; and yet, if we may credit the Chineſe hiſtorians, this immenſe maſs of building was finiſhed in five years. If therefore we can ſuppoſe Nebuchednezzar, or whoever fortified the city of Babylon, to have been capable of employing as many men for ten years as were employed in raiſing the Chineſe wall, we may ſuppoſe him able to have fortified the city of Babylon as ſtrongly as it is ſaid to have been; for the maſs of building is not quite double that of the Chineſe wall, though nearly ſo, amounting to 18,189,600 ſolid fathoms. When our author afterwards gaſconades about the works of the French king, it is difficult to avoid laughter at hearing him declare, that "infinitely more money has been expended, and much more genius required, as well as more power, taſte, and time, to finiſh Verſailles, with all its defects, than to conſtruct a pyramid, or erect an obeliſk." The genius, taſte, and time, we ſhall not diſpute; but as the ſame author confeſſes that 100,000 men were employed for 30 years together in the conſtruction of the largeſt pyramid, we think the power may juſtly be doubted. This doubt will appear ſtill the more reaſonable, when we conſider what time the abovementioned number of men would have taken to accompliſh ſome of the works of which M. Goguet boaſts ſo much. The canal of Languedoc, he tells us, extends in length upwards of 70 leagues, and required the removal of two millions of cubic fathoms of earth. This was no doubt a great work; but had 100,000 men been employed upon it at once, they muſt have removed this quantity of earth in three weeks, ſuppoſing each to have removed only a ſingle fathom a-day. Nor can we imagine, that any modern work will at all ſtand in competition with the works of the ancients as to greatneſs, whatever they may do in other reſpects.

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As to the improvements in architecture, the Greeks were undoubtedly the firſt European nation who began to diſtinguiſh themſelves in this way. Whence they took the firſt hint of improvement, we have no means of knowing: though, as we have already hinted, it is ſcarce credible but that Solomon's temple muſt have ſomewhat contributed thereto; eſpecially as we learn from Scripture, that the capitals of the columns there were ornamented in the richeſt manner. The origin of the Doric and Ionic orders we have already given an account of from Vitruvius; to which we may add, that the volutes, which are the peculiar ornament of the Ionic capital, are by ſome ſaid to repreſent the natural curling down of a piece of bark from the top of a beam, which is ſuppoſed to have been the firſt kind of column.—The Corinthian order was not invented till long after the others, and is ſaid to have taken its riſe from the following accident: A baſket had been ſet upon the ground, and covered with a ſquare tile; there grew near it a plant of acanthus or bears-breech; the leaves ſhot up and covered the outer ſurface of the baſket; and as the ſtalks roſe up among them, they ſoon reached the tile which overhung the edges of the baſket at the top; this ſtopping their courſe upwards, they curled and twiſted themſelves into a kind of volutes. In this ſituation a ſculptor, Callimachus, ſaw it; the twiſted part of the ſtalk repreſented to him the volutes of the Ionic capital, which, as they were here ſmaller, and more numerous, appeared in a new form: he ſaw the beauty of raiſing them among leaves, and was ſtruck with the repreſentation of a noble and lofty capital; which being afterwards put into execution, has been univerſally admired.

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The Romans borrowed their architecture from the Greeks, but did not imitate them in the modeſty of their private dwellings. They placed the principal front of their houſe towards the ſouth, and on this they beſtowed all the decoration of expenſive ornament. They had here lofty galleries and ſpacious rooms, and every thing carried an air of greatneſs and ſhew. In their country houſes they preſerved the ſame ſituation, and the ſame front; but the inner diſtribution was different. At the entrance they placed the meaner and more offenſive offices, after the manner of the Greeks. The firſt gallery, which received the ſtranger at his entrance, had on one ſide a paſſage to the kitchen, and on the other to the ſtalls where they kept cattle, that their noiſe or ſmell might not be offenſive within, while yet they were in readineſs for all ſervices. Theſe ſtalls were placed to the left, as in the Greek houſes; on the right was the kitchen, which had its light from above, and its chimney in the middle. Farther within the building were placed on one ſide bathing rooms, and on the other family-conveniences, in the manner of our butteries and ſtore-rooms: the bathing rooms were on the left, and the others on the right. Backwards, and full to the north, they placed their cellars, for fear of the ſun; and over theſe were other ſtore-rooms. From this part of the ſtructure one came into the court; for in theſe there generally was only one court: this was taken up by ſervants, and thoſe who had the care of the cattle; and on each ſide there were ſtalls for the cattle. In front from the entrance, but very far from all theſe annoyances, ſtood the nobler apartments for the maſter of the family.

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21 Revival of the art.

In the 15th and 16th centuries, when learning of all kinds began to revive, architecture ſeemed as it were to be recalled into life. The firſt improvements in it began in Italy, and owed their exiſtence to the many ruins of the ancient Roman ſtructures that were to be found in that country, from whence an improved method of building was gradually brought into the other countries of Europe: and though the Italians for a long time retained the ſuperiority as architects over the other European nations; yet, as men of genius travelled from all quarters into Italy, where they had an opportunity of ſeeing the originals from whence the Italians copied, architects have ariſen in other nations equal, if not ſuperior, to any that ever appeared in Italy. Of this we have a recent inſtance in our own countryman Mr Mylne, who lately gained the prize in architecture at Rome, where it would no doubt be diſputed by ſuch natives of Italy as were beſt ſkilled in that art.

We ſhall conclude this hiſtory with an account of the mode of architecture followed by thoſe nations who never had any connection either with the Jews, Greeks, or Romans, and whoſe manner of building muſt conſequently be reckoned quite original, and peculiar to themſelves. Theſe nations are the Chineſe, the Americans, and the ancient Celtes; by the laſt of which the iſland of Britain moſt probably was firſt peopled. The firſt are a very ingenious people, and pretend to very high antiquity; but their architecture is univerſally allowed to be much inferior to that of the Greeks and Romans. 22 Chineſe bridges. It is true, they excelled the ancient Egyptians in knowing the method of conſtructing arches; but though they make uſe of arches in conſtructing bridges, and build ſome of theſe of a prodigious height and length, they ſeem ſtrangely deficient in the knowledge of finiſhing them with propriety. Their method of building them is as follows. As ſoon as they finiſh the ſides of the arch next to the land, or, if there are more arches than one, as ſoon as they finiſh the piers that ſtand between them, they proceed to lay on the ſtones (which are commonly about four or five feet long, and half a foot broad) alternately upright and croſſwiſe, ſo that the key-ſtones always lie horizontally. The top of the arch is uſually no thicker than theſe ſtones; and becauſe the bridges, eſpecially thoſe that have but one arch, are ſometimes 40 or 50 feet between the piers, and conſequently much higher than the cauſeway, they make an aſcent on both ſides by ſteps about three inches thick; the inconvenience of which for horſes and carriages is very evident. In other reſpects, however, the Chineſe bridges are well built, and ſome of them exceedingly beautiful. One in particular, near Pekin, was built of white marble curiouſly wrought and poliſhed. It had 70 pillars on each ſide, divided by cartridges of fine marble, beautifully carved with flowers, foliage, birds, beaſts, and a variety of other ornaments. On each ſide of the entrance on the bridge, at the eaſt end, ſtood two lions of an extraordinary ſize, on two marble pedeſtals, with ſeveral other ſmaller lions in different attitudes. At the other end of the bridge ſtood likewiſe two curious pedeſtals, on which were ſkilfully carved two children; and all the reſt of the workmanſhip was anſwerable to it.

The ſize of ſome of the Chineſe bridges is aſtoniſhing; ſome of them conſiſting of above 100 lofty arches, and being upwards of 160 fathoms in length. A very ſurpriſing one is to be ſeen at the city of Swen-chew-fu, built over the point of an arm of the ſea, which otherwiſe muſt be croſſed in a bark, and often not without danger. It is 2520 Chineſe feet in length, and 20 in breadth; and is ſupported by 252 huge piers, 126 on each ſide. All the ſtones of it are of a greyiſh colour, and of ſuch a length and thickneſs as to go acroſs from one ſide to the other. Another ſort of bridges are built over a valley, to join two mountains together. Of this kind there is one mentioned by travellers, called *pons volans*, which is reckoned to be 400 cubits in length, and 500 in height. Another ſtill more ſtupendous is to be ſeen in the province of Shen-ſi. It was built over ſeveral high hills, and employed 100,000 men. To erect this bridge, ſome of the hills were levelled, and vaſt arches built between others, ſome of which were ſupported by pillars of a monſtrous height and thickneſs, where the valley proved too wide.

23 Triumphal arches.

The Chineſe are likewiſe very fond of triumphal arches. Theſe are to be ſeen in great numbers, not only in all their cities, but on the mountains and eminences along the roads. They were originally erected in memory of their heroes, or perſons who had ſignalized themſelves by ſervices done the ſtate; but ſome of them are alſo erected to the memories of noble and illuſtrious women. The ornamental part of their ancient triumphal arches is ſo curiouſly wrought, the feſtoons and flowers ſo neatly cut, and the birds and other animals carved in ſuch lively attitudes, that Father Le Compte looked upon them as Chineſe maſter-pieces of that kind. Theſe ornaments are ſo wonderfully detached from one another, that they ſeem to be only joined to, or run into, each other by ſmall cordons, without the leaſt confuſion. This ſufficiently ſhews the ſuperior ſkill of their ancient workmen; for in thoſe of later date the ſculpture is ſparing, looks coarſe and heavy, and is without any piercing, or variety to enliven it. Except this neatneſs in the carving, however, neither the ancient nor modern architecture of the Chineſe can be compared with the European, either with regard to the proportion, or the diſpoſition of its parts. They have neither cornices nor capitals; and that which bears ſome reſemblance to our frizes, is of ſuch a height, that it rather ſhocks the eye that is unaccuſtomed to it; tho' it is ſo much the more agreeable to the Chineſe taſte, as affording more ſpace for ornaments.

24 American architecture.

Among the Americans, as may be naturally imagined, architecture was in a much lower ſtate than either among the ancient Egyptians, or perhaps any other nation whatever. The Peruvians, who were the moſt civilized nation in America, had indeed attained to the art of poliſhing ſtones and fitting them to one another; but they were entirely ignorant of the uſe of cement, and were equally deſtitute of contrivance in their buildings. Their temples were often of a vaſt extent. That of Pachacamac, together with a palace of the Inca, and a fortreſs, were ſo connected together, as to form a ſtructure half a league in circuit. Being unacquainted, however, with the uſe of the pulley, they were unable to raiſe the large ſtones, employed in building it, to any conſiderable height, and conſequently the walls of all their edifices were low. Thoſe of the temple of Pachacamac roſe only twelve feet from the ground. They were indeed built with ſo much nicety, that the ſeams could hardly be diſcerned; but the apartments, as far as they can be traced in the ruins, were ill diſpoſed, and afforded little accommodation. There was not a ſingle window in any part of the building; and as no light could enter but by the door, the greateſt part of the building muſt either have been totally dark, or artificially illuminated.

In the kingdom of Mexico, many magnificent cities and temples are ſaid to have been found by the Spaniards; but, as not the leaſt veſtiges of any ſuch buildings are now to be ſeen, it may juſtly be queſtioned whether they ever had an exiſtence. Nor do even the exaggerated deſcriptions of the Spaniſh writers, when they deſcend to particulars, tend to give us any high idea of their magnificence. As far as can be gathered from their obſcure and inaccurate deſcriptions, the famous temple of Mexico was only a ſquare maſs of earth partly faced with ſtone. It was raiſed to ſuch a height, that the aſcent to it was by a ſtair-caſe of 114 ſteps. Its baſe extended 90 feet on each ſide; and at the top it terminated in a quadrangle of 30 feet ſquare, where were placed a ſhrine of the Deity, and two altars on which the victims were ſacrificed. All the other celebrated temples in the kingdom were formed exactly on the ſame model; from which we can entertain no very high idea of the progreſs of the Mexicans in architecture.

25 Celtic.

The Celtic architecture is ſtill viſible in ſome remains of ancient Druidic temples, &c. in ſome parts of Britain. It appears to have been ſtill more barbarous than the American; the ſtones being not only put together without any cement, but without the leaſt poliſh; although, like other nations, they endeavoured to ſhew their magnificence by the vaſt ſize of the ſtones whereof theſe rude ſtructures were compoſed. Of this there is a remarkable inſtance in the ruin called *Stonehenge**, near Saliſbury in England. This, by Dr Stukely, is reckoned to be the remains of the chief Druidic temple in the iſland; and ſome of its ſtones are ſo big, that it would require above 140 oxen to draw them.

26 Extraordinary method of vitrifying walls.

Several circular buildings of ſtones placed upon one another without any cement are alſo to be ſeen in different parts of the Highlands of Scotland. A very extraordinary ſpecies of buildings, however, have lately been diſcovered in that country, in which the ſtones, inſtead of being cemented together with clay or lime, are melted together into a kind of half vitrified maſs. What hath given occaſion to ſuch an extraordinary method of building, it is difficult to determine. It ſeems hard to ſuppoſe that our anceſtors ſhould have known how to vitrify walls, and at the ſame time remained ignorant of the uſe of every kind of cement; and if, on the other hand, they really were acquainted with cement, the total want of it in every one of their buildings is equally unaccountable. Be this as it will, the fact is now certainly eſtabliſhed, and an account has been publiſhed by Mr Williams, mineral engineer, of ſeveral ruins in the Highlands, where "the walls have been vitrified, or run and compacted together, by the force of fire; and that ſo effectually, that the moſt of the ſtones have been melted down; and any part of the

* See the ticle *Stonehenge*.

the ſtones not quite run to glaſs has been entirely enveloped by the vitrified matter; and in ſome places the vitrification has been ſo complete, that the ruins now appear like vaſt maſſes or fragments of coarſe glaſs or ſlags."

In what age this unparallelled method of building was in uſe, we can by no means determine, as not only hiſtory, but even fable of every kind, is ſilent about it. Nay, ſo little has ſuch a contrivance been dreamed of by the moderns, that Mr Pennant, and others, who have obſerved theſe vitrified ruins in Scotland, took them for the lava's of ancient burning mountains.

27 Conjecture concerning them.

Theſe vitrified walls, notwithſtanding the apparent difficulty of erecting them, ſeem by no means to have been deficient in height: for Mr Williams mentions one, the remains of which are ſtill 12 feet perpendicular, from which it may be ſuppoſed to have been originally much higher; though even this is a vaſt height, conſidering the materials. Concerning their conſtruction Mr Williams has the following conjecture.

" I imagine, (ſays he), they have raiſed two parallel dykes of earth or ſods in the direction or courſe of their intended wall or building, and left a ſpace between them juſt wide enough for the wall. I ſuppoſe theſe two parallel dykes, the groove, or mould in which they were to run their wall. This groove between the two dykes I ſuppoſe they packed full of fuel, on which they would lay a proper quantity of the materials to be vitrified. There is no doubt but a hot fire would melt down the ſtones, eſpecially if they were of the plum-pudding kind, and not too large; and the frame of earth would keep the materials, when in fuſion, from running without the breadth of their intended wall.

" This being the foundation, I ſuppoſe they have added new fires, and more materials, and raiſed their mould of earth by degrees, till they brought the whole to the intended height, and then have removed the earth from both ſides the vitrified wall.

I am confident, from the appearance of the ruins, that the materials were run down by the fire in ſome ſuch method as this. In all the ſections of the larger and ſmaller fragments of the vitrified ruins I have ſeen, I never ſaw the leaſt appearance of a ſtone being laid in any particular way. I never ſaw a large ſtone in any fragment of theſe ruins; nor any ſtone, nor piece of a ſtone, that was not affected by the fire, and ſome part of it vitrified; and all the bits of ſtones that appear in theſe fragments, appear higgledy piggledy, juſt as we would ſuppoſe they would fall down in the fire when the materials were in a ſtate of fuſion.

" I have often ſeen lime-ſtone for land burnt in turf-kilns, which were nothing but two parallel dykes raiſed about ſix or ſeven feet high, and the ends built up as they filled in the ſtone and fuel.

" Theſe anſwer very well in moderate weather; but in a high wind, I have ſeen the lime-ſtone vitrified to that degree, that it would coſt the farmers much labour to dig out the vitrified matter, and they would have but very little lime for their pains; yet the turf-kiln would ſtand it ſo well, that they would burn more than once in the ſame kiln.

" This I give as an example that they might run their vitrified wall in a groove between two turf-walls.

" A gentleman in Edinburgh, of great knowledge and veracity, told me, that his father had a brick-kiln built on the edge of a pretty ſteep bank; and that, while the kiln was burning, a high wind one night increaſed the heat to ſuch a degree, that in the morning great part of the kiln was vitrified, which ran in a lava a conſiderable way down the hill."

Theſe vitrified ruins are generally found on the tops of ſmall hills, and have always the remains of ſome dry ſtone incloſures on the ſouth ſide of them, which are by our author thought to have been places where their cattle were confined, and kept out of the reach of their enemies.—As to any other ſpecies of architecture in Britain, we know of none but what was introduced by the Romans, and, after being almoſt entirely loſt, was conſiderably improved by the Normans, and ſtill more, on the revival of the polite arts in the 15th and 16th centuries, as already obſerved.

PART I. PRINCIPLES OF ARCHITECTURE.

MANY ages muſt have elapſed before architecture came to be conſidered as a fine art. Utility was its original deſtination, and ſtill continues to be its principal end. Experience, however, has taught us, that architecture is capable of exciting a variety of agreeable feelings. Of theſe, utility, grandeur, regularity, order, and proportion, are the chief.

28 ſtinction of buildings.

Architecture being an uſeful as well as a fine art, leads us to diſtinguiſh buildings, and parts of buildings, into three kinds, *viz.* what are intended for uſe ſolely, what for ornament ſolely, and what for both. Buildings intended for utility ſolely, ought in every part to correſpond preciſely to that intention: the leaſt deviation from uſe, though contributing to ornament, will be diſagreeable; for every work of uſe being conſidered as a mean to an end, its perfection as a mean is the capital circumſtance, and every other beauty in oppoſition is neglected as improper. On the other hand, in ſuch things as are intended ſolely for ornament, as columns, obeliſks, triumphal arches, &c. beauty alone ought to be regarded. The principal difficulty in architecture lies in combining uſe and ornament. In order to accompliſh theſe ends, different and even oppoſite means muſt be employed; which is the reaſon why they are ſo ſeldom united in perfection; and hence, in buildings of this kind, the only practicable method is, to prefer utility to ornament according to the character of the building: in palaces, and ſuch buildings as admit of a variety of uſeful contrivance, regularity ought to be preferred; but in dwelling-houſes that are too ſmall for variety of contrivance, utility ought to prevail, neglecting regularity as far as it ſtands in oppoſition to convenience.

29 Intrinſic and relative beauty.

In conſidering attentively the beauty of viſible objects, we diſcover two kinds. The firſt may be termed *intrinſic* beauty, becauſe it is diſcovered in a ſingle object, without relation to any other. The ſecond may be termed *relative* beauty, being founded on a combination

tion of relative objects. Architecture admits of both kinds. We ſhall firſt give a few examples of *relative* beauty.

The proportions of a door are determined by the uſe to which it is deſtined. The door of a dwelling-houſe, which ought to correſpond to the human ſize, is confined to ſeven or eight feet in height, and three or four in breadth. The proportions proper for a ſtable or coach-houſe are different. The door of a church ought to be wide, in order to afford an eaſy paſſage for a multitude; and its height muſt be regulated by its wideneſs, that the proportion may pleaſe the eye. The ſize of the windows ought always to be proportioned to that of the room they are deſtined to illuminate; for if the apertures be not large enough to convey light to every corner, the room muſt be unequally lighted, which is a great deformity. Steps of ſtairs ſhould likewiſe be accommodated to the human figure, without regarding any other proportion; they are accordingly the ſame in large and in ſmall buildings, becauſe both are inhabited by men of the ſame ſize.

We ſhall next conſider *intrinſic* beauty, blended with that which is *relative*. A cube itſelf is more agreeable than a parallelopipedon; this conſtantly holds in ſmall figures: but a large building in the form of a cube is lumpiſh and heavy; while a parallelopipedon, ſet on its ſmaller baſe, is more agreeable on account of its elevation: Hence the beauty of Gothic towers. But if this figure were to be uſed in a dwelling-houſe, to make way for relative beauty, we would immediately perceive that utility ought chiefly to be regarded; and this figure, inconvenient by its height, ought to be ſet on its larger baſe: the loftineſs in this caſe would be loſt; but that loſs will be more than ſufficiently compenſated by the additional convenience. Hence the form of buildings ſpread more upon the ground than raiſed in height, is always preferred for a dwelling-houſe.

30 Internal diviſions of houſes.

With regard to the internal diviſions, utility requires that the rooms be rectangular, to avoid uſeleſs ſpaces. An hexagonal figure leaves no void ſpaces; but it determines the rooms to be all of one ſize, which is both inconvenient and diſagreeable for want of variety. Though a cube be the moſt agreeable figure, and may anſwer for a room of a moderate ſize; yet, in a very large room, utility requires a different figure. Unconfined motion is the chief convenience of a great room; to obtain this, the greateſt length that can be had is neceſſary. But a ſquare room of large ſize is inconvenient. It removes chairs, tables, &c. at too great a diſtance from the hand, which, when unemployed, muſt be ranged along the ſides of the room. Utility therefore requires a large room to be a parallellogram. This figure is likewiſe beſt calculated for the admiſſion of light; becauſe, to avoid croſs-lights, all the windows ought to be in one wall; and if the oppoſite wall be at ſuch a diſtance as not to be fully lighted, the room muſt be obſcure. The height of a room exceeding nine or ten feet has little relation to utility; therefore proportion is the only rule for determining the height, when above that number of feet.

31 Utility and beauty often incompatible.

Artiſts who deal in the beautiful, love to entertain the eye; palaces and ſumptuous buildings, in which intrinſic beauty may be fully diſplayed, give them an opportunity of exerting their taſte. But ſuch a propenſity is peculiarly unhappy with regard to private dwelling-houſes; becauſe, in theſe, relative beauty cannot be diſplayed to perfection, without hurting intrinſic beauty. There is no opportunity for great variety of form in a ſmall houſe; and in edifices of this kind, internal convenience has not hitherto been happily adjuſted to external regularity. Perhaps an accurate coincidence in this reſpect is beyond the reach of art. Architects, however, conſtantly ſplit upon this rock; for they never can be perſuaded to give over attempting to reconcile theſe two incompatibles: how otherwiſe ſhould it happen, that of the endleſs variety of private dwelling-houſes, there ſhould not be one found that is generally agreed upon as a good pattern? the unwearied propenſity to make a houſe regular as well as convenient obliges the architect, in ſome articles, to ſacrifice convenience to regularity; and, in others, regularity to convenience; and accordingly the houſe which turns out neither regular nor convenient, never fails to diſpleaſe.

Nothing can be more evident, than that the form of a dwelling-houſe ought to be ſuited to the climate; yet no error is more common than to copy in Britain the form of Italian houſes, not forgetting even thoſe parts that are purpoſely contrived for collecting air, and for excluding the ſun: witneſs our colonnades and logios, deſigned by the Italians to gather cool air, and exclude the beams of the ſun, conveniencies which the climate of this country does not require.

32 Architecture conſidered as fine art.

We ſhall next view architecture as one of the fine arts; which will lead us to the examination of ſuch buildings, and parts of buildings, as are calculated ſolely to pleaſe the eye. Variety prevails in the works of nature; but art requires to be guided by rule and compaſs. Hence it is, that in ſuch works of art as imitate nature, the great art is, to hide every appearance of art; which is done by avoiding regularity, and indulging variety. But in works of art that are original and not imitative, ſuch as architecture, ſtrict regularity and uniformity ought to be ſtudied, ſo far as conſiſtent with utility.

33 Differenc between proporti of numb and quan tity.

Proportion is not leſs agreeable than regularity and uniformity; and therefore, in buildings intended to pleaſe the eye, they are all equally eſſential. It is taken for granted by many writers, that in all the parts of a building there are certain ſtrict proportions which pleaſe the eye, in the ſame manner as in ſound there are certain ſtrict proportions which pleaſe the ear; and that, in both, the ſlighteſt deviation is equally diſagreeable. Others ſeem to reliſh more a compariſon between proportion in numbers, and proportion in quantity; and maintain, that the ſame proportions are agreeable in both. The proportions, for example, of the numbers 16, 24, and 36, are agreeable; and ſo, ſay they, are the proportions of a room, whoſe height is 16 feet, the breadth 24, and the length 36. But it ought to be conſidered, that there is no reſemblance or relation between the objects of different ſenſes. What pleaſes the ear in harmony, is not the proportion of the ſtrings of the inſtrument, but of the ſound which theſe ſtrings produce. In architecture, on the contrary, it is the proportion of different quantities that pleaſes the eye, without the leaſt relation to ſound. The ſame thing may be ſaid of numbers. Quantity is a real quality of every body; number is not a real quality, but merely an idea that ariſes upon viewing a plurality of things in ſucceſſion.

ſion. An arithmetical proportion is agreeable in numbers; but have we from this any reaſon to conclude, that it muſt alſo be agreeable in quantity? At this rate, a geometrical proportion, and many others, ought alſo to be agreeable in both. A certain proportion may coincide in quantity and number; and amongſt an endleſs variety of proportions, it would be wonderful if there never ſhould be a coincidence. One example is given of this coindence in the numbers 16, 24, and 36; but, to be convinced that it is merely accidental, we need but reflect, that the ſame proportions are not applicable to the external figure of a houſe, and far leſs to a column.

It is ludicrous to obſerve writers acknowledging the neceſſity of accurate proportions, and yet differing widely about them. Laying aſide reaſoning and philoſophy, one fact univerſally agreed on ought to have undeceived them, that the ſame proportions which pleaſe in a model are not agreeable in a large building: a room 48 feet in length, and 24 in breadth and height, is well proportioned: but a room 12 feet wide and high, and 24 long, approaches to a gallery.

34
eauty ari-
ng from
roportion.

Perrault, in his compariſon of the ancients and moderns, goes to the oppoſite extreme; maintaining, that the different proportions aſſigned to each order of columns are arbitrary, and that the beauty of theſe proportions is entirely the effect of cuſtom. But he ſhould have conſidered, that if theſe proportions had not originally been agreeable, they could never have been eſtabliſhed by cuſtom.

For illuſtrating this point, we ſhall add a few examples of the agreeableneſs of different proportions. In a ſumptuous edifice, the capital rooms ought to be large, otherwiſe they will not be proportioned to the ſize of the building; for the ſame reaſon, a very large room is improper in a ſmall houſe. But in things thus related, the mind requires not a preciſe or ſingle proportion, rejecting all others; on the contrary, many different proportions are equally agreeable. It is only when a proportion becomes looſe and diſtant, that the agreeableneſs abates, and at laſt vaniſhes. Accordingly, in buildings, rooms of different proportions are found to be equally agreeable, even where the proportion is not influenced by utility. With regard to the proportion the height of a room ſhould bear to the length and breadth, it muſt be extremely arbitrary, conſidering the uncertainty of the eye as to the height of a room when it exceeds 16 or 17 feet. In columns, again, every architect muſt confeſs that the proportion of height and thickneſs varies betwixt 8 diameters and 10, and that every proportion between theſe two extremes is agreeable. Beſides, there muſt certainly be a further variation of proportion, depending on the ſize of the column. A row of columns 10 feet high, and a row twice that height, requires different proportions: The intercolumniations muſt alſo differ in proportion according to the height of the row.

Proportion of parts is not only itſelf a beauty, but is inſeparably connected with a beauty of the higheſt reliſh, that of concord and harmony: which will be plain from what follows: A room, the parts of which are all finely adjuſted to each other, ſtrikes us not only with the beauty of proportion, but with a pleaſure far ſuperior. The length, the breadth, the height, the windows, raiſe each of them a ſeparate emotion: Theſe emotions are ſimilar; and, though faint when ſeparately felt, they produce in conjunction the emotion of concord or harmony, which is very pleaſant. On the other hand, where the length of a room far exceeds the breadth, the mind, comparing together parts ſo intimately connected, immediately perceives a diſagreement or diſproportion which diſguſts. Hence a long gallery, however convenient for exerciſe, is not an agreeable figure of a room.

35
Form of ſtructures to be ſuited to the purpoſes for which they are intended.

In buildings deſtined chiefly or ſolely to pleaſe the eye, regularity and proportion are eſſentially neceſſary, becauſe they are the means of producing intrinſic beauty. But a ſkilful artiſt will not confine his view to regularity and proportion; he will alſo ſtudy congruity, which is perceived when the form and ornaments of a ſtructure are ſuited to the purpoſe for which it is appointed. Hence every building ought to have an expreſſion ſuited to its deſtination. A palace ought to be ſumptuous and grand; a private dwelling, neat and modeſt; a play-houſe, gay and ſplendid; and a monument, gloomy and melancholy. A heathen temple has a double deſtination: It is conſidered as a houſe dedicated to ſome divinity; therefore it ought to be grand, elevated, and magnificent: It is alſo conſidered as a place of worſhip; and therefore ought to be ſomewhat dark and gloomy, becauſe dimneſs or obſcurity produces that tone of mind which is favourable to humility and devotion. Columns, beſides their chief deſtination of being ſupports, contribute to that peculiar expreſſion which the deſtination of a building requires. Columns of different proportions ſerve to expreſs loftineſs, lightneſs, &c. as well as ſtrength. Situation may alſo contribute to expreſſion: Conveniency regulates the ſituation of a private dwelling-houſe; and the ſituation of a palace ought to be lofty. This leads to a queſtion, Whether the ſituation, where there happens to be no choice, ought, in any meaſure, to regulate the form of the edifice? The connection between a great houſe and a neighbouring field, though not extremely intimate, demands however ſome congruity. It would, for example, diſpleaſe us to find an elegant building thrown away upon a wild uncultivated country: congruity requires a poliſhed field for ſuch a building. The old Gothic form of building was well ſuited to the rough uncultivated regions where it was invented; but was very ill adapted to the fine plains of France and Italy.

36
Internal diviſion of houſes.

The external ſtructure of a houſe leads naturally to its internal ſtructure. A large and ſpacious room, which is the firſt that commonly receives us, is a bad contrivance in ſeveral reſpects. In the firſt place, when immediately from the open air we ſtep into ſuch a room, its ſize in appearance is diminiſhed by contraſt; it looks little, compared with the great canopy of the ſky. In the next place, when it recovers its grandeur, as it ſoon doth, it gives a diminutive appearance to the reſt of the houſe; paſſing from it, every apartment looks little. In the third place, by its ſituation it ſerves only for a waiting-room, and a paſſage to the principal apartments. Rejecting therefore this form, a hint may be taken from the climax in writing for another that appears more ſuitable: A handſome portico, proportioned to the ſize and faſhion of the front, leads into a waiting-room of a larger ſize, and this to the great room, all by a progreſſion of ſmall to great.

Grandeur is the principal emotion that architecture is capable of raiſing in the mind: it might therefore be the chief ſtudy of the artiſt, in great buildings deſtined to pleaſe the eye. But as grandeur depends partly on ſize, it is unlucky for architecture that it is governed by regularity and proportion, which never deceive the eye by making objects appear larger than they are in reality. But though regularity and proportion contribute nothing to grandeur, ſo far as that emotion depends on ſize; yet they contribute greatly to it by confining the ſize within ſuch bounds that it can be taken in and examined at one view; for when objects are ſo large as not to be comprehended but in parts, they tend rather to diſtract than ſatisfy the mind.

We ſhall next paſs to ſuch ornaments as contribute to give buildings a peculiar expreſſion. It has been doubted, whether a building can regularly admit any ornament but what is uſeful, or at leaſt has that appearance. But, conſidering the double aim of architecture as a fine, as well as an uſeful art, there is no reaſon why ornaments may not be added to pleaſe the eye, without any relation to utility. A private dwelling-houſe, it is true, and other edifices, where uſe is the chief aim, admit not regularly any ornament but what has at leaſt the appearance of uſe: but temples, triumphal arches, and other buildings intended chiefly or ſolely for ſhow, may be highly ornamented.

37 Different kinds of ornaments.

This ſuggeſts a diviſion of ornaments into three kinds, *viz.* 1. Ornaments that are beautiful without relation to uſe; ſuch as ſtatues, vaſes, baſſo or alto relievo: 2. Things in themſelves not beautiful, but poſſeſſing the beauty of utility, by impoſing on the ſpectator, and appearing to be uſeful; ſuch as blind windows: 3. Where things are beautiful in themſelves, and at the ſame time take on the appearance of uſe; ſuch as pilaſters.

With regard to the *firſt*, we naturally require that a ſtatue be ſo placed, as to be ſeen in every direction, and examined at different diſtances. Statues, therefore, are properly introduced to adorn the great ſtair that leads to the principal door of a palace, or to leſſen the void between pillars. But a niche in the external front is an improper place for a ſtatue. There is an additional reaſon againſt placing them upon the roof or top of the walls: their ticklish ſituation gives pain, as they have the appearance of being in danger of tumbling down; beſides, we are inclined to feel from their being too much expoſed to the inclemencies of the weather. To adorn the top of the wall with a row of vaſes, is an unhappy conceit, by placing a thing, whoſe natural deſtination is utility, where it cannot have even the appearance of uſe. As to carvings upon the external ſurface of a building, termed *baſſo relievo* when flat, and *alto relievo* when prominent, all contradictory expreſſions ought to be avoided. Now, firmneſs and ſolidity being the proper expreſſions of a pedeſtal, and, on the contrary, lightneſs and delicacy of carved work, the pedeſtal, whether of a column or of a ſtatue, ought to be ſparingly ornamented. The ancients never ventured any bolder ornament than the baſſo relievo.

With reſpect to ornaments of the *ſecond* kind, it is a great blunder to contrive them ſo as to make them appear uſeleſs. A blind window, therefore, when neceſſary for regularity, ought to be ſo diſguiſed as to appear a real window: when it appears without diſguiſe, it is diſguſtful, as a vain attempt to ſupply the want of invention; it ſhows the irregularity in a ſtronger light, by ſignifying that a window ought to be there in point of regularity, but that the architect had not ſkill ſufficient to connect external regularity with internal convenience.

As to the *third*, it is an error to ſink pilaſters ſo far into the wall, as to remove totally, or moſtly, the appearance of uſe. They ſhould always project ſo much from the wall, as to have the appearance of ſupporting the entablature over them.

38 Columns.

From ornaments in general, we deſcend to a pillar, the chief ornament in great buildings. The deſtination of a pillar is to ſupport, really, or in appearance, another part termed the *entablature*. With regard to the form of a pillar, it muſt be obſerved, that a circle is a more agreeable figure than a ſquare, a globe than a cube, and a cylinder than a parallellopipedon. This laſt, in the language of architecture, is ſaying, that a column is a more agreeable figure than a pilaſter; and for that reaſon it ought to be preferred, when all other circumſtances are equal. Another reaſon concurs, that a column annexed to a wall, which is a plain ſurface, makes a greater variety than a pilaſter. Beſides, pilaſters at a diſtance are apt to be miſtaken for pillars; and the ſpectator is diſappointed, when, on a nearer approach, he diſcovers them to be only pilaſters.

As to the parts of a column, a bare uniform cylinder, without a capital, appears naked; and without a baſe, appears too tickiſhly placed to ſtand firm: it ought therefore to have ſome finiſhing at the top and bottom: Hence the three chief parts of a column, the ſhaft, the baſe, and the capital. Nature undoubtedly requires proportion among theſe parts, but it admits of variety of proportion. Vitruvius and ſome of the elder writers ſeem to think, that the proportions of columns were derived from the human figure, the capital repreſenting the head, the baſe the feet, and the ſhaft the body. The Tuſcan has been accordingly denominated the *Gigantic;* the Doric, the *Herculean;* the Ionic, the *Matronal;* and the Corinthian, the *Virginal;*—the Compoſite is a mixture of the Corinthian and Ionic. As to the baſe, the principle of utility interpoſes to vary it from the human figure, and to proportion it ſo to the whole, as to give the column the appearance of ſtability.

39 Whether new orders can be invented.

Among the Greeks, we find only three orders of columns, the Doric, the Ionic, and the Corinthian, diſtinguiſhed from each other by their deſtination as well as by their ornaments. It has been diſputed, whether any new order can be added to theſe: ſome hold the affirmative, and give for inſtances the Tuſcan and Compoſite; others maintain, that theſe properly are not diſtinct orders, but only the original orders with ſome ſlight variation. The only circumſtances that can ſerve to diſtinguiſh one order from another, are the form of the column, and its deſtination. To make the firſt a diſtinguiſhing mark, without regard to the other, would multiply orders without end. Deſtination is more limited, and it leads us to diſtinguiſh three kinds of orders; one plain and ſtrong, for the purpoſe of ſupporting plain and maſſy buildings; one delicate and graceful, for ſupporting buildings of that character; and between theſe, a third, ſupporting buildings of a mixed nature. So that, if deſtination alone is to be regarded, the Tuſcan is of the ſame order with the Doric, and the Compoſite with the Corinthian.

The ornaments of theſe three orders ought to be ſuited to the purpoſes for which they are intended. Plain and ruſtic ornaments would not be a little diſcordant with the elegance of the Corinthian order, and ſweet and delicate ornaments not leſs with the ſtrength of the Doric.

40 Rules regarding building in general.

With reſpect to buildings of every kind, one rule, dictated by utility, is, that they be firm and ſtable. Another, dictated by beauty, is, that they alſo appear ſo to the eye: for every thing that appears tottering, and in hazard of tumbling down, produceth in the ſpectator the painful emotion of fear, inſtead of the pleaſing emotion of beauty; and accordingly it ſhould be the great care of the artiſt, that every part of his edifice appear to be well ſupported. Some have introduced a kind of conceit in architecture, by giving parts of buildings the appearance of falling; of this kind is the church of St Sophia in Conſtantinople; the round towers in the uppermoſt ſtories of Gothic buildings is in the ſame falſe taſte.

The moſt conſiderable ornaments uſed in architecture are the five orders of columns, pediments, arches, balluſters, *&c.* of which in the following chapters.

CHAP. I. *Of the Orders of Architecture.*

An **ORDER** conſiſts of two principal members, the **COLUMN** and the **ENTABLATURE**; each of which is compoſed of three principal parts. Thoſe of the Column are, the *Baſe*, the *Shaft*, and the *Capital*; and thoſe of the Entablature are, the *Architrave*, the *Frize*, and the *Cornice*. All theſe are ſubdivided into many leſſer parts, whoſe number, form, and dimenſions, characteriſe each order, and expreſs the degree of ſtrength, delicacy, richneſs, or ſimplicity peculiar to it.

41 Parts of an order divided into two claſſes.

The parts that compoſe an order may be diſtributed into two different claſſes. In the *firſt* may be ranged all that have any analogy to the primitive huts, and repreſent ſome part that was neceſſary in their conſtruction. Such are the ſhaft of the column, with the plinth of its baſe, and the abacus of its capital; likewiſe the architrave and triglyphs, the mutules, modilions, or dentils, which all of them repreſent the rafters, or ſome other pieces of timber uſed to ſupport the covering; and the corona, repreſenting the beds of materials that compoſed the covering. All theſe may properly be diſtinguiſhed by the name of *eſſential members*. The ſubſervient parts, contrived for the uſe or ornaments of the former, and commonly called *mouldings*, may conſtitute the *ſecond* claſs.

There are eight regular mouldings in ornamenting columns: the fillet, liſtel, or ſquare; the aſtragal, or bead; the torus, or tore; the ſcotia, mouth, or caſement; the echinus, ovolo, or quarter-round; the inverted cyma, talon, or ogee; the cyma, cyma recta, or cymatium; the cavetto, or hollow. The names of theſe allude to their forms, and their forms are adapted to the purpoſes for which they are intended. See Plate XXIX.

The ovolo and talon, as they are ſtrong at the extremities, are fit for ſupports; the cyma and cavetto, though improper for ſupports, ſerve for coverings to ſhelter other members; the torus and aſtragal, being ſhaped like ropes, are intended to bind and fortify the parts with which they are connected: But the uſe of the ſcotia and fillet is only to ſeparate and diſtinguiſh the other mouldings, to give a graceful turn to the profile, and to prevent the confuſion which would ariſe from joining ſeveral curved members together.

There are various methods of deſcribing the contours of mouldings; but the ſimpleſt and beſt is to form them of quadrants of circles.

42 Profile, what.

An aſſemblage of what are called eſſential parts and mouldings is termed a *profile*. The moſt perfect profiles are ſuch as are compoſed of few mouldings, varied in form and ſize; and ſo diſpoſed, that the ſtraight and curved ones ſucceed each other alternately. When ornaments are employed in mouldings, ſome of them ſhould be left plain, in order to give a proper repoſe: For, when all are ornamented, the figure of the profile is loſt.

43 Diminution of columns.

Columns, in imitation of trees, from which they drew their origin, are tapered in their ſhafts. In the antiques the diminution is variouſly performed; beginning ſometimes from the foot of the ſhaft, and at others from one quarter, or one third of its height; the lower part being perfectly cylindrical. The former of theſe was moſt in uſe amongſt the ancients, and, being the moſt natural and graceful, ought to have the preference, though the latter hath been more univerſally practiſed by modern artiſts.

The firſt architects, ſays Mr Auzoult, probably made their columns in ſtraight lines, in imitation of trees; ſo that their ſhaft was a fruſtum of a cone: but finding this form abrupt and diſagreeable, they made uſe of ſome curve, which, ſpringing from the extremities of the ſuperior and inferior diameters of the column, ſwelled beyond the ſides of the cone, and by that means gave a more pleaſing figure to the contour.

Vitruvius, in the ſecond chapter of his third book, mentions this practice, but in ſo obſcure and curſory a manner, that his meaning hath not been underſtood; and ſeveral of the modern architects, intending to conform themſelves to his doctrine, have made the diameters of their columns greater in the middle than at the foot of the ſhaft. Leon Baptiſta, Alberti, and others of the Florentine and Roman architects, have carried this to a very great exceſs; for which they have been juſtly blamed, as it is neither natural, reaſonable, nor beautiful.

Monſieur Auzoult obſerves, that a column, ſuppoſing its ſhafts to be the fruſtum of a cone, may have an additional thickneſs in the middle, without being ſwelled there beyond the bulk of its inferior parts; and ſuppoſes the addition mentioned by Vitruvius to ſignify nothing but the increaſe towards the middle of the column, occaſioned by changing the ſtraight line, which at firſt was in uſe, for a curve.

This ſuppoſition is extremely juſt, and founded on what is obſerved in the works of antiquity; where there is no inſtance of columns thicker in the middle than at the bottom, though all have the ſwelling hinted at by Vitruvius, all of them being terminated by curves; ſome granite columns excepted, which are bounded by ſtraight lines; a proof, perhaps, of their an-

antiquity, or of their having been wrought in the quarries of Egypt by bungling and unſkilful workmen.

Monſieur Blondel, in his book entitled *Reſolution des quatre principaux problemes d' Architecture*, teaches various manners of diminiſhing columns; the beſt and ſimpleſt of which is by means of the inſtrument which Nicomedes invented to deſcribe the firſt conchoid: for this, being applied at the bottom of the ſhaft, performs at one ſweep both the ſwelling and the diminution; giving ſuch a graceful form to the column, that it is univerſally allowed to be the moſt perfect practice hitherto diſcovered. The columns in the Pantheon, accounted the moſt beautiful among the antiques, are made in this manner; as appears by the exact meaſures of one of them to be found in Deſgodet's antiquities of Rome.

44 **Vignola's method.**

To give an accurate idea of the operation, it will be neceſſary firſt to deſcribe Vignola's method of diminution, on which it is grounded. "As to this ſecond method, ſays Vignola, it is a diſcovery of my own; and although it be leſs known than the former, it will be eaſily comprehended by the figure. Having therefore determined the meaſures of your column, (that is to ſay, the height of the ſhaft, and its inferior and ſuperior diameters), draw a line indefinitely from C through D, perpendicular to the axis of the column: this done, ſet off the diſtance C D, which is the inferior ſemi-diameter, from A, the extreme point of the ſuperior ſemi-diameter, to B, a point in the axis; then from A, through B, draw the line A B E, which will cut the indefinite line C D in E; and, from this point of interſection E, draw thro' the axis of the column any number of rays as E b a, on each of which, from the axis towards the circumference, ſetting off the interval C D, you may find any number of points, a, a, a, through which if a curve be drawn, it will deſcribe the ſwelling and diminution of the column."

Plate XXV. (B).

45 **Nicomedes's inſtrument.**

Though this method be ſufficiently accurate for practice, eſpecially if a conſiderable number of points be found, yet, ſtrictly ſpeaking, it is defective; as the curve muſt either be drawn by hand, or by applying a flexible ruler to all the points; both of which are liable to variations. Blondel therefore, to obviate this objection, (after having proved the curve paſſing from A to C through the points a a, to be of the ſame nature with the firſt conchoid of the ancients), employed the inſtrument of Nicomedes to deſcribe it; the conſtruction of which is as follows:

Having determined, as above, the length of the ſhaft, with the inferior and ſuperior diameters of the column, and having likewiſe found the length of the line C D E, take three rulers, either of wood or metal, as F G, I D, and A H; of which let F G and I D be faſtened together at right angles in G. Cut a dove-tail groove in the middle of F G, from top to bottom; and at the point E on the ruler I D (whoſe diſtance, from the middle of the groove in F G, is the ſame as that of the point of interſection from the axis of the column) fix a pin; then on the ruler A H ſet off the diſtance A B, equal to C D the inferior ſemidiameter of the column, and at the point B fix a button, whoſe head muſt be exactly fitted to the groove made in F G, in which it is to ſlide; and, at the other extremity of the ruler A H, cut a ſlit or canal from H to K, whoſe length muſt not be leſs than the difference of length between E B and E D, and whoſe breadth muſt be ſufficient to admit the pin fixed at E, which muſt paſs through the ſlit, that the ruler may ſlide thereon.

The inſtrument being thus completed, if the middle of the groove, in the ruler F G, be placed exactly over the axis of the column, it is evident that the ruler A H, in moving along the groove, will with the extremity A deſcribe the curve A a a C; which curve is the ſame as that produced by Vignola's method of diminution, ſuppoſing it done with the utmoſt accuracy; for the interval A B, a b, is always the ſame; and the point E is the origin of an infinity of lines, of which the parts B A, ba, ba, extending from the axis to the circumference, are equal to each other and to D C. And if the rulers be of an indefinite ſize, and the pins at E and B be made to move along their reſpective rulers, ſo that the intervals A B and D E may be augmented or diminiſhed at pleaſure, it is likewiſe evident that the ſame inſtrument may be thus applied to columns of any ſize.

46 Quantity o diminution

In the remains of antiquity the quantity of the diminution is various; but ſeldom leſs than one eighth of the inferior diameter of the column, nor more than one ſixth of it. The laſt of theſe is by Vitruvius eſteemed the moſt perfect.

Of the TUSCAN Order.

47 Plate XXV

This is the moſt ſolid and ſimple of all the orders. It is compoſed of few parts, devoid of ornaments, and ſo maſſy, that it ſeems capable of ſupporting the heavieſt burden. There are no remains of a regular Tuſcan order among the antiques: the doctrine of Vitruvius concerning it is obſcure; and the profiles of Palladio, Scamozzi, Serlio, de l'Orme, and Vignola, are all imperfect.

The height of the Tuſcan column is 14 modules, or ſemi-diameters, each conſiſting of 30 minutes; and that of the whole entablature $3\frac{1}{2}$ modules; which being divided into 10 equal parts, three of them are for the height of the architrave, three for the frize, and the remaining four for the cornice: The capital is one module; the baſe, including the lower cincture of the ſhaft, is likewiſe one module; and the ſhaft, with its upper cincture and aſtragal, 12 modules.

Theſe are the general dimenſions of the order; the particular dimenſions may be learned by inſpection of the plates.

In the remains of antiquity, the quantity of diminution at the top of the Tuſcan column is various; but ſeldom leſs than one eighth, nor more than one ſixth, of the inferior diameter of the column. The laſt of theſe is generally preferred; and Chalmers and others make the ſame diminution in all columns, without regard to their order.

Of the DORIC.

48 Pl. XXVI

This order is next in ſtrength to the Tuſcan; and, being of a grave, robuſt, and maſculine aſpect, is by Scamozzi called the *Herculean*. As it is the moſt ancient of all the orders, it retains more of the ſtructure of the primitive huts than any of the reſt; the triglyphs in its frize repreſenting the ends of the joiſts, and the mutules in its cornice repreſenting the rafters.

The height of the Doric column, including its ca-

Plate XXV. (B).

Fig. 2. The second sort of Huts

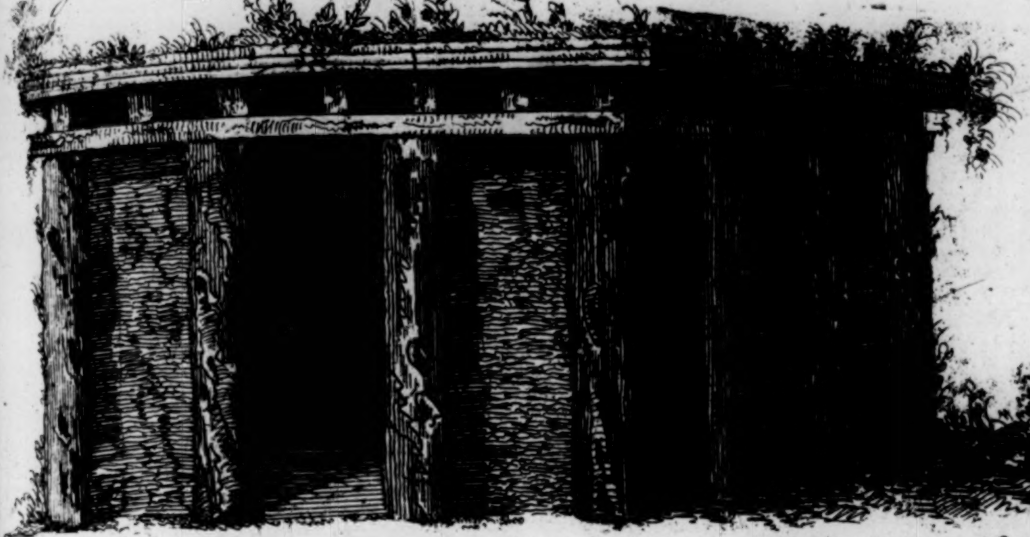


Fig. 1. The first sort of Huts

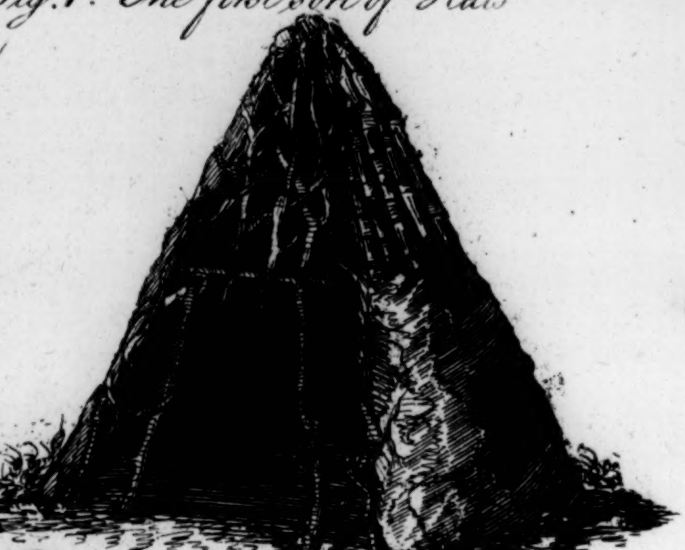


Fig. 4.
Origin of the Corinthian Order.

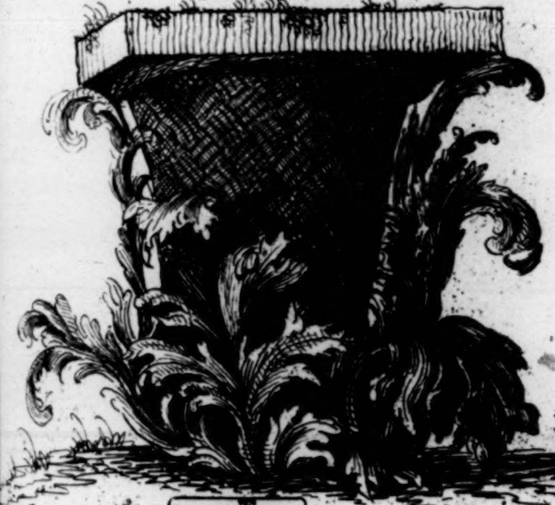
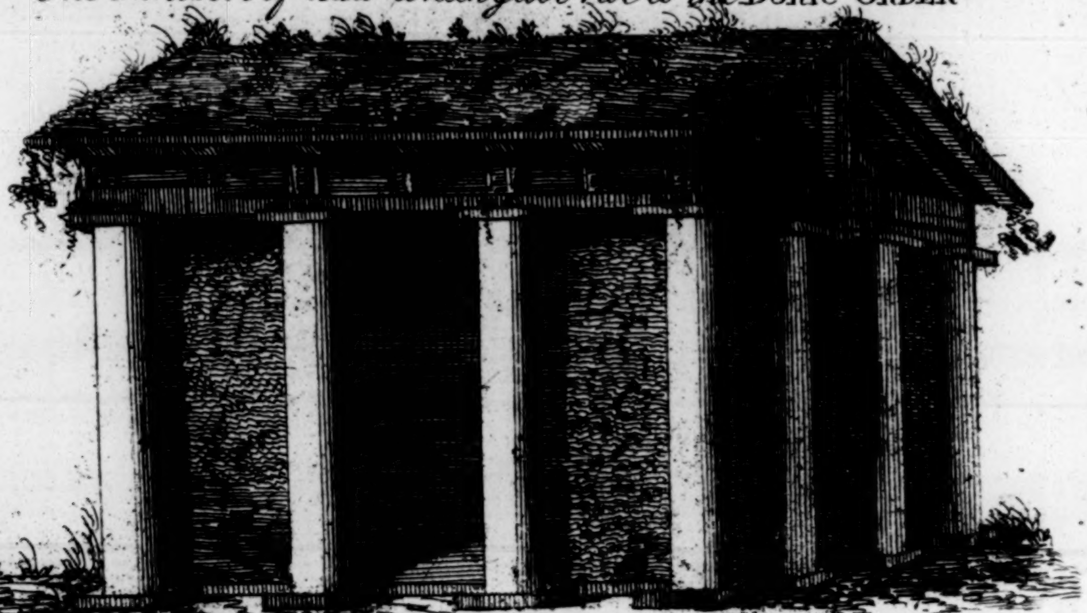


Fig. 3.
The third sort of huts which gave rise to the DORIC ORDER



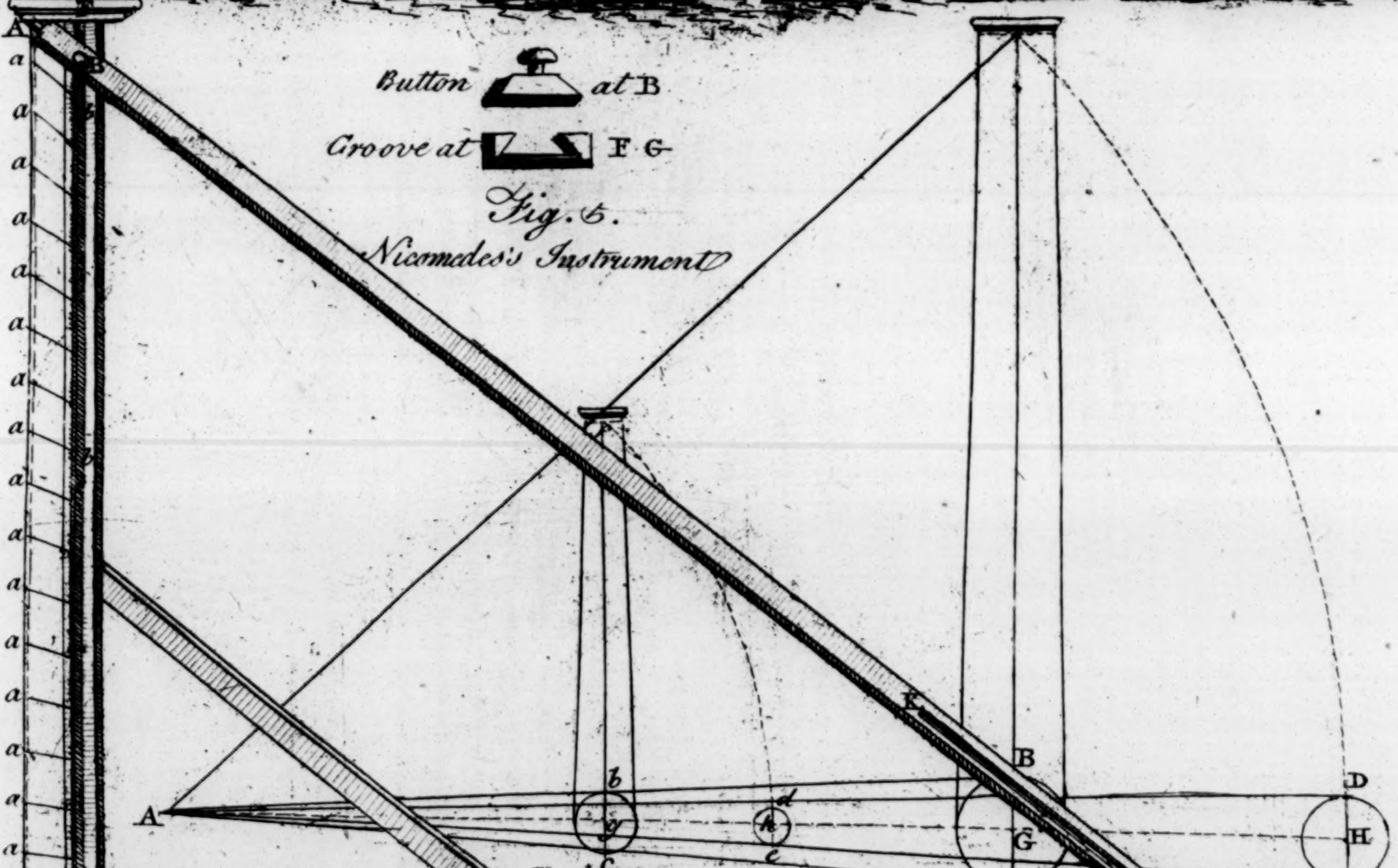
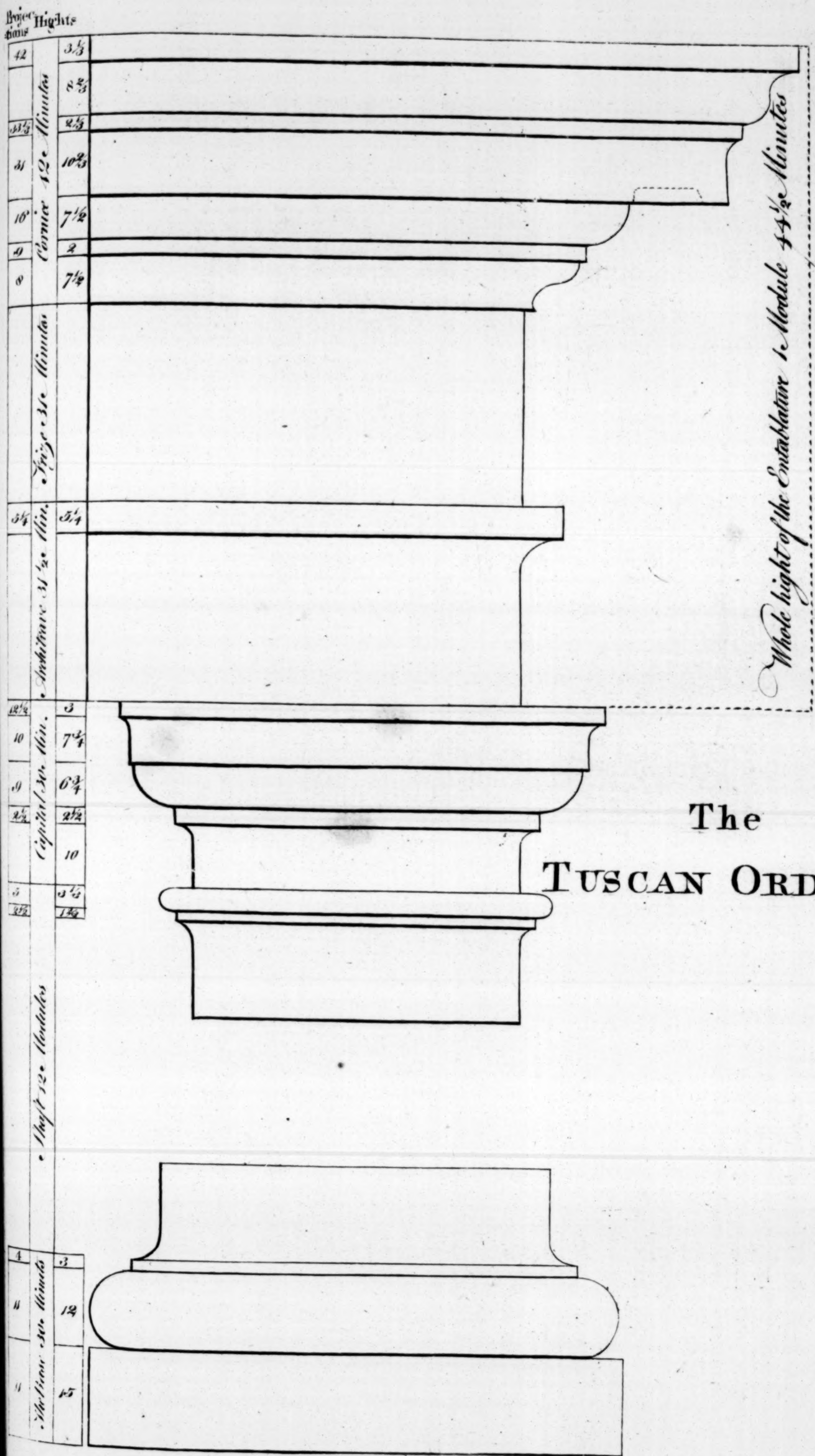

Button at B
Groove at F G
A
a
C
D
b
g
c
d
h
e
K
B
G
C
D
H
E
I
H

Fig. 5.
Nicomedes's Instrument

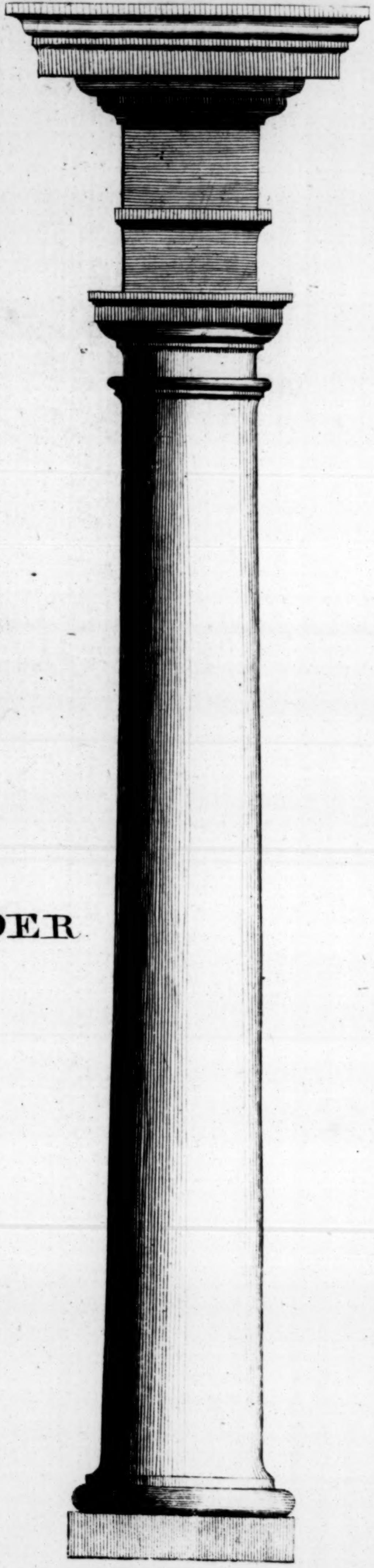
A Bell Sculpt

3 MA 53

Plate XXVI.


Projections
Hights
42
3 1/3
8 2/3
33 1/3
2 2/3
31
10 2/3
16
7 1/2
9
2
8
7 1/2
Cornice 42 Minutes
Frize 31 Minutes
5 1/4
5 1/4
Architrave 31 1/2 Min.
12 1/2
3
10
7 3/4
9
6 3/4
2 1/2
2 1/2
10
Capital 30 Min.
5
3 1/3
2 1/2
1 2/3
Shaft 12 Modules
4
3
11
12
11
15
The Base 30 Minutes
Whole hight of the Entablature 1 Module 44 1/2 Minutes

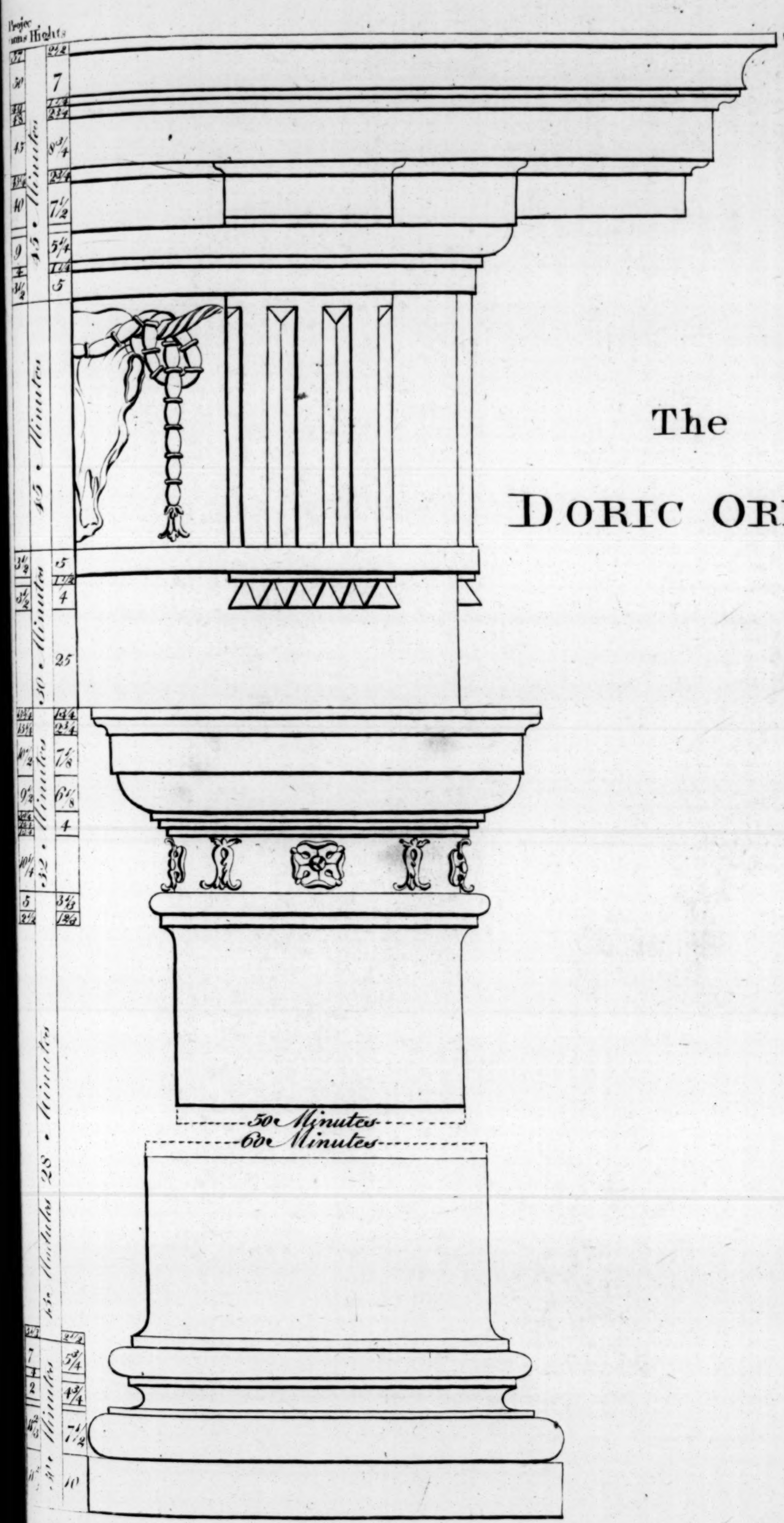
The TUSCAN ORDER



A. Bell Sculp.

3 MA 53

Plate XXVII



Projec tions
Hights
57
50
45
40
9
3½
3½
3½
10½
9½
10¼
5
2½
7
2
2½
7
2¾
8¾
2¾
7½
5¼
1¼
5
5
1½
4
25
1¾
2¾
7⅞
6⅛
4
3⅓
1⅔
2½
5¾
4¾
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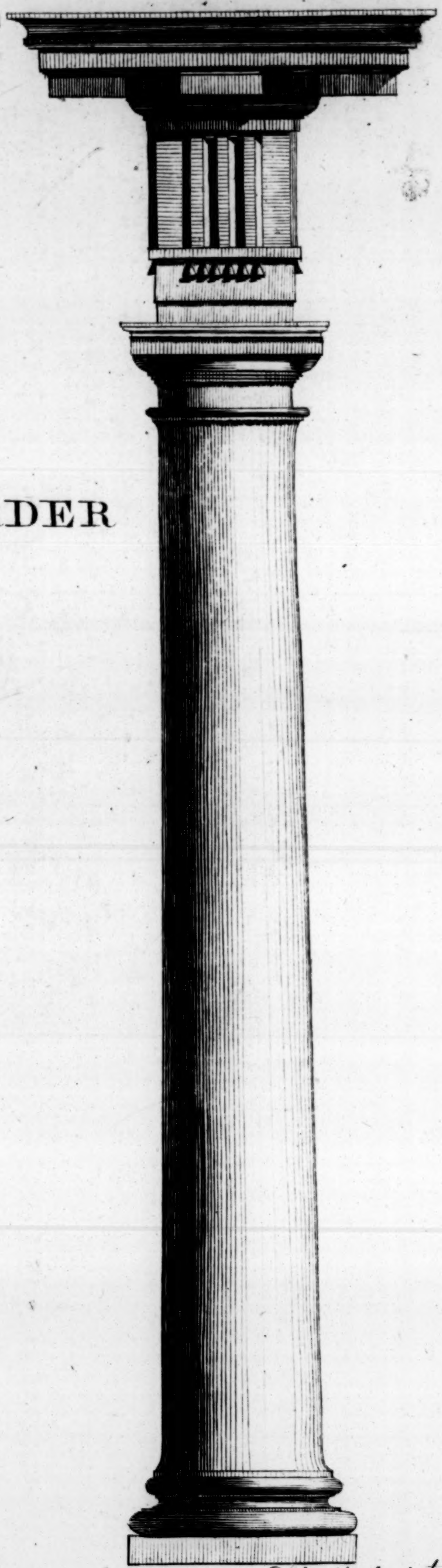
10
15 • Minutes
45 • Minutes
30 • Minutes
32 • Minutes
28 • Minutes
50 Minutes
60 Minutes

The

DORIC ORDER



A. Bell Sculp^t.

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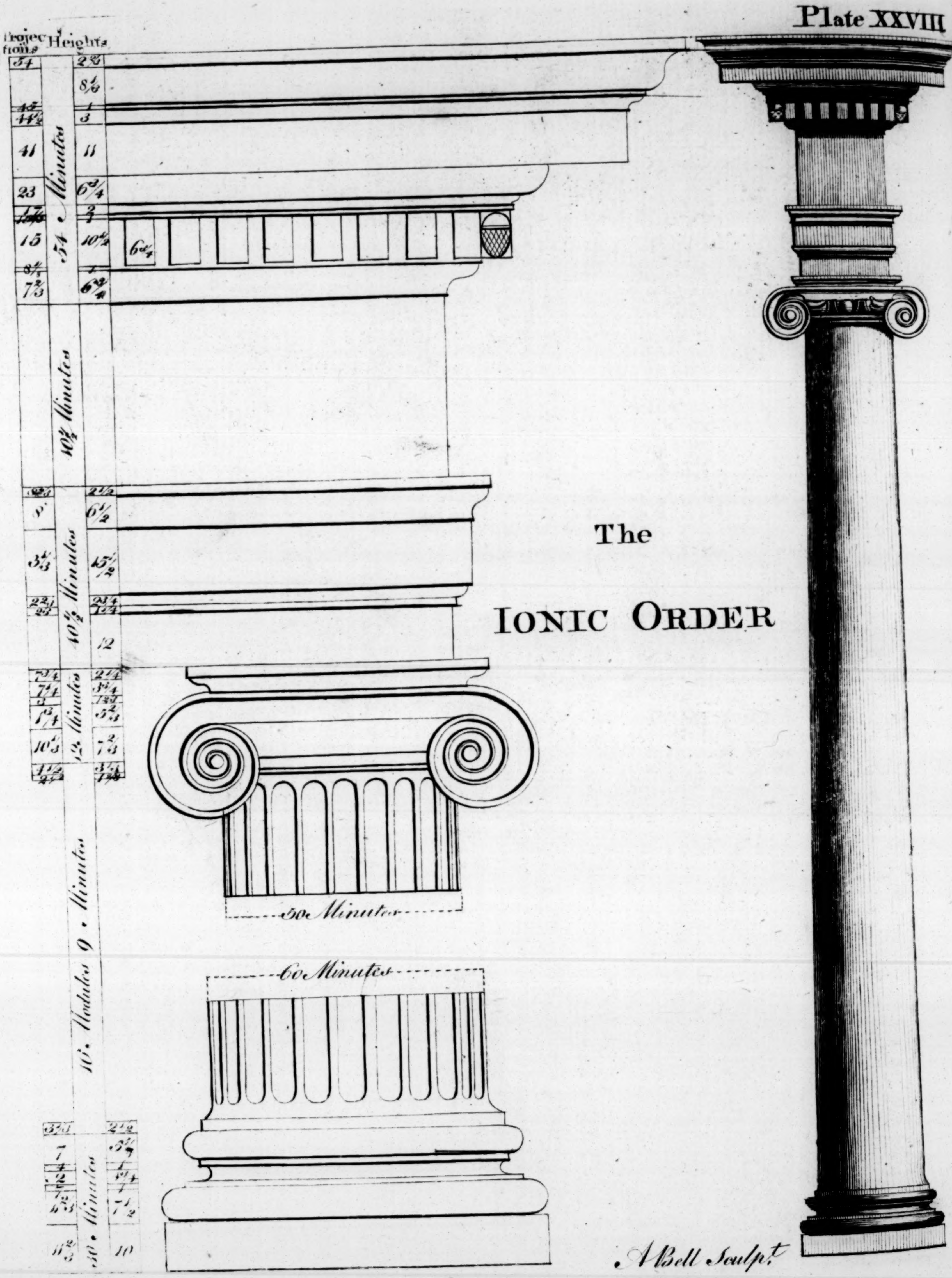
Plate XXVIII



Projections
Heights
54
41
23
15
11
10½
6¾
54 Minutes
40½ Minutes
6½
15½
12
12 Minutes
10⅔
7⅓
50 Minutes
60 Minutes
10 Modules 9 Minutes
7
30 Minutes
7½
10

The IONIC ORDER

A Bell Sculp^t.

3 MA 53

Plate. XXIX

Fig. 1.
Fillet List

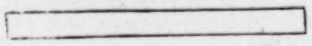


Fig. 2.
Astragal

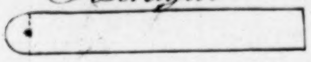


Fig. 3.
Torus

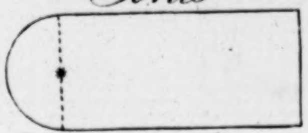


Fig. 4.
Scotia Mouth

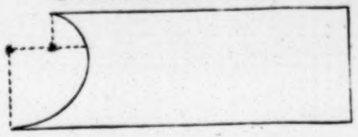


Fig. 5.
Ovolo

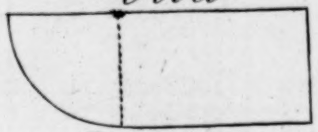


Fig. 6.
Ogee

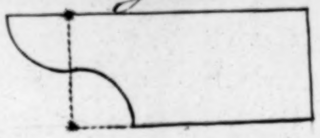


Fig. 7.
Cyma Recta

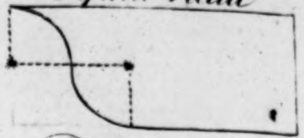


Fig. 8.
Cavetto

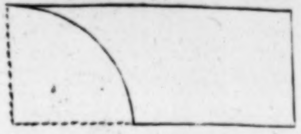


Fig. 9.
VOLUTE

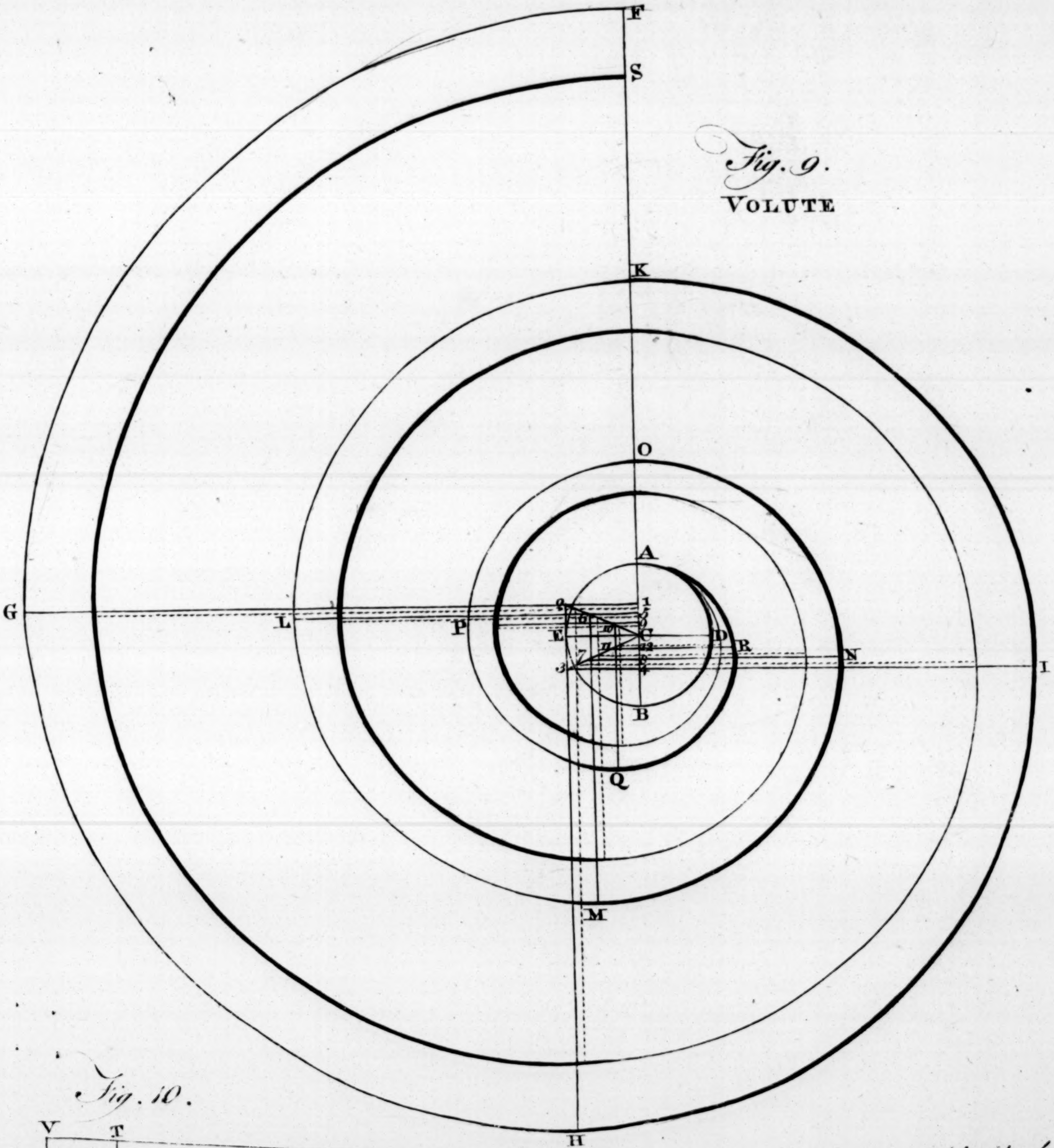

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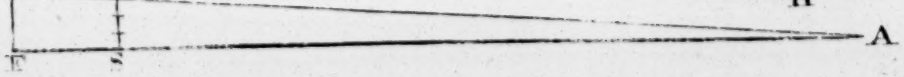
Fig. 10.



A. Bell Sculp^t.

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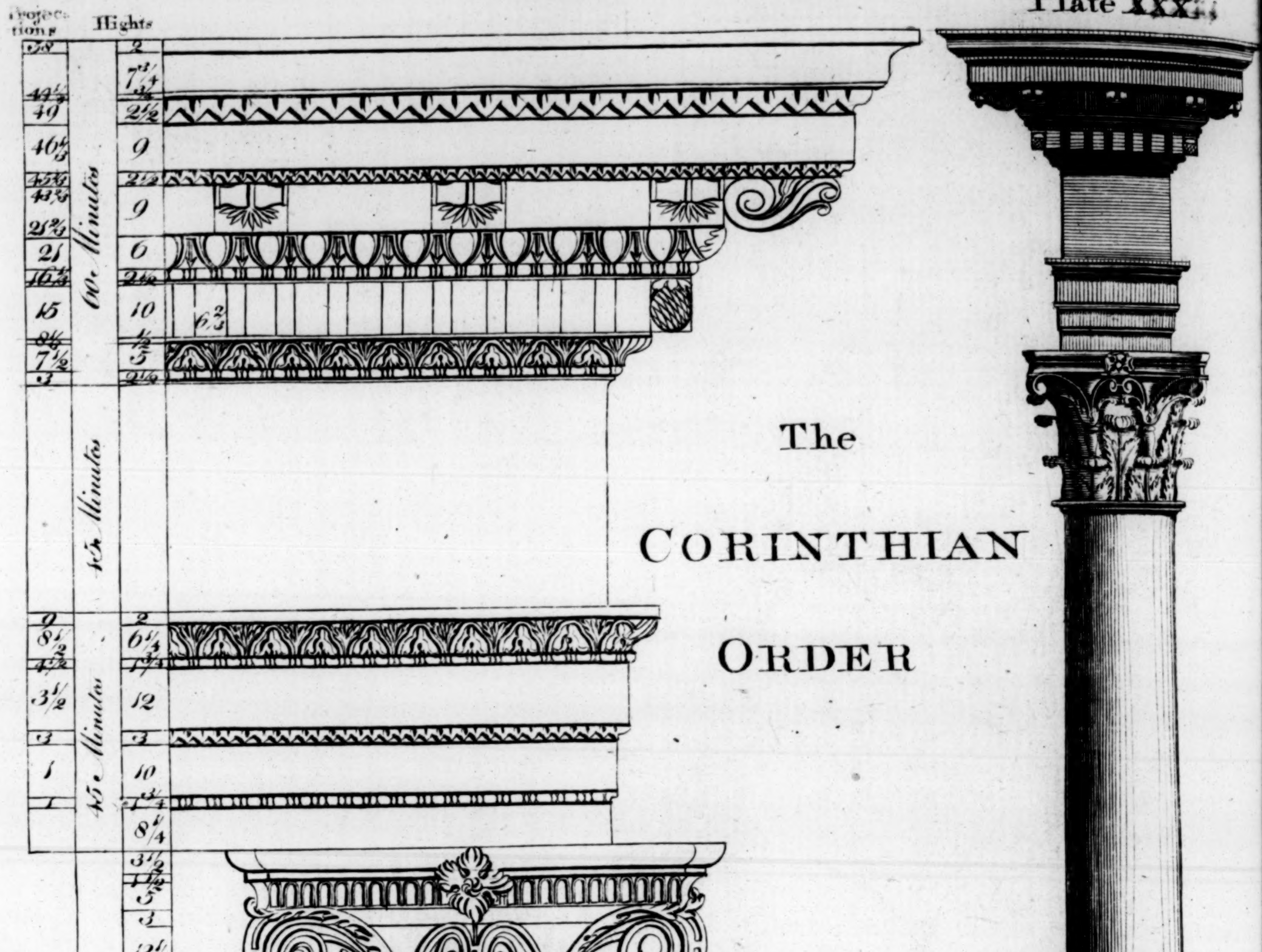
Plate XXXII

The CORINTHIAN ORDER


Projections
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2
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45 Minutes
45 Minutes
70 Minutes
20 Minutes
16 Modules
30 Minutes
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49
46⅔
45⅔
43⅔
21⅔
21
16⅔
15
8½
7½
3
0
8½
4½
3½
3
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2
6¼
1¾
12
3
10
1¼
8¼
3½
1½
5
3
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9½
4½
18
4½
19
3⅓
1⅔
5
2½
50 Minutes
60 Minutes
3⅔
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2½
3¾
4¾
1
7½
10

A. Bell Sculp

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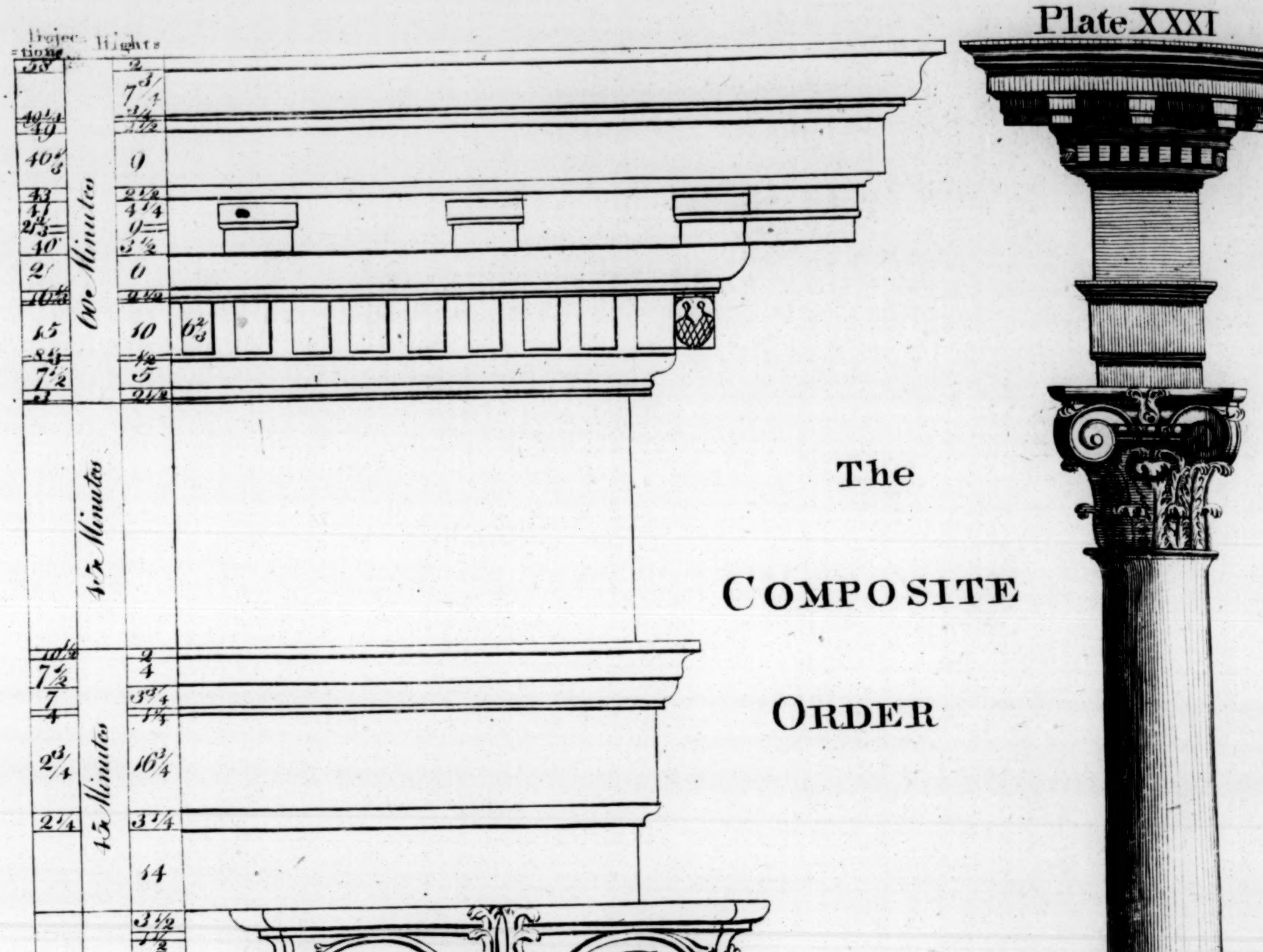
Projec-tions
Hights
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45 Minutes
45 Minutes
70 Minutes
10 Modules 20 Minutes
30 Minutes
30 Minutes
60 Minutes
The
Composite
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A. Bell Sculp.

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Principles. pital and baſe, is 16 modules, and the height of the entablature four; the latter of which being divided into eight parts, two of them are for the architrave, three for the frize, and three for the cornice.

In moſt of the antiques, the Doric column is executed without a baſe. Vitruvius likewiſe makes it without one; the baſe, according to him, having been firſt employed in the Ionic order, in imitation of the ſandal of a woman's foot. Scamozzi blames this practice and moſt of the modern architects are of his opinion.

49 Ornaments of the frize. In the profile of the theatre of Marcellus, the frize is enriched with huſks and roſes; the architrave conſiſts only of one faſcia and a fillet; the drops are conical; the metope is enriched with a bull's ſkull, adorned with a garland of beads, in imitation of thoſe on the temple of Jupiter Tonans at the foot of the Capitol. In ſome antique fragments, and in a great many modern buildings, the metopes are alternately adorned with ox-ſkulls and pateras. But they may be filled with any other ornaments, according to the deſtination of the building.

50

The IONIC Order

LXXVIII. Is of a more ſlender make than the Doric or Tuſcan; its appearance is ſimple, yet graceful and majeſtic; its ornaments are few; ſo that it has been compared to a ſedate matron, in decent, rather than magnificent, attire.

Among the ancients, the form of the Ionic profile appears to have been more poſitively determined than that of any other order; for, in all the antiques at Rome (the temple of Concord excepted), it is exactly the ſame.

The modern artiſts have likewiſe been unanimous in their opinions; all of them, excepting Palladio and his imitators, having employed the dentil, cornice, and the other parts of the profile, nearly as they are found in the Colliſeum, the temple of Fortune, and the theatre of Marcellus.

The height of the Ionic column is 18 modules, and that of the entablature $4\frac{1}{2}$, or one quarter of the height of the column, as in the other orders, which is a trifle leſs than in any of the antique Ionics. In all the antiques, the baſe is Attic; and the ſhaft of the column may either be plain, or fluted with 24 flutings, or 20 only, as in the temple of Fortune. The plan of the flutings may be a trifle more than a ſemicircle, as in the forum of Nerva, becauſe they then appear more diſtinct. The fillets, or intervals between them, muſt not be broader than one third of the breadth of a fluting, nor narrower than one fourth. The ornaments of the capital muſt correſpond with the flutings of the ſhaft; and there muſt be an ove above the middle of each fluting. The volutes ought to be traced according to Mr Goldman's method, which is as follows:

51 hod of ing vo- s. Plate XXIX. fig. 9. Draw the cathetus F C, whoſe length muſt be 15 minutes, or one fourth of a module; and, from the point C, deſcribe the eye of the volute A E B D, of which the diameter is to be $6\frac{2}{3}$ minutes; divide it into four equal ſectors by the diameters A B, D E. Biſect the radii C A, C B, in 1 and 4; and on the line 1, 4, conſtruct a ſquare 1, 2, 3, 4. From the centre C, to the angles 2, 3, draw the diagonals C 2, C 3, and divide the ſide of the ſquare 1, 4, into 6 equal parts, at 5, 9, C, 12, 8. Then through the points 5, 9, 12, 8, draw the lines 5, 6, 9, 10, 12, 11, 8, 7, parallel to the diameter E D, which will cut the diagonals in 6, 7, 10, 11; and the points 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, will be the centres of the volute. From the firſt centre 1, with the diſtance 1 F, deſcribe the quadrant F G; from the ſecond centre 2, with the diſtance 2 G, deſcribe the quadrant G H; and, continuing the ſame operation from all the 12 centres, the contour of the volute will be completed.

Fig. 10. The centres for deſcribing the fillet are found in this manner. Conſtruct a triangle, of which the ſide A F is equal to the part of the cathetus contained between A F and the ſide F V, equal to C 1; place the diſtance F S from F towards A, equal to F S the breadth of the fillet, and through the point S draw the line S T, which will be to C 1 in the ſame proportion as A S is to A F; place this line on the diameter of the eye A B; divide it into three equal parts; and, through the points of diviſion, draw lines parallel to the diameter E D, which will cut the diagonals C 2, C 3, and you will have twelve new centres, from whence the interior contour of the fillet may be deſcribed, in the ſame manner as the exterior one was from the firſt centres.

Of the CORINTHIAN Order.

52 Plate XXX. The proportions of this order are extremely delicate. It is divided into a great variety of members, and enriched with a profuſion of ornaments. Scamozzi calls it the *virginal order*; and indeed it has all the delicacy in its make, and all the delicacy in its dreſs, peculiar to young girls.

The moſt perfect model of the Corinthian order is generally allowed to be in the three columns in the Campo Vaccino at Rome, the remains, as it is thought, of the temple of Jupiter Stator.

The Corinthian column ſhould be 20 modules high, and the entablature 5; which proportions are a medium between thoſe of the Pantheon and the three columns. The baſe of the column may be either Attic or Corinthian: They are both beautiful. If the entablature be enriched, the ſhaft may be fluted. The flutings may be filled, to one third of their height, with cabblings, as in the inſide of the Pantheon; which will ſtrengthen the lower part of the column, and make it leſs liable to injury.

In moſt of the antiques at Rome, the capital of this order is enriched with olive-leaves; the acanthus being ſeldom employed but in the Compoſite. De Cordemoy, however, prefers the acanthus.

The diviſions of the entablature bear the ſame proportions to each other, as the Tuſcan, Ionic, and Compoſite orders.

The COMPOSITE

53 Pl. XXXI. Is, ſtrictly ſpeaking, only a ſpecies of the Corinthian; and therefore retains, in a great meaſure, the ſame character.

54 Different kinds of ornaments. It does not appear that the ancients affected any particular form of entablature to this order. Sometimes the cornice is entirely plain, as in the temple of Bacchus; at others, as in the arch of Septimius Severus, it is enriched with dentils differing very little from the Ionic; and in the arch of Titus, there are both dentils

and modilions; the whole form of the profile being the ſame with the Corinthian, as executed in the antiques at Rome.

The modern architects have varied more in this than in any other order, each following the bent of his own fancy.

The height of the Compoſite column, and parts of the entablature, is the ſame with that of the Corinthian. The foot of the leaves of the capital ought not to project beyond the upper part of the ſhaft. The different bunches of leaves ſhould be ſtrongly marked; the ſprigs which ariſe between the upper ones ſhould be kept flat upon the vaſe; and the ornaments of the volutes muſt not project beyond the fillets that incloſe them.

55

CHAP. II. *Of Pilaſters.*

THESE differ from columns only in their plan; which is a ſquare, as that of columns is round. Their baſes, capitals, and entablatures, have the ſame parts, with the ſame heights and projections, as thoſe of columns: they are alſo diſtinguiſhed in the ſame manner, by the names of Tuſcan, Doric, Ionic, Corinthian, and Compoſite.

The column is undoubtedly more perfect than the pilaſter. However, they may be employed with great propriety on many occaſions. Some authors declaim againſt pilaſters, becauſe, according to them, they do not admit of diminution. But this is a miſtake; there are many inſtances, in the remains of antiquity, of their being diminiſhed. Scamozzi always gave his pilaſters the ſame diminution as his columns: Palladio and Inigo Jones have likewiſe diminiſhed them in many of their buildings.

56 Pilaſters where uſeful.

Pilaſters are employed in churches, galleries, halls, and other interior decorations, to ſave room; for, as they ſeldom project beyond the ſolid wall above one quarter of their diameter, they do not occupy near ſo much ſpace as columns. They are likewiſe uſed in exterior decorations; ſometimes alone, inſtead of columns, on account of their being leſs expenſive; and ſometimes they accompany columns, being placed behind them to ſupport the architraves, where they enter the building, as in the Pantheon at Rome; or, in the ſame line with them, to fortify the angles, as in the portico of Septimius.

When pilaſters are uſed alone, they ſhould project one quarter of their diameter beyond the walls. When placed behind columns, eſpecially if they be very near them, they need not project above one eighth of their diameter. But, when placed on a line with columns, their projection muſt be regulated by that of the columns; and conſequently, it can never be leſs than a ſemidiameter, even when the columns are engaged as much as poſſible.

57 How ornamented.

The ſhafts of pilaſters are frequently adorned with flutings, in the ſame manner as thoſe of columns; the plan of which may be a trifle more than a ſemicircle: their number muſt be ſeven on each face, which makes them nearly of the ſame ſize with thoſe of columns. The intervals, or fillets, muſt either be one third or one fourth of the fluting in breadth.

Pl. XXXII. The capitals of pilaſters are profiled nearly in the ſame manner as thoſe of columns.

CHAP. III. *Of Attics.*

58 THESE very properly follow the pilaſters; being nothing more than ſquare pillars with their cornices. They had their origin in Athens, where it was for many ages a rule in building to conceal the roof. For this purpoſe, nothing ſerved ſo well as a kind of low or little order ranged in a continued line, ſingly, or with the interruption of balluſters; which riſing above the reſt of the work and before the roof, hid it perfectly, and placed ſomething agreeable in view. The place of attics, therefore, is at the uppermoſt extremity of a building, to which they ſerve as a crown, or very properly make a finiſhing for the other orders when they have been uſed in the ſtructure. They muſt never ſtand under any thing except ſuch ornaments as are placed at the very top. Theſe Attics ſhould never exceed in height one third of the height of the order on which they are placed, nor be leſs than one quarter of it. The baſe, dye, and cornice, of which they are compoſed, may bear the ſame proportions to each other as thoſe of pedeſtals do; and the baſe and cornice may be compoſed of the ſame mouldings as thoſe of pedeſtals. Sometimes the Attic is continued throughout; at others, it projects, and forms a pilaſter over each column of the order. The breadth of this pilaſter is ſeldom made narrower than the upper diameter of the column below it, and never broader. Its projection may be equal to one quarter of its breadth.

CHAP. IV. *Of Perſians, Caryatides, and Termini.*

59

BESIDES columns and pilaſters, it is ſometimes cuſtomary to employ repreſentations of the human figure, to ſupport entablatures in buildings. The male figures are called *Perſians;* and the female, *Carians,* or *Caryatides.*

60 Origin Perſian

The *Perſians* are ſo called from a victory gained over the Perſians by Pauſanias, who having brought home ſpoils and trophies to the Athenians, they fixed upon Perſian figures for thoſe which ſhould ſupport entablatures, and thus kept in mind that there were once Perſian ſlaves in Athens. To repreſent theſe conquered people in the loweſt ſtate poſſible, they loaded them with the heavieſt entablature, *viz.* that of the Doric order. In proceſs of time, however, other figures beſides thoſe of Perſians were introduced, and other entablatures put over them; but the name was ſtill retained.

61 Of Ca des.

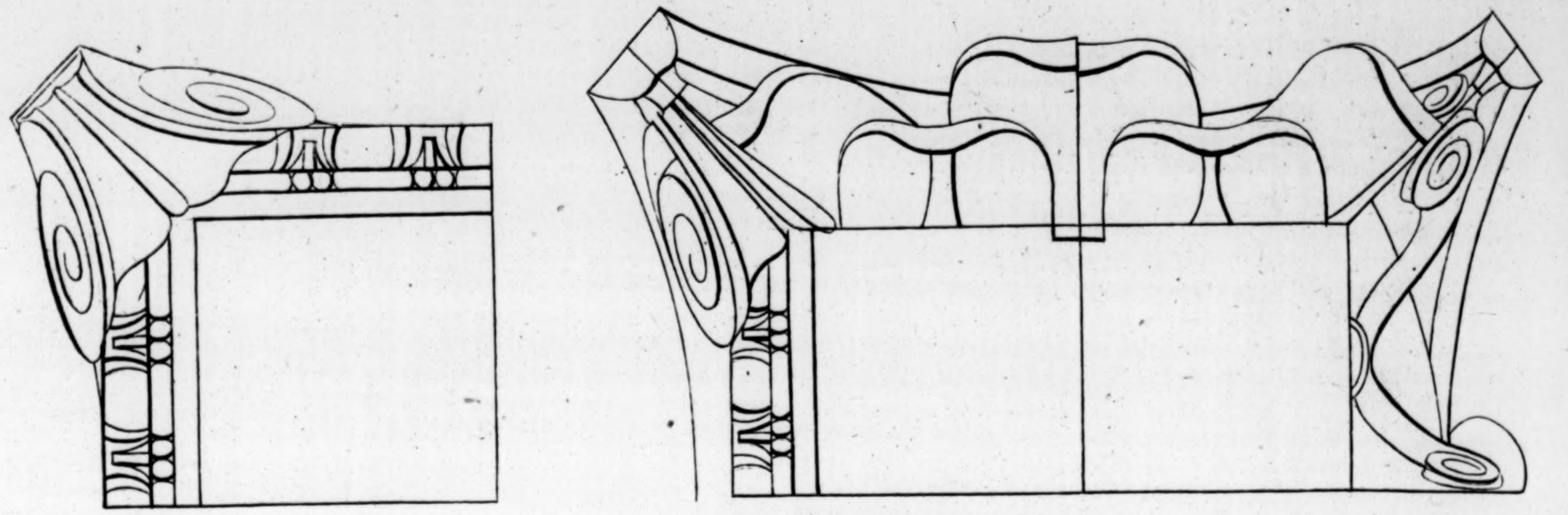
The proper Caryatides are women dreſſed in long robes, after the Aſiatic manner; and the origin of the device was as follows.—The Carians had been long at war with the Athenians; but being at length totally vanquiſhed, their wives were led away captives; and, to perpetuate the memory of this event, trophies were erected, in which figures of women dreſſed in the Caryatic manner, were uſed to ſupport entablatures like the Perſians; and though other female figures were afterwards uſed in the ſame manner, the name of *Caryatides* was always retained.

The ancients made frequent uſe of Perſians and Caryatides, and delighted in diverſifying them a thouſand ways. The modern artiſts have followed their example; and there is a great variety of compoſitions of this kind to be met with in different parts of Europe.

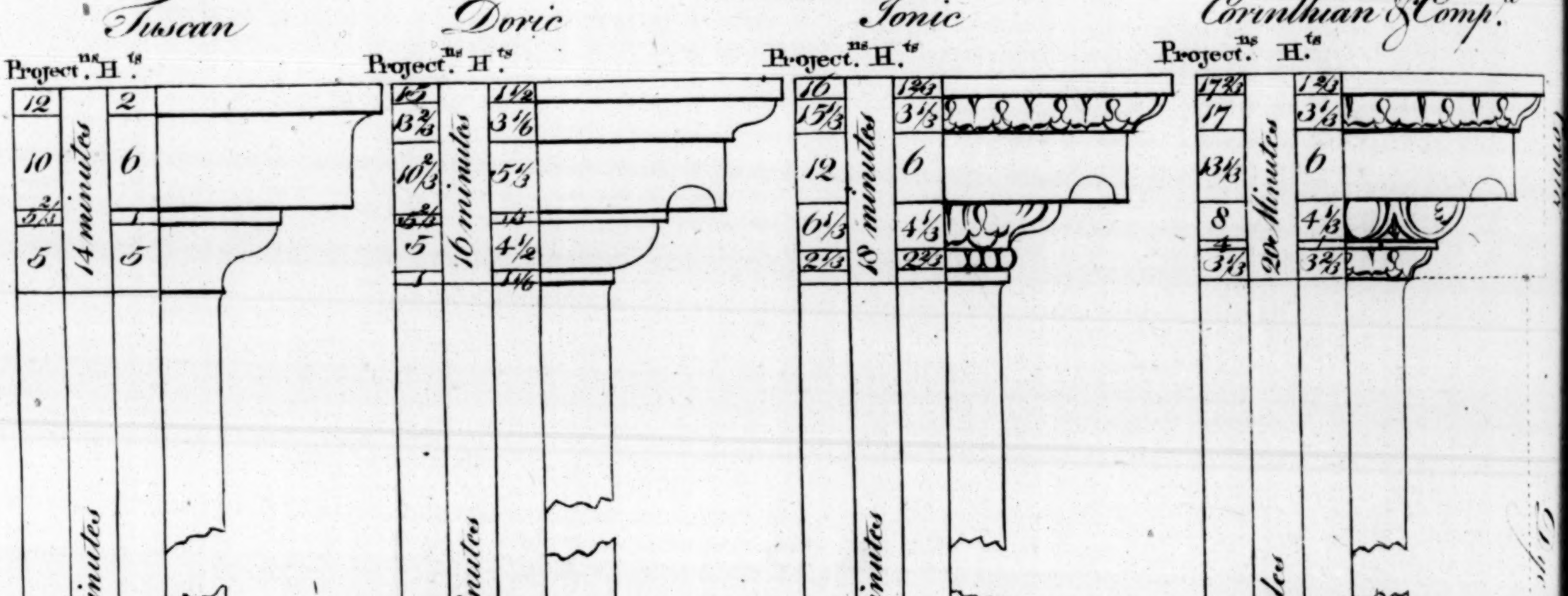
Indecent attitudes, diſtorted features, and all monſtrous

3 MA 53

PLANS of PILASTER CAPITALS



PEDESTALS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1 2/3
3 1/3
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4 1/3
3 2/3
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A. Bell Sculp.

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ſtrous productions, ought to be avoided, of which there are many examples in Gothic buildings. On the contrary, the attitudes ſhould be ſimple and graceful, the countenance always pleaſing, though varied and ſtrongly marked agreeable to the nature of the object repreſented.

62 Their pro-ortions, &c.

The Caryatides, or female figures, ſhould never much exceed the human ſize. But the Perſians, or male figures, may be of any ſize; and the larger the better, as they will ſtrike the beholder with the greater awe and aſtoniſhment. Perſians may be uſed with propriety in arſenals, galleries of armour, &c. under the figures of captives, heroic virtues, &c. Their entablature ought to be Doric, and bear the ſame proportion to them as to columns of the ſame height. The entablature for Caryatides ought to be either Ionic or Corinthian, according as the character of the figures is more or leſs delicate.

63 Termini.

Termini are ſometimes employed, inſtead of Perſians or Caryatides, to ſupport the entablatures of monuments, chimney-pieces, and ſuch like compoſitions. Theſe figures owe their origin to the ſtones uſed by the ancients to mark the limits of particular poſſeſſions. Numa Pompilius, to render theſe inviolable, conſecrated the terminus into a deity, and inſtituted feſtivals and ſacrifices to his honour. In a ſhort time, what was formerly only large upright ſtones, were repreſented in human ſhape; and afterwards introduced as ornaments to temples and other buildings. The termini are now principally uſed as ornaments for gardens and fields.

64

Chap. V. *Of Pedeſtals.*

Most writers conſider the *Pedeſtal* as a neceſſary part of the order, without which it is not complete. It is indeed a matter of little importance whether it be conſidered in that light, or as a diſtinct compoſition: we ſhall therefore treat of a pedeſtal as a diſtinct body, having no more connection with the order than an attic, a baſement, or any other part with which it may on ſome occaſions be aſſociated.

A pedeſtal conſiſts of three principal parts; the baſe, the dye, and the cornice. The dye is always nearly of the ſame figure; being conſtantly either a cube or a parallelopipedon: but the baſe and cornice are varied and adorned with more or fewer mouldings, according to the ſimplicity or richneſs of the compoſition in which the pedeſtal is employed. Hence pedeſtals are, like columns, diſtinguiſhed by the names of *Tuſcan*, *Doric*, *Ionic*, *Corinthian*, and *Compoſite*.

65 edeſtals here pro-er.

Some authors are averſe to pedeſtals, and compare a column raiſed on a pedeſtal to a man mounted on ſtilts; imagining that they were introduced merely from neceſſity, and for want of columns of a ſufficient length. It is indeed true, that the ancients often made uſe of artifices to lengthen their columns; as appears by ſome that are in the Baptiſtery of Conſtantine at Rome; the ſhafts of which, being too ſhort for the building, were lengthened and joined to their baſes by an undulated ſweep, adorned with acanthus leaves. Nevertheleſs, there are many occaſions where pedeſtals are evidently neceſſary; and ſome in which the order, were it not ſo raiſed, would loſe much of its beautiful appearance. Thus, in the inſides of churches, if the columns that ſupport the vault were placed immediately on the ground, the ſeats would hide their baſes and a good part of their ſhafts; and, in the theatres of the ancients, if the columns of the ſcene had been placed immediately on the ſtage, the actors would have hid a part of them from the audience. In interior decorations, a pedeſtal diminiſhes the parts of the order, which otherwiſe might perhaps appear too clumſy, and hath the advantage of placing the column in a more favourable view, by raiſing its baſe nearer the level of the ſpectator's eye. In a ſecond order of arcades, there is no avoiding pedeſtals; as without them it is impoſſible to give the arches any tolerable proportion.

66 Their proportions.

With regard to the proportion that pedeſtals ought to bear to that of the columns they ſupport, it is by no means fixed. Both the ancients and moderns vary greatly on this head. Vignola's proportions are generally reckoned the beſt. He makes his pedeſtals in all the orders of the ſame height, *viz.* one third of the column; and as their breadth of courſe increaſes or diminiſhes in the ſame degree as the diameters of their reſpective columns do, the character of the order is always preſerved, which, according to any other method, is impoſſible.

As to the diviſions of the pedeſtal; if the whole height be divided into nine parts, one of them may be given to the height of the cornice, two to the baſe, and the ſix remaining to the dye. The breadth of the dye is always made equal to that of the plinth of the column. The projection of the cornice may be made equal to its height; and the baſe being divided into three parts, two of them will be for the height of the plinth, and one for the mouldings, whoſe projection muſt be leſs than that of the cornice. Theſe meaſures are common to all pedeſtals. See Plate XXXII.

Chap. VI. *Of Intercolumniations.*

67

Columns are either engaged, or inſulated; and, when inſulated, are either very near the wall, or at a conſiderable diſtance from it. Engaged columns, or ſuch as are near the walls of a building, are not limited in their intercolumniations, as theſe depend on the breadths of the arches, windows, niches, or other decorations placed between the columns. But columns that are entirely detached, and perform alone the office of ſupporting the entablature, as in periſtyles, porches, and galleries, muſt be near each other, for the ſake both of real and apparent ſolidity.

68 Different intercolumniations uſed by the ancients.

The intercolumniations among the ancients were various. Thoſe uſed in the Ionic and Corinthian orders were the pycnoſtyle, of which the interval was equal to one diameter and a half of the column; the ſyſtyle, whoſe interval was equal to two diameters; the euſtyle, to two and a quarter; the diaſtyle to three, and the aræoſtyle to four. In the Doric order, they uſed other intercolumniations, regulating them by the triglyphs, one of which was always placed directly over the middle of each column; ſo that they were either ſyſtyle, monotriglyph, of one diameter and a half; diaſtyle, of two diameters and three quarters; or aræoſtyle, of four diameters; and the Tuſcan intervals were very wide, ſome of them being above ſeven diameters, which was very practicable, as the architraves were of wood.

Among theſe different intercolumniations, the pycnoſtyle and ſyſtyle are too narrow; for although the ancients made frequent uſe of them, that ought rather to be aſcribed to neceſſity than choice. For, as the architraves were compoſed of ſingle ſtones, extending from the middle of one column to the middle of another, it would have been difficult, eſpecially in large buildings, to find blocks of a ſufficient length for diaſtyle intervals. With regard to the aræoſtyle and Tuſcan intercolumniations, they are by much too wide, and can only be uſed in ruſtic buildings, where the architraves are of wood; neither is the diaſtyle ſufficiently ſolid in large compoſitions. The euſtyle is a medium between the narrow and broad intervals; and, being at the ſame time both ſpacious and ſolid, hath been preferred to any of the reſt by the ancients as well as the moderns.

69 Uſed by Vignola.

Vignola obſerved nearly the ſame proportion in all his intercolumniations; which practice, though condemned by ſeveral writers, is certainly preferable to any other; as it preſerves the character of each order, and maintains in all of them an equal degree of real ſolidity. Setting aſide therefore the pycnoſtyle and ſyſtyle diſpoſitions on account of their want of ſpace, and the aræoſtyle for its deficiency in point of ſtrength, it may be eſtabliſhed, that the diaſtyle and euſtyle intercolumniations (the latter of which, on moſt occaſions, ought to have the preference) may be employed in all the orders without diſtinction, excepting the Doric; in which the moſt perfect interval is ditriglyph; neither the monotriglyph, nor the aræoſtyle, being to be ſuffered but in caſes of neceſſity.

Sometimes, on account of the windows, doors, niches, and other decorations, which correſpond with the intercolumniations of the periſtyle, or gallery, it is not poſſible to make the intervals ſo narrow as euſtyle, or even as diaſtyle: wherefore the moderns, authoriſed by ſome few examples of the ancients, where grouped columns are employed, have invented a manner of diſpoſing them, called by Perrault *aræoſtyle*, which admits of a larger interval, without any detriment to the apparent ſolidity of the building. This kind of diſpoſition is compoſed of two ſyſtyle intercolumniations; the column that ſeparates them being approached towards one of thoſe at the extremities, ſufficient room only being left between them for the projection of the capitals; ſo that the great ſpace is three diameters and a half wide, and the little one half a diameter.

In periſtyles, galleries, or porticos, all the intercolumniations muſt be equal; but in a logio, or porch, the middle interval may be broader than the others, by a triglyph or modilion, or three or four dentils; unleſs the columns at the angles be coupled, or grouped with pilaſters; in which caſe, all the intervals ſhould be of the ſame dimenſions.

When buildings are very ſmall, as is frequently the caſe in temples and other inventions uſed for ornamenting gardens, the intercolumniations may be broader, in proportion to the diameter of the columns, than uſual; becauſe, when they are nearer each other than three feet, there is hardly room for a bulky perſon to paſs between them.

CHAP. VII. *Of Arches.*

70 Arches where proper.

ARCHES are not ſo magnificent as colonnades; but they are more ſolid and leſs expenſive. They are proper for triumphal entrances, gates of cities, of palaces, of gardens, and of parks, and in general for all openings that require an extraordinary breadth.

71 How adorned.

There are various manners of adorning arches. Sometimes their piers are ruſticated; ſometimes they are adorned with pilaſters, termini, or caryatides; and ſometimes they are made ſufficiently broad to admit niches or windows. The circular part of the arch is either ſurrounded with ruſtic key-ſtones, or with an archivolt enriched with mouldings; which, in the middle, is ſometimes interrupted by a conſole, a maſk, ſerving at the ſame time as a key to the arch, and as a ſupport to the architrave of the order. The archivolt is ſometimes ſupported by an impoſt, at the head of the pier; and at others by columns placed on each ſide of it, with a regular entablature, or architrave and cornice. There are likewiſe inſtances of arcades without piers, the arches being turned on ſingle columns, as in the temple of Faunus at Rome, &c. This practice, however, ought to be ſeldom imitated, as it is neither ſolid nor handſome.

When arches are large, the key-ſtone ſhould never be omitted, but cut in the form of a conſole, and carried cloſe under the ſoffit of the architrave, which, on account of its extraordinary length, requires a ſupport in the middle. The impoſts of arches ſhould never be omitted; at leaſt, if they be, a platform ought to ſupply their place. If columns are employed without pedeſtals in arcades, they ſhould always be raiſed on a plinth. In all arches, the circular part ought not to ſpring immediately from the impoſt, but take its riſe at ſuch a diſtance above it as is neceſſary in order to have the whole curve ſeen at the proper point of view.

72 Proportio

The void or aperture of arches ſhould never be higher, nor much lower, than double their breadth; the breadth of the pier ſhould ſeldom exceed two thirds, nor be leſs than one third, of the breadth of the arch; and the angular pier ought to be broader than the others, by one half, one third, or one fourth; the impoſt ſhould not be more than one ſeventh, nor leſs than one ninth of the aperture; and the archivolt muſt not be more than one eighth, nor leſs than one tenth of it. The breadth of the conſole muſt, at the bottom, be equal to that of the archivolt; and its ſides muſt be drawn from the centre of the arch: the length of it muſt not be leſs than one and a half of its ſmalleſt breadth, nor more than double. The thickneſs of the pier depends on the breadth of the portico; for it muſt be ſtrong enough to reſiſt the preſſure of its vault. But with regard to the beauty of the building, it ſhould not be leſs than one quarter of the breadth of the arch, nor more than one third. Theſe are the general dimenſions of arches.

CHAP. VIII. *Of Orders above Orders.* 73

WHEN, in a building, two or more orders are employed, one above another, the laws of ſolidity require the ſtrongeſt ſhould be placed lowermoſt. Hence the Tuſcan muſt ſupport the Doric, the Doric the Ionic, the Ionic the Compoſite or Corinthian, and the Compoſite the Corinthian.

This rule, however, is not always ſtrictly adhered to. Moſt authors place the Compoſite above the Corinthian. There are likewiſe examples where the ſame order is repeated, as in the theatre of Statilius Taurus, and the Coliſeum; and others, where an intermediate order is omitted, and the Ionic placed on the Tuſcan, or the Corinthian on the Doric. But none of theſe practices ought to be imitated.

In placing columns above one another, the axis of all the columns ought to correſpond, or be in the ſame perpendicular line, at leaſt in front.

74 Proportions of columns placed above each other. With regard to the proportions of columns placed above each other, Scamozzi's rule, That the lower diameter of the ſuperior column ſhould conſtantly be equal to the upper diameter of the inferior one, is univerſally eſteemed the beſt, and gives all the columns the appearance of one long tapering tree, cut into ſeveral pieces. According to this rule, the Doric column will be to the Tuſcan, as $13\frac{1}{3}$ to 14; the Ionic to the Doric, as 15 to 16; the Compoſite or Corinthian to the Ionic, as $16\frac{2}{3}$ to 18; and the Corinthian to the Compoſite, as $16\frac{2}{3}$ to 20.

In Britain there are few examples of more than two ſtories of columns in the ſame aſpect: and though in Italy, and other parts of Europe, we frequently meet with three, and ſometimes more; yet it is a practice by no means to be imitated; for there is no poſſibility of avoiding many ſtriking inconſiſtencies, or of preſerving the character of each order in its intercolumnial decorations.

75

CHAP. IX. *Of Baſements.*

INSTEAD of employing ſeveral orders one above the other in a compoſition, the ground-floor is ſometimes made in the form of a *baſement*, on which the order that decorates the principal ſtory is placed. The proportion of theſe baſements is not fixed, but depends on the nature of the rooms on the ground-floor. In the palace of the Porti in Vicenza, the height of the baſement is equal to that of the order. In ſome buildings, its height exceeds two thirds of that of the order; and, in others, only half the height of the order. It is not, however, adviſeable to make the baſement higher than the order it ſupports; neither ſhould it be lower than one half of the order.

76 Decorations, &c. of baſements. The uſual method of decorating baſements is with ruſtics of different kinds. The beſt, where neatneſs and finiſhing is aimed at, are ſuch as have a ſmooth ſurface. Their height, including the joint, ſhould never be leſs, nor much more, than half a module of the order placed on the baſement. Their figure may be from a ſquare to a ſeſquialtera; and their joints may be either ſquare or chamfered. The ſquare ones ſhould not be broader than one eighth of the height of the ruſtic, nor narrower than one tenth; and their depth muſt be equal to their breadth; thoſe that are chamfered muſt form a rectangle; and the breadth of the whole joint may be from one fourth to one third of the height of the flat ſurface of the ruſtic.

77

CHAP. X. *Of Pediments.*

PEDIMENTS, among the Romans, were uſed only as coverings to their ſacred buildings, till Cæſar obtained leave to cover his houſe with a pointed roof, after the manner of temples. In the remains of antiquity we meet with two kinds of pediments, the triangular and the circular. The former of theſe are promiſcuouſly applied to cover ſmall or large bodies: But the latter, being of a heavier figure, are never uſed but as coverings to doors, niches, windows, or gates.

As a pediment repreſents the roof, it ſhould never be employed but as a finiſhing to the whole compoſition.

The ancients introduced but few pediments into their buildings, uſually contenting themſelves with a ſingle one to adorn the middle or principal part. But ſome of the moderns, and particularly the Italians, have been ſo immoderately fond of them, that their buildings frequently conſiſt of almoſt nothing elſe.

The girder being a neceſſary part in the conſtruction of a roof, it is an impropriety to intermit the horizontal entablature of a pediment, by which it is repreſented, to make room for a niche, an arch, or a window.

78 Forms, &c. of pediments. In regular architecture, no other form of pediments can be admitted, beſides the triangular and circular. Both of them are beautiful; and when a conſiderable number of pediments are introduced, as when a range of windows are adorned with them, theſe two figures may be uſed alternately, as in the niches of the Pantheon, and in thoſe of the temple of Diana at Niſmes.

The proportion of pediments depends upon their ſize; for the ſame proportions will not do in all caſes.

When the baſe of the pediment is ſhort, its height muſt be increaſed; and when the pediment is long, the height muſt be diminiſhed. The beſt proportion for the height is from one fifth to one fourth of the baſe, according to the extent of the pediment, and the character of the body it covers. The materials of the roof muſt alſo be attended to; for if it be covered with tiles, it will be neceſſary to raiſe it more than one quarter of the baſe, as was the cuſtom of the ancients in their Tuſcan temples.

The tympan is always on a line with the front of the frize; and, when large, admits of various ornaments.

79

CHAP. XI. *Of Balluſtrades.*

BALLUSTRADES are ſometimes of real uſe in buildings; and at other times they are only ornamental. Such as are intended for uſe, as when they are employed in ſtair-caſes, before windows, or to incloſe terraſſes, &c. muſt always be nearly of the ſame height; never exceeding three feet and a half, nor ever leſs than three. But thoſe that are principally deſigned for ornament, as when they finiſh a building, ſhould be proportioned to the architecture they accompany: and their height ought never to exceed four fifths of the height of the entablature on which they are placed; nor ſhould it ever be leſs than two thirds thereof, without counting the zocholo, or plinth, the height of which muſt be ſufficient to leave the whole balluſtrade expoſed to view.

80 Proportions, &c. of balluſters. The beſt proportion for balluſtrades is to divide the whole given height into thirteen equal parts; eight of theſe for the height of the balluſter, three for the baſe, and two for the cornice or rail; or into fourteen, (if it be required to make the balluſter leſs), giving eight parts to the balluſter, four to the baſe, and two to the rail. One of theſe parts may be called a *module*; and

being divided into nine minutes, may ſerve to determine the dimenſions of the particular members.

In balluſtrades, the diſtance between two balluſters ſhould not exceed half the diameter of the balluſter meaſured in its thickeſt part, nor be leſs than one third of it.

The breadth of the pedeſtals, when they are placed on columns or pilaſters, is regulated by them; the dye never being made broader than the top of the ſhaft, nor much narrower; and when there are neither columns nor pilaſters on the front, the dye ſhould not be much lower than a ſquare, and ſeldom higher. On ſtairs, or any other inclined planes, the ſame proportions are to be obſerved as on horizontal ones.

CHAP. XII. *Of Gates, Doors, and Piers.*

81 Doors and gates. THERE are two kinds of entrances, *viz.* doors and gates. The former ſerve only for the paſſage of perſons on foot; but the latter likewiſe admit horſemen and carriages. Doors are uſed as entrances to churches and other public buildings, to common dwelling houſes, and apartments: And gates ſerve for inlets to cities, fortreſſes, parks, gardens, palaces, &c. The apertures of gates being always wide, they are generally made in the form of an arch, that figure being the ſtrongeſt. But doors, which are generally of ſmall dimenſions, are commonly parallelograms, and cloſed horizontally.

The general proportion for the apertures, both of gates and doors, whether arched or ſquare, is, that the height be about double the breadth.

82 Piers. The moſt common, and indeed almoſt the only ornaments for gates are the piers by which they are ſupported, and which were originally no more than bare poſts into which the hinges of the gate were driven. Though this, however, is the only proper uſe of piers, it muſt be concealed as much as poſſible, and they muſt ſeem as if placed there only for ornament. As they are to be fixed to the wall before the houſe, ſo they muſt alſo be proportioned to it; and as they are to be ſeen in the ſame view with the front of the houſe, their correſpondence with it is equally neceſſary. They are to be placed on a plinth, and ſomething muſt be allowed by way of ornament and finiſhing at the top. All the luxuriance of fancy may be employed in the decoration of piers: but it will be proper to obſerve this general rule, that the pier being an inferior building, it muſt never be richer than the front of the houſe. If, for inſtance, the front of the houſe is ornamented with columns of the Doric order, the Ionic muſt not be uſed in the piers; and it will be found better to omit columns altogether, than to make uſe of the Tuſcan order for piers in any caſe. If the Ionic or Corinthian orders are employed in the front of the houſe, the Doric or Ionic may be uſed with propriety in the piers. One piece of ornament is almoſt univerſal in piers, namely, a niche with its ſeat, made as if for the conveniency of weary travellers. On this account, it will be proper to raiſe the columns on pedeſtals, becauſe the continued moulding from their cap will be a good ornament under the niche. The baſe of the columns ought always to be the attic.

Inſide-doors, however ſmall the building may be, ſhould never be narrower than two feet nine inches; nor ſhould they ever, in private houſes, exceed three feet ſix inches in breadth, which is more than ſufficient to admit the bulkieſt perſon. Their height ſhould at leaſt be ſix feet three or four inches; otherwiſe a tall perſon cannot paſs without ſtooping. In churches, palaces, *&c.* where there is a conſtant ingreſs and egreſs of people, the apertures muſt be larger. The ſmalleſt breadth that can be given to a gate is 8½ or 9 feet, which is but juſt ſufficient for the paſſage of a coach.

Plate XXXIII. fig. 1. Is a ruſtic door, compoſed by the celebrated Vignola, in which the aperture occupies two thirds of the whole height, and one half of the whole breadth; the figure of it being a double ſquare. The ruſtics may be either ſmooth or hatched; their joints muſt form a rectangle, and the breadth of each joint may be one third, or two ſevenths, of the vertical ſurface of a ruſtic. The joints of the claveaux, or key-ſtones, muſt be drawn to the ſummit of an equilateral triangle, whoſe baſe is the top of the aperture. The architrave ſurrounding the aperture may be compoſed either of a large ogee and fillet, or of a platband and fillet. Its whole breadth muſt be one tenth of the breadth of the aperture; the remaining part of each pier being for the ruſtics. The entablature is Tuſcan: the cornice is to be one fifteenth of the whole height of the door; and what remains below it being divided into 21 equal parts, the two uppermoſt of them will be for the frize and architrave, and the remaining 19 for the ruſtics and plinth at the foot of the door.

Fig. 2. Is a diſpoſition of Michael Angelo's. The windows of the Capitol at Rome are of this kind; and Sir Chriſtopher Wren hath executed doors of the ſame kind under the ſemicircular porches in the flanks of St Paul's. The figure of the aperture may be a double ſquare; the architrave one ſixth of the breadth of the aperture; and the whole entablature one quarter of its height. The front of the pilaſters or columns, on each ſide, muſt be on a line with the faſcia of the architrave; and their breadth muſt be a ſemidiameter.

Fig. 3. Is likewiſe a deſign of Vignola's. It is of the Corinthian order, and executed in the Cancellaria at Rome. The height is equal to double its breadth; and the whole ornament at the top is equal to one third of the height of the aperture. The architrave is in breadth one fifth of the breadth of the aperture; and the pilaſters that ſupport the conſoles are half as broad as the architrave. The whole is well imagined, but rather heavy; and it will be beſt to reduce the architrave to one ſixth of the aperture, diminiſhing the entablature proportionally.

Fig. 4. Is a deſign of Serlio's. The aperture may be either twice as high as broad, or a trifle leſs. The diameter of the columns may be equal to one quarter of the breadth of the aperture; and their height may be from eight diameters to eight and a half. The entablature muſt be ſomewhat leſs than one quarter of the height of the columns; and the height of the pediment may be one quarter of its baſe.

Fig. 5. Is a door in the ſalon of the Farneſe at Rome, deſigned by Vignola. The aperture forms a double ſquare. The entablature is equal to three elevenths of its height, the architrave being one of theſe elevenths; and the whole ornaments on the ſides, conſiſting

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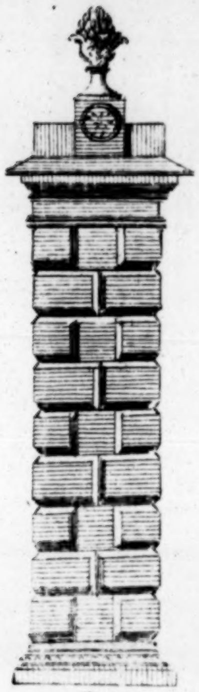
Designs for Gates & Piers.

5th Plate XXXIX.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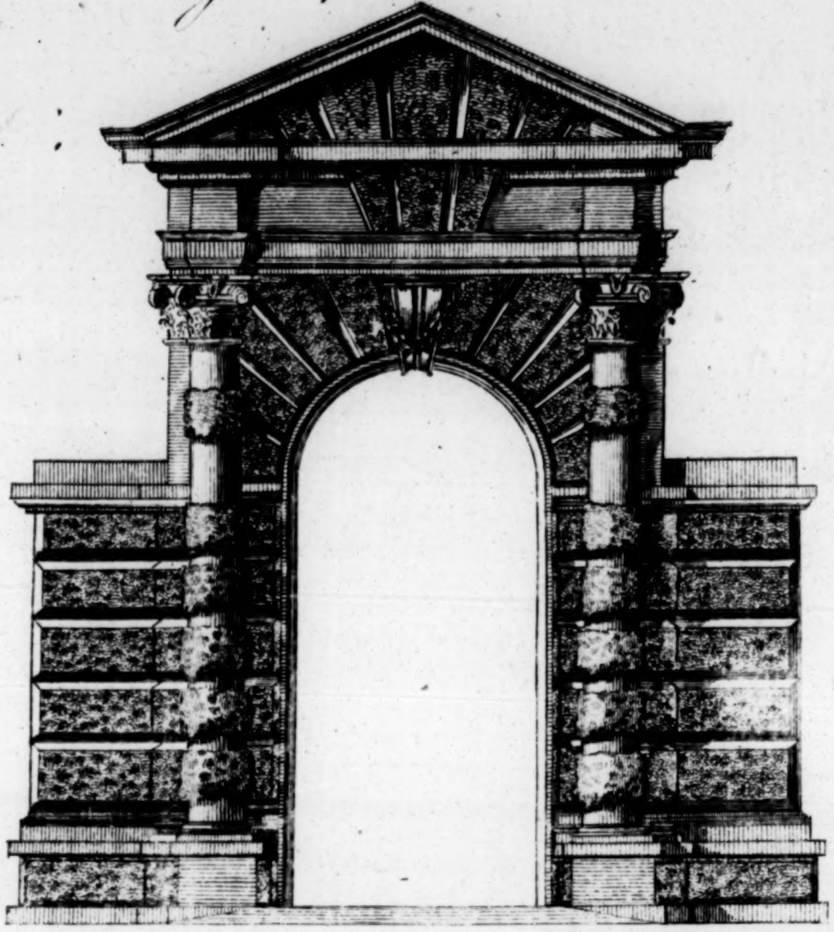
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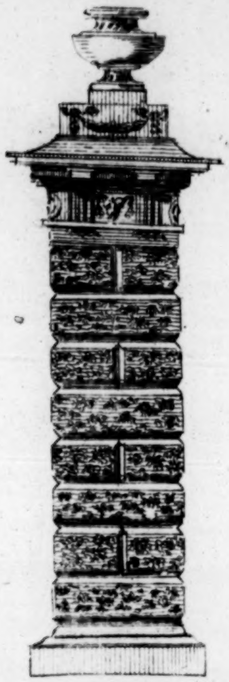
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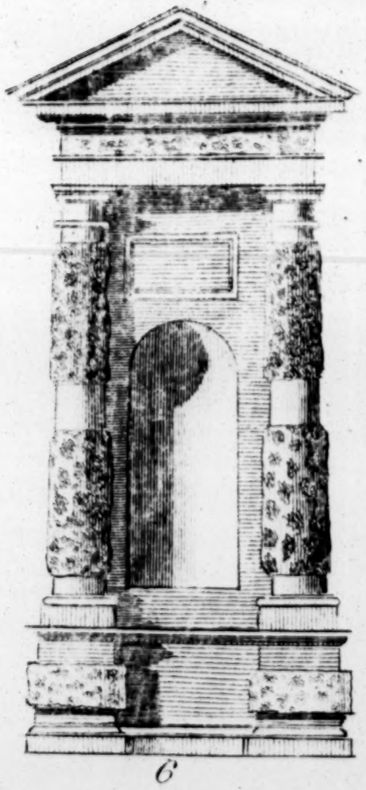
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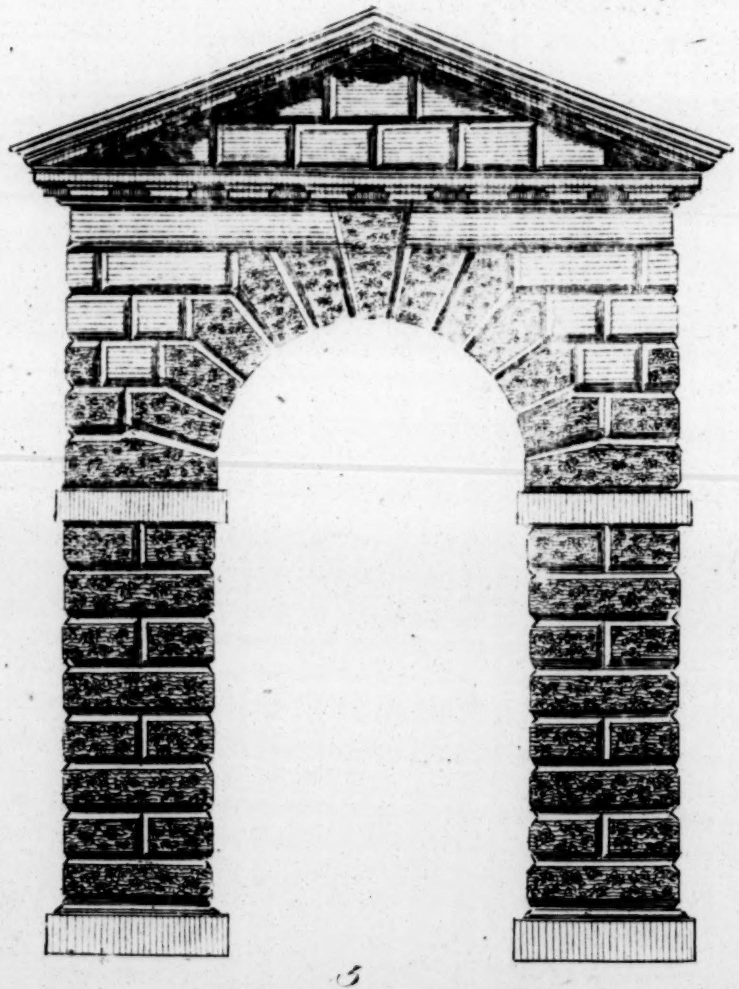
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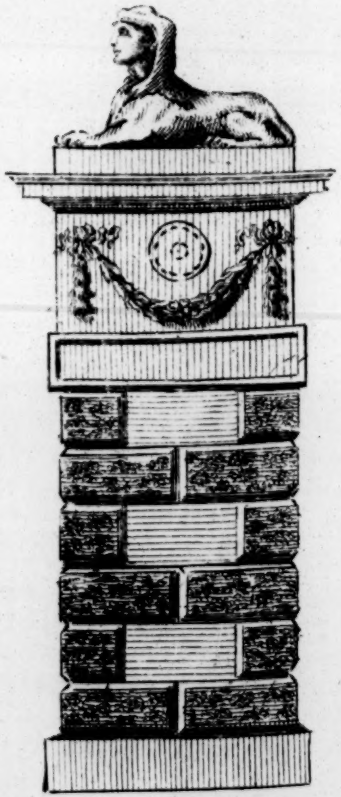

4

A.Bell Sculp

3 MA 53

Plate XXXIII.

Fig. 1.

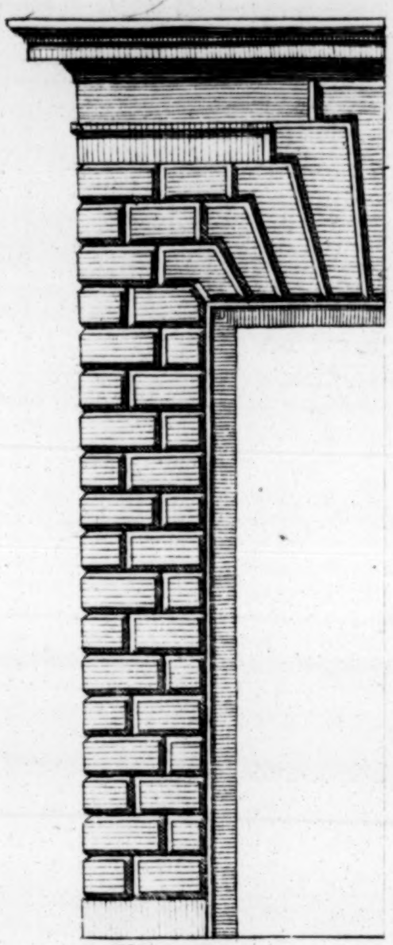


Fig. 2.

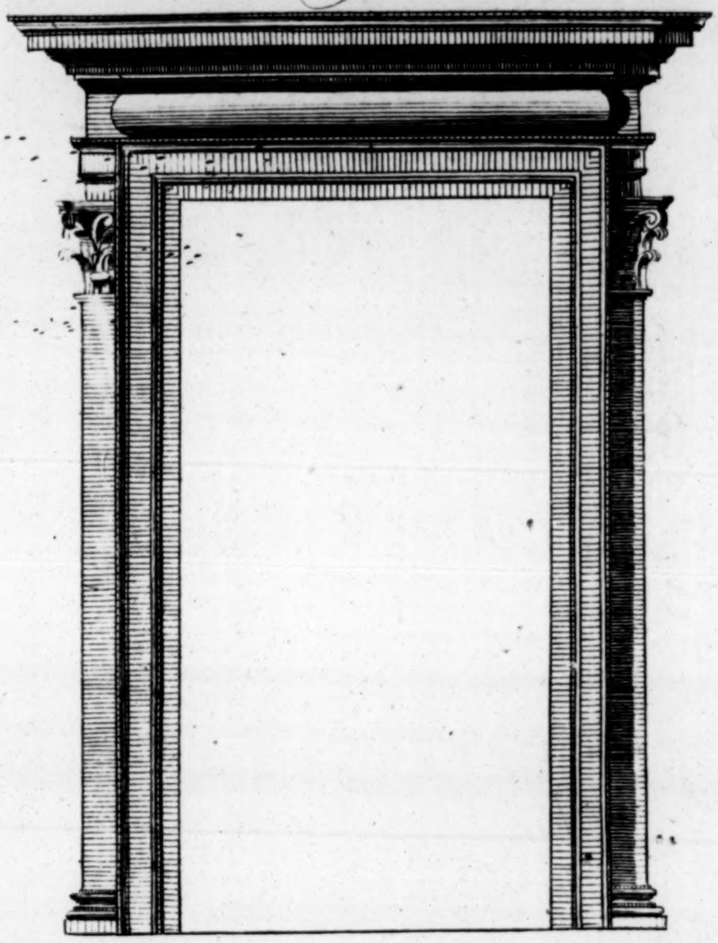


Fig. 3.

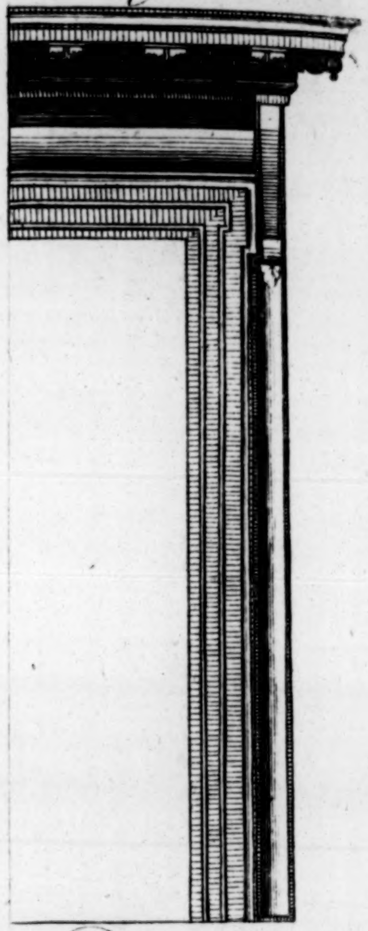


Fig. 4.

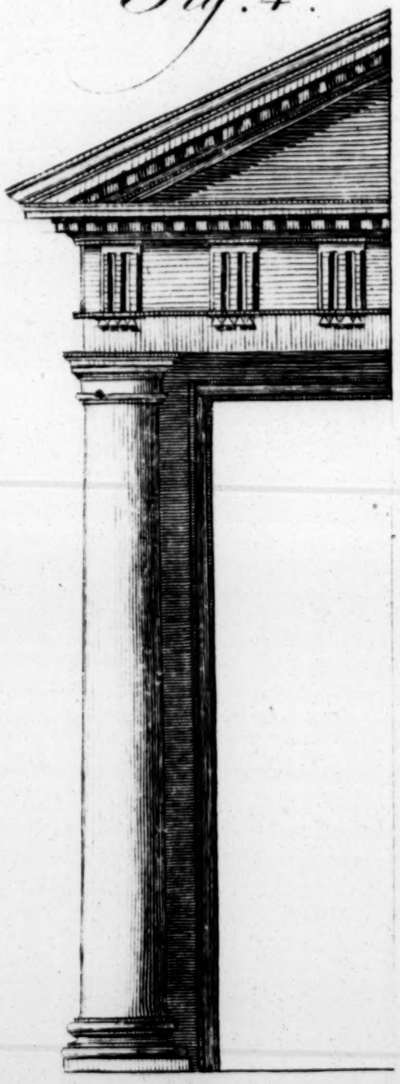


Fig. 5.

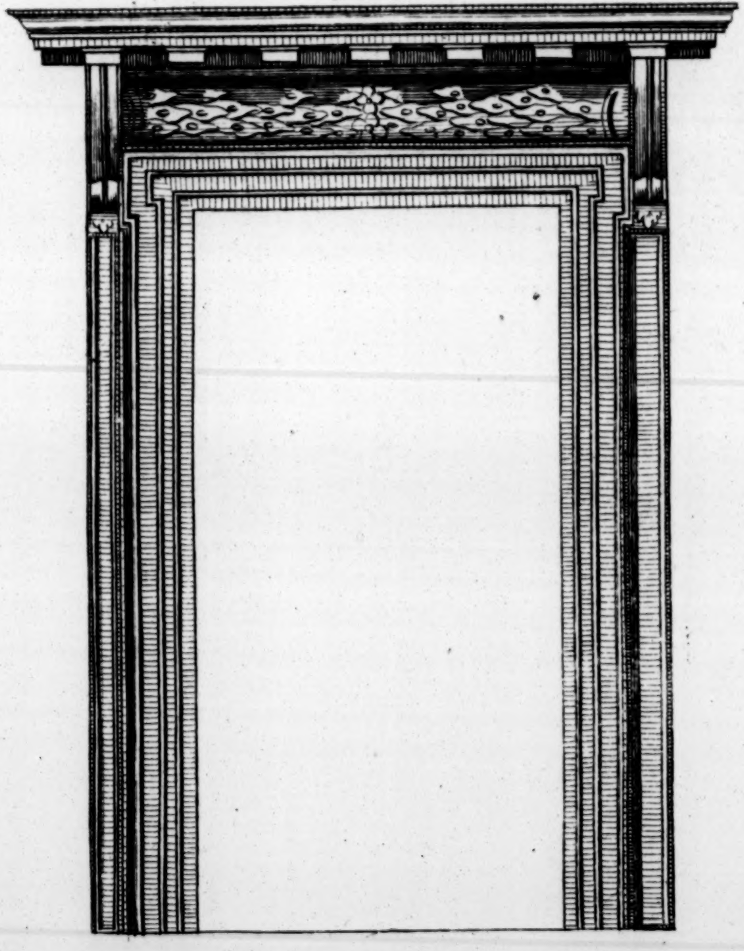
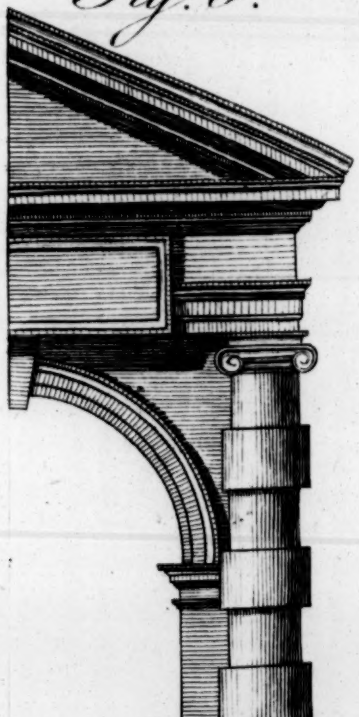


Fig. 6.



A Bell Sculp.t

ſiſting of the architrave and pilaſters, is equal to two ſevenths of the breadth of the aperture: the cornice is Compoſite, enriched with mutules and dentils; and the frize is adorned with a feſtoon of laurel.

Fig. 6. Is copied from a door at Florence, ſaid to be a deſign of Cigoli's. The height of the aperture is a trifle more than twice its breadth. It is arched; and the impoſt is equal to half a diameter. The columns are Ionic, ſomewhat above nine diameters high; and their ſhafts are garniſhed each with five ruſtic cinctures. The entablature is leſs than one quarter of the column; and the breadth of the tablet, in which there is an inſcription, is equal to the breadth of the aperture.

5th Plate XXXIX. fig. 1. Is a pier invented by Mr Chambers. Its diameter may be one quarter of its height, excluſive of the plinth and vaſe; and the height of both theſe may be equal to one diameter of the pier, or a trifle leſs. The ruſtics may either be plain, hatched, or vermiculated: the height of each courſe may be one eleventh part of the height of the pier, counting to the top of the entablature; the entablature two elevenths; and the baſe of the pier one eleventh part.

Fig. 2. Is likewiſe a compoſition of Mr Chambers, imitated from M. Angelo Buonaroti's deſign for Cardinal Sermonetti. The height of the aperture is ſomewhat more than twice its breadth; which breadth occupies one third of the breadth of the whole compoſition. The order is Compoſite; and the height of the entablature is equal to one quarter of the height of the column. He has made a break in it over each column: but, unleſs the column project conſiderably, it will be as well to carry the entablature on in a ſtraight line. The dimenſions of the particular parts may be meaſured on the deſign.

Fig. 3. Is alſo a compoſition of Mr Chambers, executed at Goodwood, the ſeat of his grace the duke of Richmond, in Suſſex. The diameter is one quarter of the height, excluſive of the finiſhing, which is equal to one diameter: and the height of the pier, from the top of the entablature downwards, being divided into eleven and a half parts, one of theſe parts is given to the baſe, one to each ruſtic, and one and a half to the aſtragal, frize, and cornice.

Fig. 4. Is a compoſition of the late earl of Burlington's, that great architect and patron of the fine arts, which is executed at Chiſwick, and at Bedford-houſe in Bloomſbury-ſquare with ſome little difference.

Fig. 5. Is an invention of Mr Chambers.

Fig. 6. Is one of Inigo Jones's; of which kind he hath executed a couple of piers at Aimſbury in Wiltſhire, the ſeat of his grace the duke of Queenſberry.

CHAP. XIII. *Of Windows.*

83
roportions
f windows.

THE firſt conſideration with regard to windows is their ſize, which varies according to the climate, the deſtination of the building, &c. In Britain, the windows of the ſmalleſt private houſes are commonly from 3 to $3\frac{1}{2}$ feet broad; and being generally twice their breadth in height, or ſomewhat more, in the principal apartments, they generally riſe to within a foot or two of the cielings of the rooms, which are frequently no higher than 10 feet, and at moſt 12 or 13. But, in more conſiderable houſes, the apartments are from 15 to 20 feet high, and ſometimes more; and in theſe the windows are from 4 to 5 and $5\frac{1}{2}$ feet broad, and high in proportion. Theſe dimenſions are ſufficient for dwelling-houſes of any ſize in this country; when they are larger, they admit too much of the cold air in winter. But churches, and other buildings of that kind, may have larger windows, proportioned to the ſize of the ſtructures.

The proportions of the apertures of windows depend upon their ſituation. Their breadth in all the ſtories muſt be the ſame; but the different heights of the apartments make it neceſſary to vary the height of the windows likewiſe. In the principal floor, it may be from $2\frac{1}{8}$ of the breadth to $2\frac{1}{3}$, according as the rooms have more or leſs elevation. In the ground-ſtory, where the apartments are lower, the apertures of the windows ſeldom exceed a double ſquare; and, when they are in a ruſtic baſement, they are frequently made much lower. The height of the windows of the ſecond floor may be from $1\frac{1}{2}$ of their breadth to $1\frac{4}{5}$; and Attics and Mezzanines may be either a perfect ſquare, or ſomewhat lower.

84
How ornamented.

The windows of the principal floor are generally moſt enriched. The ſimpleſt method of adorning them is, with an architrave ſurrounding the aperture, and crowned with a frize and cornice. The windows of the ground-floor are ſometimes left entirely plain, without any ornament; and at others they are ſurrounded with ruſtics, or a regular architrave with a frize and cornice. Thoſe of the ſecond floor have generally an architrave carried entirely round the aperture; and the ſame is the method of adorning Attic and Mezzanine windows: but the two laſt have ſeldom either frize or cornice; whereas the ſecond-floor windows are often crowned with both.

The breaſts of all the windows on the ſame floor ſhould be on the ſame level, and raiſed above the floor from two feet nine inches to three feet ſix inches at the very moſt. When the walls are thick, the breaſts ſhould be reduced under the apertures, for the conveniency of looking out. In France, the windows are frequently carried quite down to the floor. When the building is ſurrounded with gardens, or other beautiful objects, this method renders the rooms exceeding pleaſant.

The interval between the apertures of windows depends in a great meaſure on their enrichments. The breadth of the aperture is the leaſt diſtance that can be between them; and twice that breadth ſhould be the largeſt in dwelling-houſes; otherwiſe the rooms will not be ſufficiently lighted. The windows in all the ſtories of the ſame aſpect muſt be placed exactly above one another.

Plate XXXIV. fig. 1. Is a deſign of P. Leſcot, abbot of Clagny, executed in the old Louvre at Paris. The apertures may be a double ſquare, or a trifle more; the architrave from one ſixth to one ſeventh of the breadth of the aperture: the pilaſter is equal to that breadth, when the architrave is narrow; or leſs, by one quarter, or one fifth, when it is broad. The whole entablature ſhould not exceed one quarter of the height of the aperture, nor be much lower. The conſoles may be equal in length to half the breadth of the aperture at moſt, and to one third of it at leaſt.

Fig. 2. Is a deſign of Palladio's, executed at the Chiericato in Vicenza: its proportions are not much

different from the following. The plat-band that ſupports the window is equal to the breadth of the architrave.

Fig. 3. Is likewiſe a deſign of Palladio's, executed by him in many of his buildings. The aperture is a double ſquare. The breadth of the architrave is one ſixth of the breadth of the aperture; and the frize and cornice together are double the height of the architrave. The breadth of the conſoles is two thirds of the breadth of the architrave.

Fig 4. Is a deſign of Ludovico da Cigoli; and executed in the ground-floor of the Ranunchini palace at Florence.

Fig. 5. Is a deſign of Inigo Jones, executed at the Banqueting-houſe. The aperture may be a double ſquare; the architrave may be one ſixth of its breadth; the whole entablature one quarter of its height; and the breadth of the conſoles two thirds of the breadth of the architrave.

Fig. 6. Is a deſign of M. Angelo Buonorati, executed at the Farneſe.

85 CHAP. XIV. *Of Niches and Statues.*

86 Different kinds of niches.

IT hath been cuſtomary, in all ages, to enrich different parts of buildings with repreſentations of the human body. Thus the ancients adorned their temples, baths, theatres, &c. with ſtatues of their deities, heroes, and legiſlators. The moderns ſtill preſerve the ſame cuſtom, placing in their churches, palaces, &c. ſtatues of illuſtrious perſons, and even groups compoſed of various figures, repreſenting occurrences collected from hiſtory, fables, &c. Sometimes theſe ſtatues or groups are detached, raiſed on pedeſtals, and placed contiguous to the walls of a building, or in the middle of a room, court, or public ſquare. But they are moſt frequently placed in cavities made in the walls, called *niches*. Of theſe there are two ſorts; the one formed like an arch in its elevation, and ſemicircular or ſemi-elliptical in its plan; the other is a parallelogram both in its plan and elevation.

The proportion of both theſe niches depends on the characters of the ſtatues, or the general form of the groups placed in them. The loweſt are at leaſt a double ſquare in height; and the higheſt never exceed 2½ of their breadth.

87 How decorated. With regard to the manner of decorating them, when they are alone in a compoſition, they are generally incloſed in a pannel, formed and proportioned like the aperture of a window, and adorned in the ſame manner. In this caſe, the niche is carried quite down to the bottom; but on the ſides and at the top, a ſmall ſpace is left between the niche and the architrave of the pannel. And when niches are intermixed with windows, they may be adorned in the ſame manner with the windows, provided the ornaments be of the ſame figure and dimenſions with thoſe of the windows.

88 Statues. The ſize of the ſtatues depends on the dimenſions of the niches. They ſhould neither be ſo large as to have the appearance of being rammed into the niches, as in Santa Maria Majora at Rome; nor ſo narrow as to ſeem loſt in them, as in the Pantheon. The diſtance between the outline of the ſtatue and ſide of the niche ſhould never be leſs than one third of a head, nor more than one half, whether the niche be ſquare or arched; and when it is ſquare, the diſtance from the top of the head to the ceiling of the niche ſhould not be greater than the diſtance on the ſides. Statues are generally raiſed on a plinth, the height of which may be from one third to one half of a head; and ſometimes, where the niches are large, the ſtatues may be raiſed on ſmall pedeſtals.

The character of the ſtatue ſhould always correſpond with the character of the architecture with which it is ſurrounded. Thus, if the order be Doric, Hercules, Jupiter, Mars, Æſculapius, and all male ſtatues repreſenting beings of a robuſt and grave nature, may be introduced; if Ionic, then Apollo, Bacchus, &c.; and if Corinthian, Venus, Flora, and others of a delicate nature, ſhould be employed.

CHAP. XV. *Of Chimney-pieces.* 89

AMONG the ancients, there are very few examples of chimney-pieces to be met with. Neither the Italians nor French have excelled in compoſitions of this kind. Britain, by being poſſeſſed of many able ſculptors at different times, has ſurpaſſed all other nations, both in taſte of deſign, and workmanſhip.

90 Proportion and ſituations. The ſize of the chimney muſt be regulated by the dimenſions of the room where it is placed. In the ſmalleſt apartments, the breadth of the aperture ſhould never be leſs than three feet, or three feet ſix inches. In rooms from 20 to 24 feet ſquare, or of equal ſuperficial dimenſions, it may be from 4 to 4½ feet broad; in thoſe of 24 to 27, from 4½ to 5; and, in ſuch as exceed theſe dimenſions, the aperture may even be extended to 5½ or 6 feet.

The chimney ſhould always be ſituated ſo as to be immediately ſeen by thoſe who enter the room. The middle of the partition wall is the moſt proper place in halls, ſalons, and other rooms of paſſage; but in drawing-rooms, dreſſing-rooms, and the like, the middle of the back-wall is the beſt ſituation. In bed-rooms, the chimney is always in the middle of one of the partition-walls: and in cloſets, and other very ſmall places, to ſave room, it is put in a corner. Where-ever two chimneys are uſed in the ſame room, they ſhould be placed either directly facing each other, if in different walls, or at equal diſtances from the centre of the wall in which they both are.

The proportion of the apertures of chimney-pieces of a moderate ſize is generally a perfect ſquare; in ſmall ones, it is a trifle higher; and in large ones, a trifle lower. Their ornaments conſiſt in architraves, frizes, cornices, columns, pilaſters, termini, caryatides, conſoles, and all kinds of ornaments of ſculpture, repreſenting animals and vegetables, &c. likewiſe vaſes, chalices, trophies of arms, &c. In deſigning them, regard muſt be had to the nature of the place where they are to be employed. Such as are intended for halls, ſalons, guard-rooms, galleries, and other large places, muſt be compoſed of large parts, few in number, of diſtinct and ſimple forms, and having a bold relief; but chimney-pieces for drawing-rooms, dreſſing-rooms, &c. may be of a more delicate and complicated nature.

Chimney-pieces are compoſed of wood, ſtone, or marble; the laſt of which ought to be preferred, as figures or profiles are beſt repreſented in a pure white.

Plate XXXV. fig. 1, 2, 3, and 4. are different deſigns

Plate XXXIV.

Fig. 1.

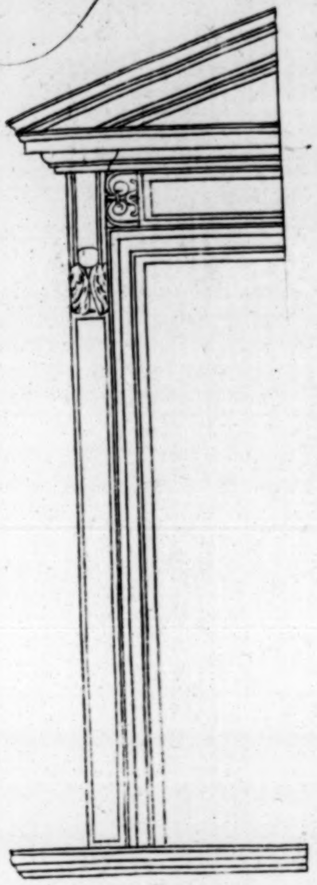


Fig. 2.

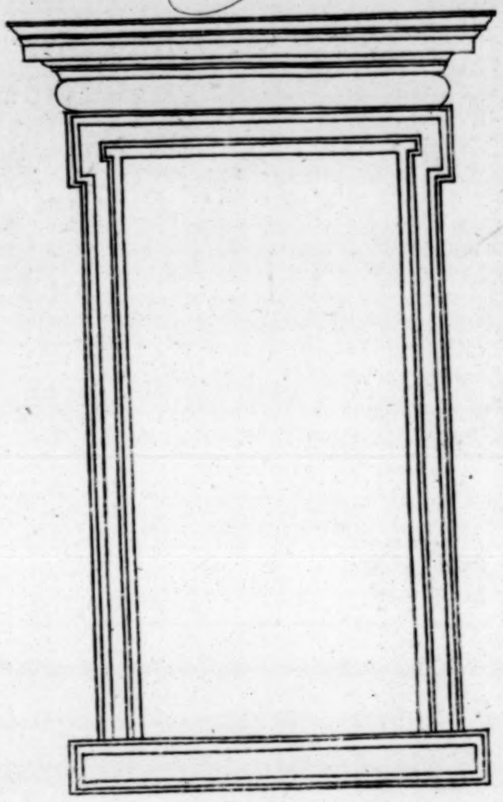


Fig. 3.

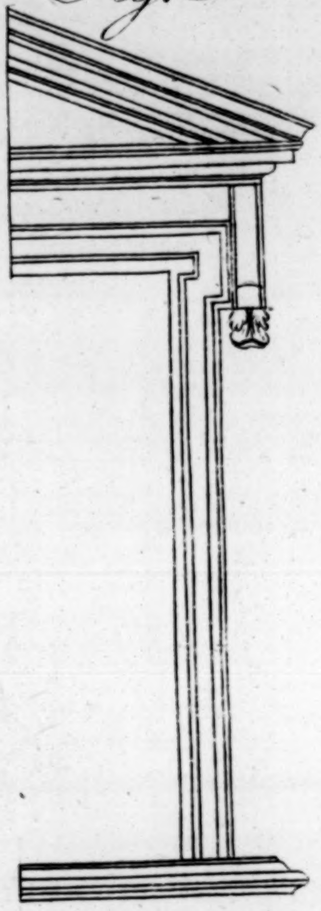


Fig. 4.

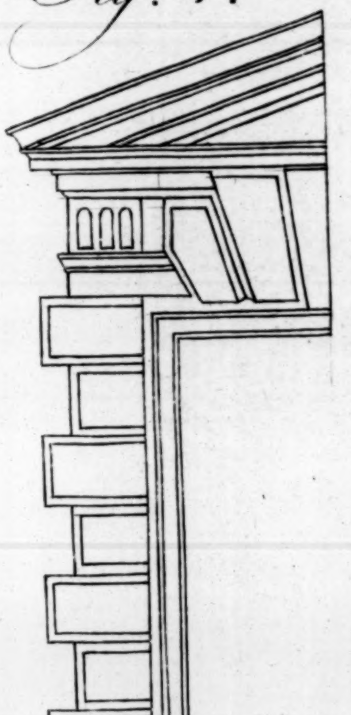


Fig. 5.

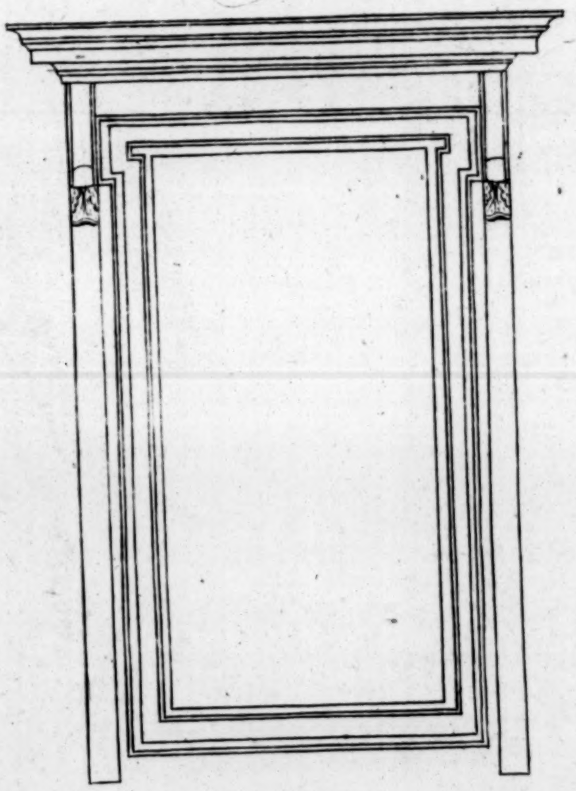
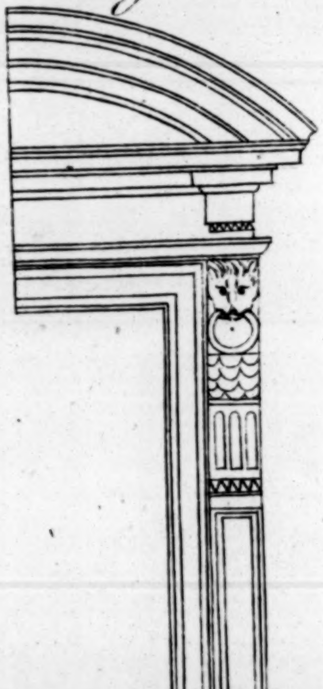


Fig. 6.



A Bell Sculp^t.

3 MA 53

Plate XXXV.

Fig. 1.

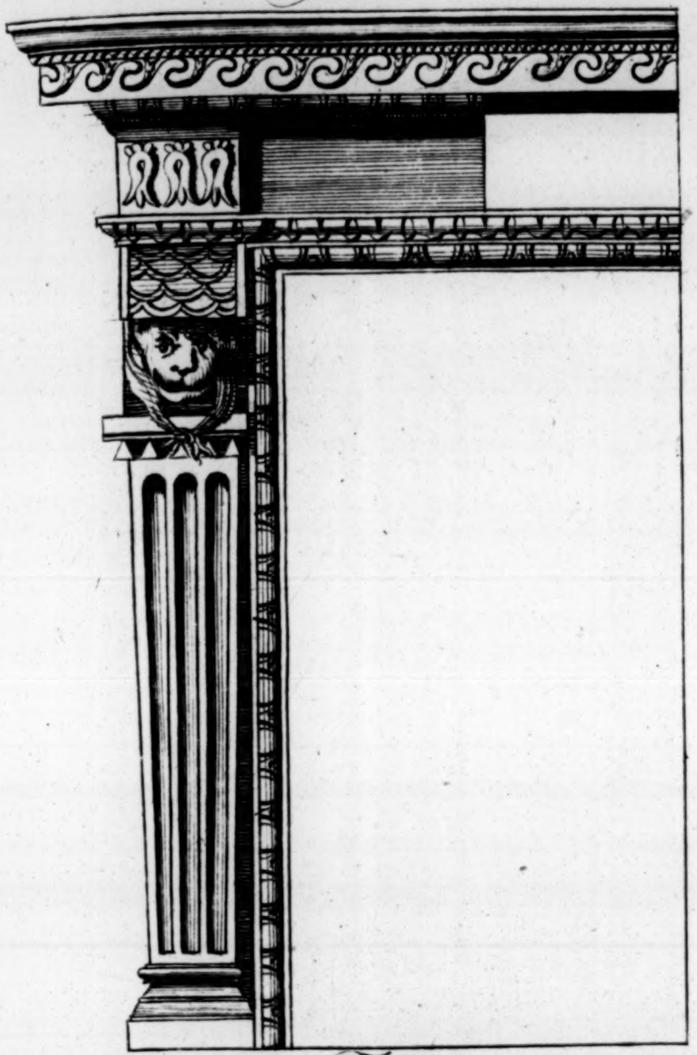


Fig. 2.

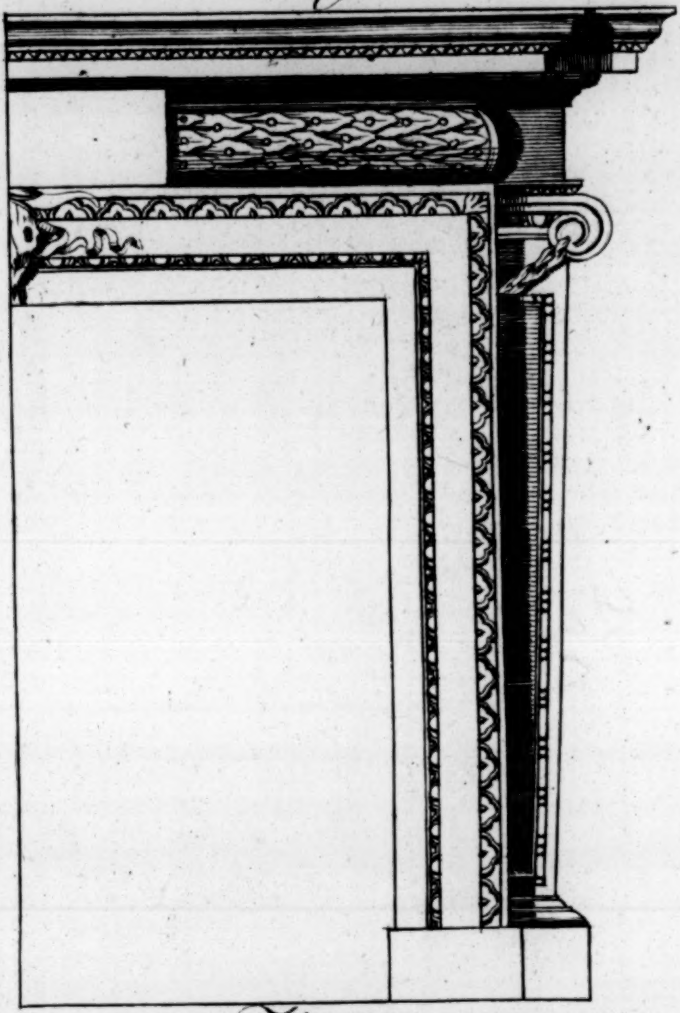


Fig. 3.

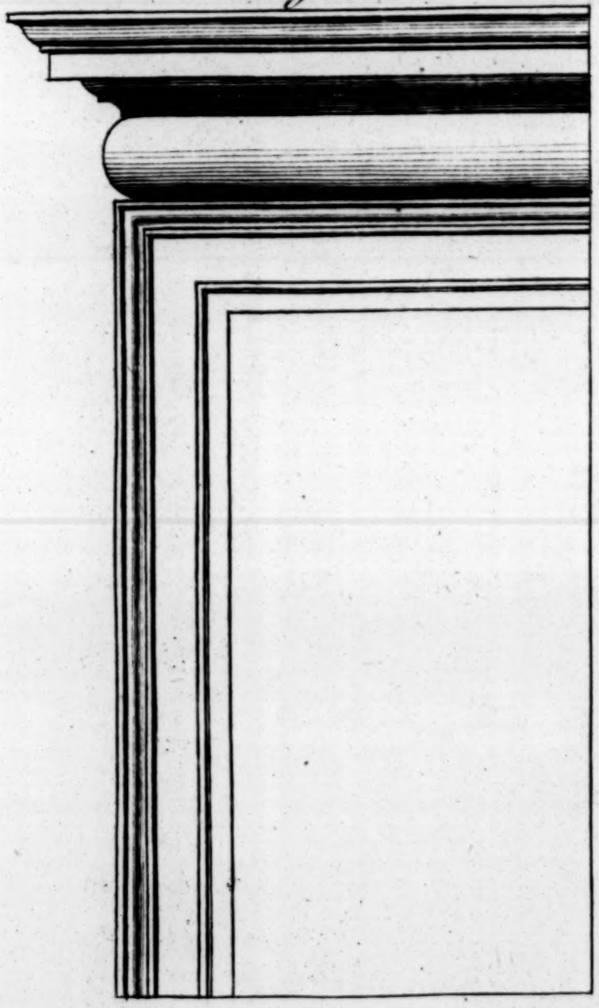
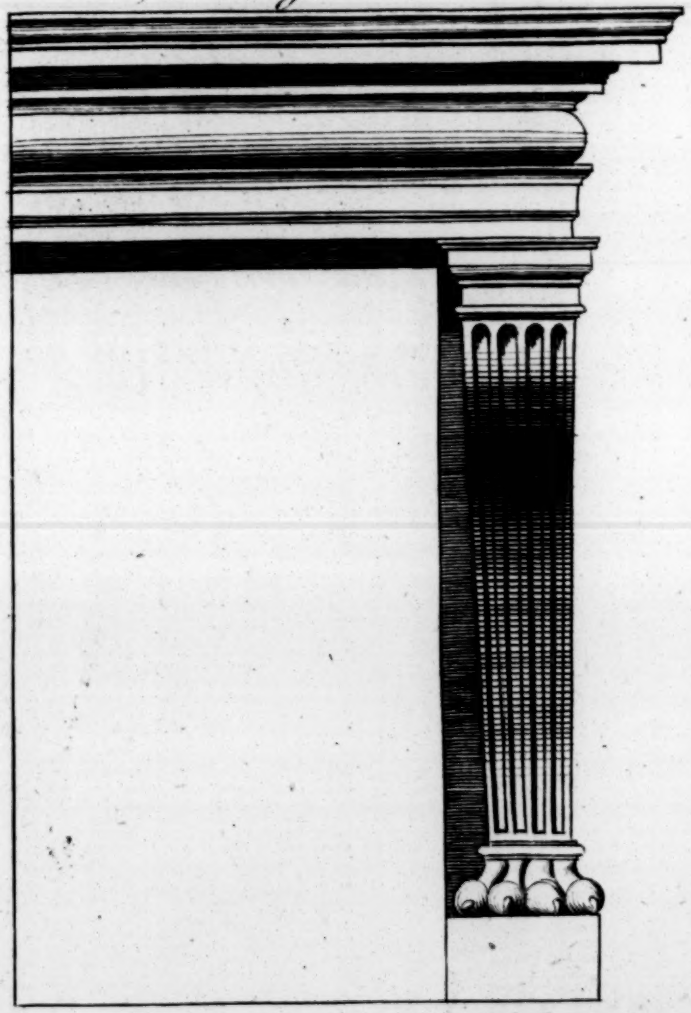


Fig. 4.



A. Bell Sculpt.

3 MA 53

Principles. ſigns for chimney-pieces by Palladio and Inigo Jones. Their proportion may be gathered from the deſigns, which are accurately executed.

91 Chap. XVI. *Of the Proportions of Rooms.*

The proportions of rooms depend in a great meaſure on their uſe, and actual dimenſions: but, with regard to beauty, all figures, from a ſquare to a ſeſquilateral, may be employed for the plan.

The height of rooms depends on their figure. Flat cieled ones may be lower than thoſe that are coved. If their plan be a ſquare, their height ſhould not exceed five ſixths of the ſide, nor be leſs than four fifths; and when it is oblong, their height may be equal to their breadth. But coved rooms, if ſquare, muſt be as high as broad; and when oblong, they may have their height equal to their breadth, more one fifth, one quarter, or even one third of the difference between the length and breadth: and galleries ſhould at leaſt be in height one and one third of their breadth, and at moſt one and a half, or one and three-fifths.

92 igh rooms proper in itain. The coldneſs of the Britiſh climate is a ſtrong objection to high rooms; ſo that it is not uncommon to ſee the moſt magnificent apartments not above 15, 16, or at moſt 18 feet high; though the extent of the rooms would require a much more conſiderable elevation. But, where beauty is aimed at, this practice ought not to be imitated.

When rooms are adorned with an entire order, the entablature ſhould never exceed one ſixth of the whole height in flat-cieled rooms, and one ſixth of the upright part in coved ones; and when there are neither columns nor pilaſters, but only an entablature, its height ſhould not be above one ſeventh of theſe heights. If the rooms be finiſhed with a ſimple cornice, it ſhould never exceed one fourteenth, nor ever be leſs than one fifteenth part of the above-mentioned height.

93 Chap. XVII. *Of Cielings.*

Cielings are either flat, or coved, in different manners. The ſimpleſt of the flat kind are thoſe adorned with large compartments, ſurrounded with one or ſeveral mouldings, either let into the cieling, or projecting beyond its ſurface: and when the mouldings that form the compartments are enriched, and ſome of the compartments adorned with well-executed ornaments, ſuch cielings have a good effect, and are very proper for common dwelling-houſes, and all low apartments. Their ornaments and mouldings do not require a bold relief; but, being near the eye, they muſt be finiſhed with taſte and neatneſs. For higher rooms, a flat cieling which has the appearance of being compoſed of various joiſts framed into each other, and forming compartments of various geometrical figures, ſhould be employed. The ſides of the joiſts forming the compartments are generally adorned with mouldings, and repreſent either a ſimple architrave, or an architrave-cornice, according to the ſize of the compartments and the height of the room.

Coved cielings are more expenſive; but they are likewiſe more beautiful. They are uſed promiſcuouſly in large and ſmall rooms, and occupy from one fifth to one third of the height of the room. If the room be low in proportion to its breadth, the cove muſt likewiſe be low; and when it is high, the cove muſt be ſo likewiſe: by which means the exceſs of the height will be rendered leſs perceptible. But, where the architect is at liberty to proportion the height of the room to its ſuperficial dimenſions, the moſt eligible proportion for the cove is one fourth of the whole height. In parallellogram-figured rooms, the middle of the cieling is generally formed into a large flat pannel. This pannel, with the border that ſurrounds it, may occupy from one half to three fifths of the breadth of the room. The figure of the cove is commonly either a quadrant of a circle or of an ellipſe, taking its riſe a little above the cornice, and finiſhing at the border round the great pannel in the centre. The border projects ſomewhat beyond the coves on the outſide; and, on the ſide towards the pannel, it is generally made of ſufficient depth to admit the ornaments of an architrave, or architrave and cornice. Principles.

In Britain, circular rooms are not much in uſe; but they are very beautiful. Their height muſt be the ſame with that of ſquare rooms; their cielings may be flat; but they are handſomer when coved, or of a concave form.

Arcs doublaux, or ſoffits of arches, when narrow, are ornamented with *guillochs*, or frets; but, when broad, they may be adorned in a different manner.

When the profiles of the room are gilt, the cielings ought likewiſe to be gilt. The uſual method is to gild all the ornaments, and to leave the grounds white, pearl colour, light blue, or of any other tint proper to ſet off the gilding to advantage. Painted cielings, ſo common in France and Italy, are but little uſed in Britain.

Chap. XVIII. *Of Stairs and Stair-caſes.* 94

There are many kinds of ſtair-caſes: for, in ſome, the ſteps are made ſtraight; in others, winding; in others, mixed of both. Of ſtraight ſtairs, ſome fly directly forward, others are ſquare, others triangular. Others are called *French flights*, or *winding-ſtairs*, (which in general are called *ſpiral*, or *cockle-ſtairs*); of which ſome are ſquare, ſome circular or round, and ſome elliptical or oval; and theſe again are various, ſome winding about a ſolid, others about an open newel. Stairs mixed of ſtraight and winding ſteps are alſo of various kinds; ſome are called *dog-legged;* ſome there are that wind about a ſolid newel, and others that fly about a ſquare open newel.

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Palladio ſays, in placing ſtair-caſes, the utmoſt care ought to be taken; it being difficult to find a place convenient for them, that will not at the ſame time prejudice the reſt of the building. But commonly the ſtairs are placed in the angle, wing, or middle of the front.

To every ſtair-caſe are required three openings.

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ſigns for chimney-pieces by Palladio and Inigo Jones. Their proportion may be gathered from the deſigns, which are accurately executed.

91 Chap. XVI. *Of the Proportions of Rooms.*

The proportions of rooms depend in a great meaſure on their uſe, and actual dimenſions: but, with regard to beauty, all figures, from a ſquare to a ſeſquilateral, may be employed for the plan.

The height of rooms depends on their figure. Flat cieled ones may be lower than thoſe that are coved. If their plan be a ſquare, their height ſhould not exceed five ſixths of the ſide, nor be leſs than four fifths; and when it is oblong, their height may be equal to their breadth. But coved rooms, if ſquare, muſt be as high as broad; and when oblong, they may have their height equal to their breadth, more one fifth, one quarter, or even one third of the difference between the length and breadth: and galleries ſhould at leaſt be in height one and one third of their breadth, and at moſt one and a half, or one and three-fifths.

92 High rooms improper in Britain. The coldneſs of the Britiſh climate is a ſtrong objection to high rooms; ſo that it is not uncommon to ſee the moſt magnificent apartments not above 15, 16, or at moſt 18 feet high; though the extent of the rooms would require a much more conſiderable elevation. But, where beauty is aimed at, this practice ought not to be imitated.

When rooms are adorned with an entire order, the entablature ſhould never exceed one ſixth of the whole height in flat-cieled rooms, and one ſixth of the upright part in coved ones; and when there are neither columns nor pilaſters, but only an entablature, its height ſhould not be above one ſeventh of theſe heights. If the rooms be finiſhed with a ſimple cornice, it ſhould never exceed one fourteenth, nor ever be leſs than one fifteenth part of the above-mentioned height.

93 Chap. XVII. *Of Cielings.*

Cielings are either flat, or coved, in different manners. The ſimpleſt of the flat kind are thoſe adorned with large compartments, ſurrounded with one or ſeveral mouldings, either let into the cieling, or projecting beyond its ſurface: and when the mouldings that form the compartments are enriched, and ſome of the compartments adorned with well-executed ornaments, ſuch cielings have a good effect, and are very proper for common dwelling-houſes, and all low apartments. Their ornaments and mouldings do not require a bold relief; but, being near the eye, they muſt be finiſhed with taſte and neatneſs. For higher rooms, a flat cieling which has the appearance of being compoſed of various joiſts framed into each other, and forming compartments of various geometrical figures, ſhould be employed. The ſides of the joiſts forming the compartments are generally adorned with mouldings, and repreſent either a ſimple architrave, or an architrave-cornice, according to the ſize of the compartments and the height of the room.

Coved cielings are more expenſive; but they are likewiſe more beautiful. They are uſed promiſcuouſly in large and ſmall rooms, and occupy from one fifth to one third of the height of the room. If the room be low in proportion to its breadth, the cove muſt likewiſe be low; and when it is high, the cove muſt be ſo likewiſe: by which means the exceſs of the height will be rendered leſs perceptible. But, where the architect is at liberty to proportion the height of the room to its ſuperficial dimenſions, the moſt eligible proportion for the cove is one fourth of the whole height. In parallellogram-figured rooms, the middle of the cieling is generally formed into a large flat pannel. This pannel, with the border that ſurrounds it, may occupy from one half to three fifths of the breadth of the room. The figure of the cove is commonly either a quadrant of a circle or of an ellipſe, taking its riſe a little above the cornice, and finiſhing at the border round the great pannel in the centre. The border projects ſomewhat beyond the coves on the outſide; and, on the ſide towards the pannel, it is generally made of ſufficient depth to admit the ornaments of an architrave, or architrave and cornice.

In Britain, circular rooms are not much in uſe; but they are very beautiful. Their height muſt be the ſame with that of ſquare rooms; their cielings may be flat; but they are handſomer when coved, or of a concave form.

Arcs doublaux, or ſoffits of arches, when narrow, are ornamented with *guillochs*, or frets; but, when broad, they may be adorned in a different manner.

When the profiles of the room are gilt, the cielings ought likewiſe to be gilt. The uſual method is to gild all the ornaments, and to leave the grounds white, pearl colour, light blue, or of any other tint proper to ſet off the gilding to advantage. Painted cielings, ſo common in France and Italy, are but little uſed in Britain.

Chap. XVIII. *Of Stairs and Stair-caſes.* 94

There are many kinds of ſtair-caſes: for, in ſome, the ſteps are made ſtraight; in others, winding; in others, mixed of both. Of ſtraight ſtairs, ſome fly directly forward, others are ſquare, others triangular. Others are called *French flights*, or *winding-ſtairs*, (which in general are called *ſpiral*, or *cockle-ſtairs)*; of which ſome are ſquare, ſome circular or round, and ſome elliptical or oval; and theſe again are various, ſome winding about a ſolid, others about an open newel. Stairs mixed of ſtraight and winding ſteps are alſo of various kinds; ſome are called *dog-legged;* ſome there are that wind about a ſolid newel, and others that fly about a ſquare open newel.

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To every ſtair-caſe are required three openings.

Firſt, the door leading thereto.

Secondly, the window, or windows that give light to it;

And, thirdly, the landing.

Firſt, the door leading to the ſtair-caſe ſhould be ſo placed, that moſt of the building may be ſeen before you come at the ſtairs, and in ſuch a manner that it may be eaſy for any perſon to find out.

Secondly, for the windows; if there be but one, it muſt be placed in the middle of the ſtair-caſe, that thereby the whole may be enlightened.

Thirdly, the landing of ſtairs ſhould be large and ſpacious, for the convenient entering into rooms: in a word, ſtair-caſes ſhould be ſpacious, light, and eaſy in aſcent. The height of large ſteps muſt never be leſs than ſix inches, nor more than ſeven inches and a half.

The breadth of ſteps ſhould never be leſs than 10 inches, nor more than 18 inches; and the length of them not leſs than three feet, nor more than 12.

96 Plate XXXVI. fig. 1. A ſtair-caſe of two flights.—*A* ſhews the manner of drawing the *ramp*, which is to riſe equal to the height of the firſt ſtep of the next flight, and as much as its *kneeling;* as is ſhewn by the *ramp* interſecting the rail of the ſecond flight.

Fig. 2. Shews the ſtraight rail interſecting a circular cap.

Fig. 3. Section of two different hand-rails.

Fig. 4. Shews the manner of dove-tailing the riſer into the ſtep.

97 Plate XXXVII. fig. 1. Repreſents a ſtair-caſe, with flights, and its landing-rail.

Fig. 2. Shews the ſolid part of the ſtep out of which the ſcroll is formed; where *a* repreſents the *overſail* of the ſtep; *b*, The thickneſs of the bracket, with its *mitring* to the *riſer;* and, *c*, The *ſtring-board*.

Fig. 4. Shews the ſcale for drawing the ſcroll of fig. 3.—To perform which, take the diſtance from 1 to the centre, in fig. 3. and ſet it from 1 to the centre in fig. 4.; divide that extent into three parts, then ſet four ſuch parts on the upper ſide of the ſcale, and draw the line from 4 to 1; ſet one foot of your compaſſes at 4, and ſtrike the circular line; let that be divided into 12 equal parts, and then draw lines from 4 through thoſe diviſions to the upright line.

The ſcale being thus made, draw the ſcroll of fig. 3. by it in the following manner.

Set one foot of your compaſſes in 1, and deſcribe a ſtroke at *c*; take the ſame diſtance, and with one foot in 2, croſs the ſtroke at *c*; then from *c*, turn the part from 1 to 2, and proceed in the ſame manner; for if the diſtance were taken in the ſcale from 1 to the centre, it would ſtrike the circle too flat; and if taken from 2, it would ſtrike the circle too quick.

When this is well underſtood, there will be little difficulty in drawing the ſcroll below fig. 2.; which throws itſelf out farther in proportion than that in fig. 3.; for this will always be the caſe when the upper line of the ſcale, which conſiſts of four diviſions in fig. 4. is made but with three diviſions or leſs; whence it appears, that the upper line of the ſcale may be drawn at what length you pleaſe, according as you would bring in or keep out the ſcroll.

98 Plate XXXVIII. Shews the manner of ſquaring twiſt-rails.

Fig. 2. Exhibits the pitch-board, to ſhew what part of the ſtep the twiſted part of the rail contains; the three doted lines drawn from the rail to the pitch-board repreſent the width of the rail, which is to be kept level. The doted lines *a* and *b* ſhew how much half the width of the rail turns up from its firſt beginning to 3.

Fig. 3. Shews the ſame pitch-board, with the manner of the rail's turning up. If the ſides of the twiſted part of the rail be ſhaped by the rail-mould, ſo that they direct down to its ground-plan, that is, the upper ſide of the rail being firſt ſtruck by the mould, then apply the mould to the under ſide, as much back as the level of the pitch-board ſhews, by being ſtruck on the ſide of the rail, and then fig. 3. being applied to the outſide of the rail, from its firſt twiſting part to 3, will ſhow how much wood is to be taken off.

Fig. 5. Exhibits the ſquare of the rail, with the raking line of the pitch-board drawn through the middle on the upper ſide; then draw the depth of the ſide the rail parallel to this, and the doted lines from the diagonal of the rail; theſe lines ſhew what quantity of wood will be wanting on the upper and lower ſides of the rail. Set your compaſſes at *c*, and draw the circular ſtroke from the raking part of the pitch-board to *b*; take the diſtance *a b* and transfer it from *a* to *b*, in fig 7. The ſeveral diſtances thus found may be ſet at any number of places, ranging with the ſtraight part of the rail; and it then forms the width of the mould for the twiſting part of the rail.

Fig. 7. Shews the ſweep of the rail. The rail cannot be fixed leſs than one fourth part from the *noſing* or front of the ſtep.

The remaining part of the pitch-board may be divided into any number of parts, as here into four; from theſe diviſions draw lines acroſs the pitch-board to the raking line; then take the diſtances from the ground-line of the pitch-board to the plan of the rail, and ſet them perpendicular from the raking line of the pitch board; and theſe diviſions, when the rail is in its proper poſition, lie directly over the diviſions on the ground plan.

In this figure *l*, *m*, and *n*, riſe as much above *o* as the dotted line in fig. 5. does above the width of the rail; and they ſink as much below *o* as the other doted line in fig. 5. falls below the width of the rail; the ſame thickneſſes muſt be glued upon *o*, though the greateſt part will come off in ſquaring. The reaſon of placing the letters *l*, *m*, and *n*, where they are, is, that they might not obſtruct the ſmall diviſions of the rail-mould.

Fig. 4. Shews how to find the rail when it takes more than one ſtep. The remaining part of the pitch-board is divided into four parts, as before in fig. 7 and it takes in two ſuch parts of the next ſtep. Draw lines from theſe diviſions to the diagonal of the pitch-board as in fig. 7. then take the diſtance *a b*, and ſet it from *c* to *d*, and ſo proceed with the other diviſions.

Another way to find the outſide of the rail-mould is, to draw all the diviſions acroſs the plan of the rail; then take the diſtance from the ground-line of the pitch-board to 4, transfer it from the diagonal of the pitch-board to 4 on the rail; and ſo proceed with the other diſtances. Now, when the rail is put in its proper ſituation, *c* will be perpendicular to *b*, and all the diviſions, as 1, 2, 3, 4, *&c.* in the rail, will be perpendicular to 1, 2, 3, 4, *&c.* in the ground-plan.

Fig. 6. Shews the plan of a rail of five ſteps.

Plate XXXVI

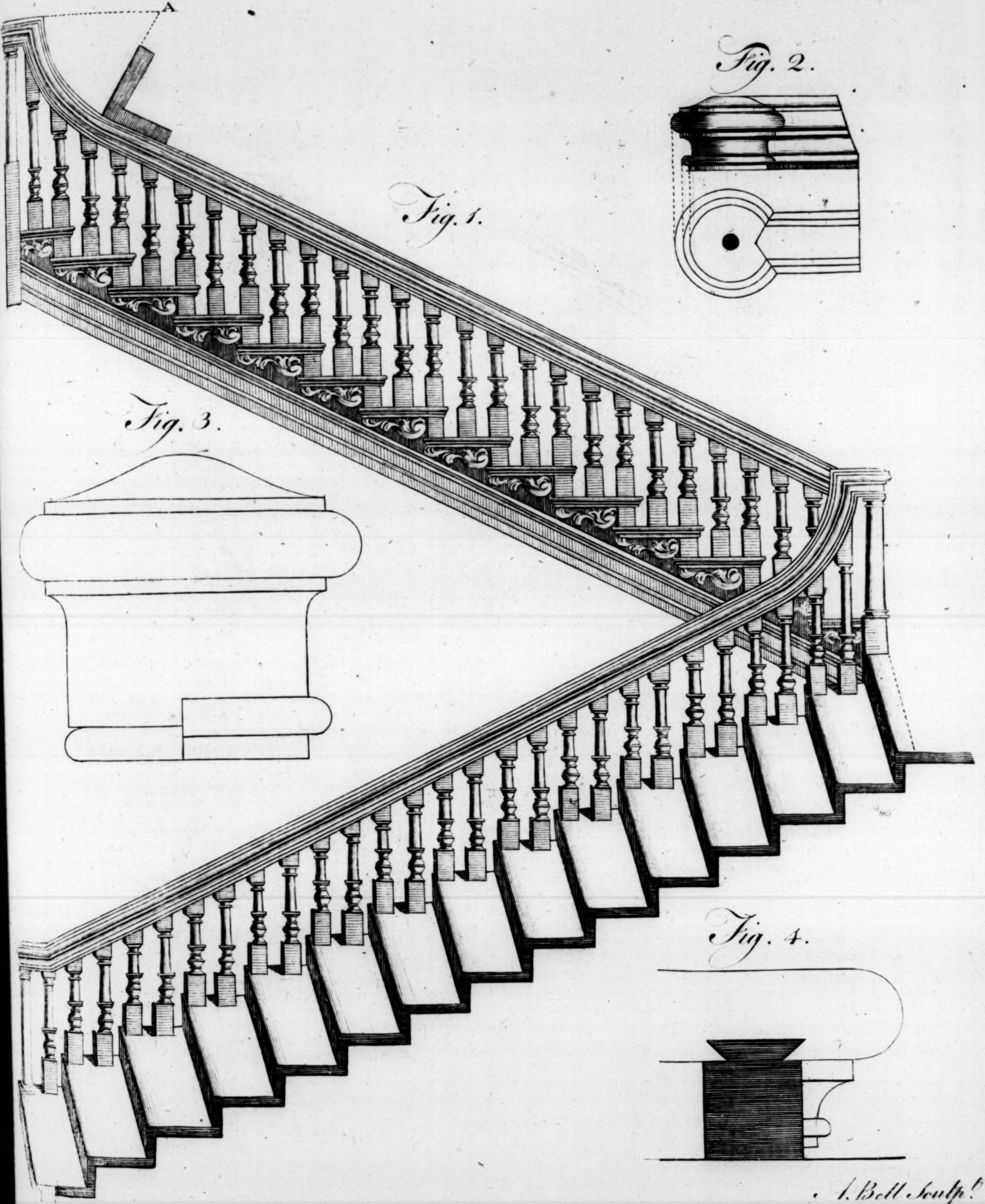

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

A. Bell Sculpt.

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Plate XXXVII

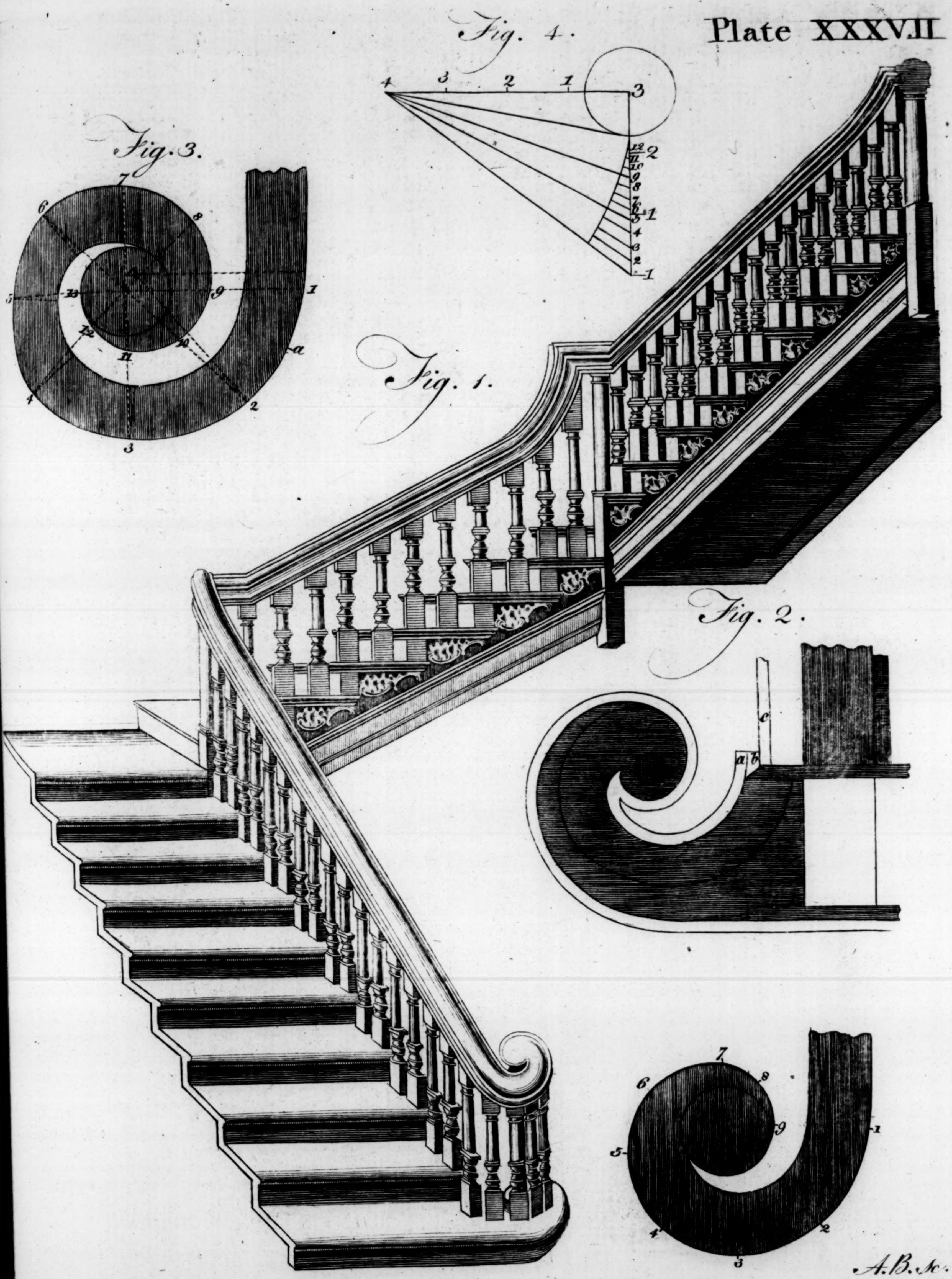
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Fig. 1.
Fig. 2.
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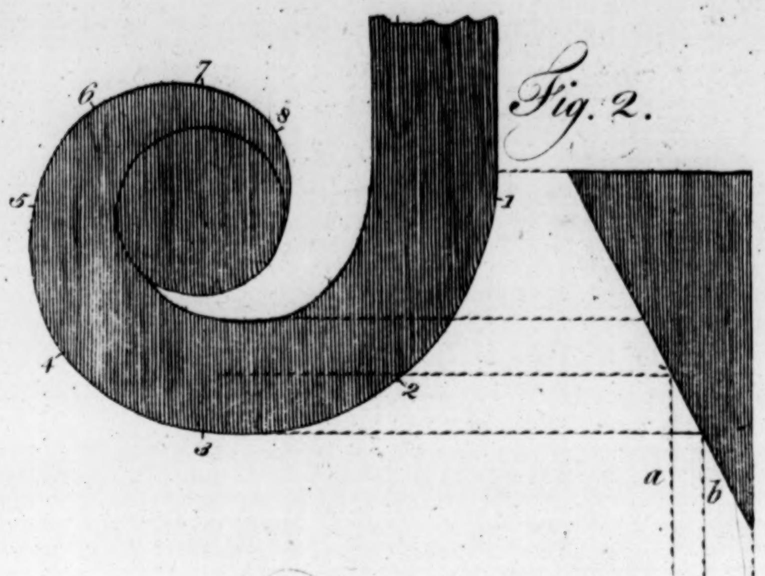
Plate XXXVIII.

Fig. 2.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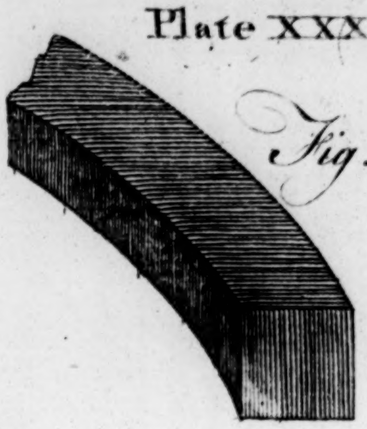

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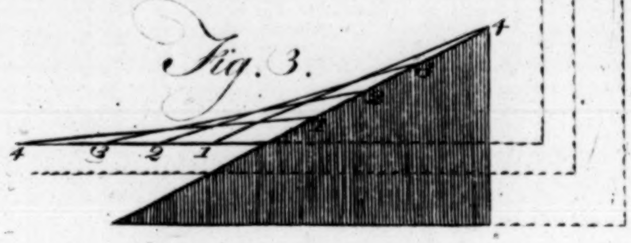

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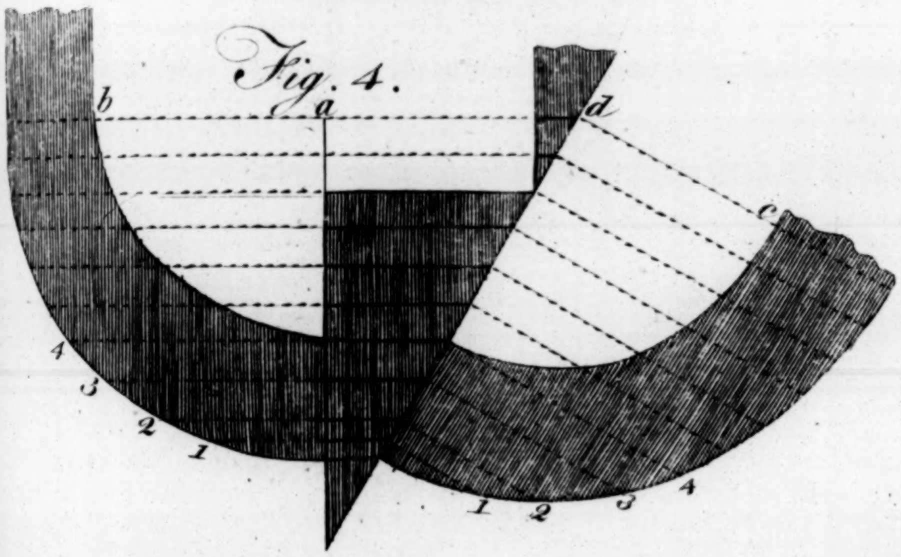
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Fig. 6.

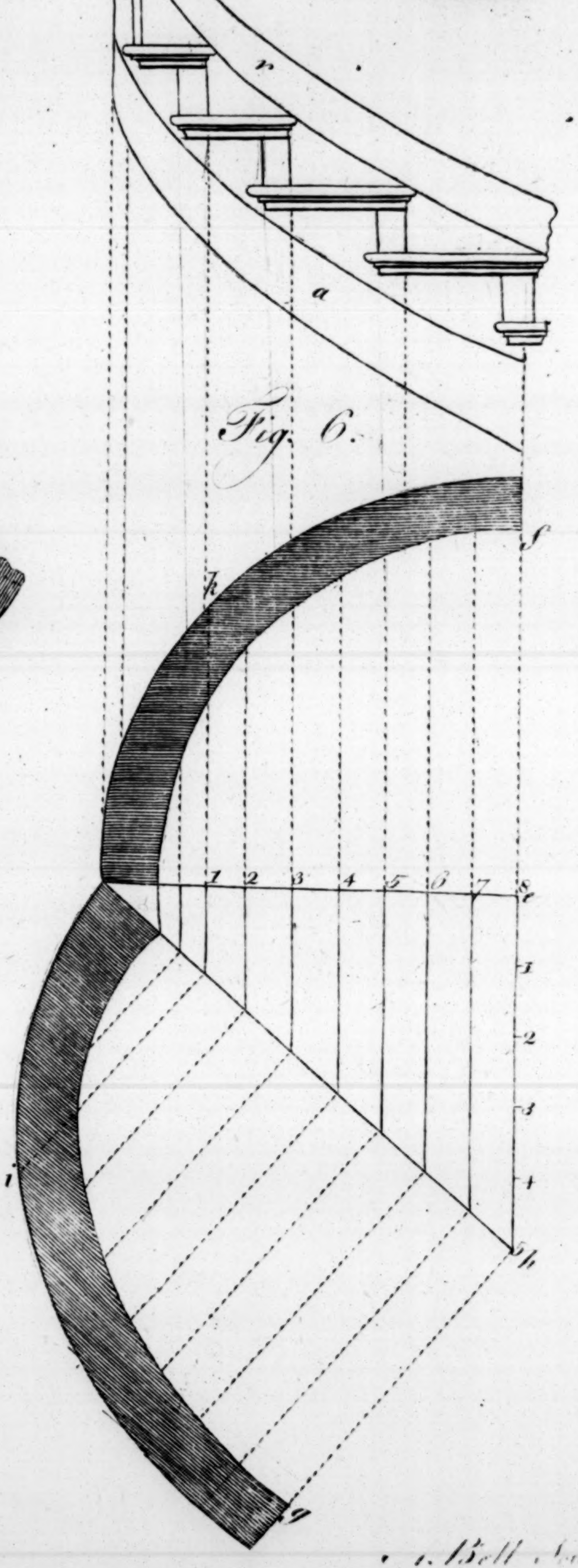
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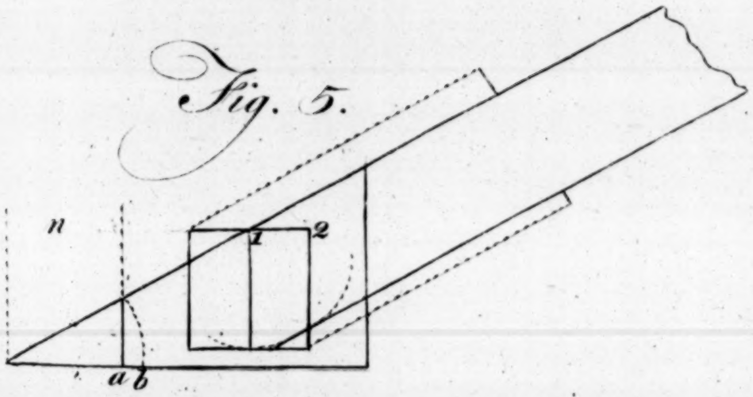
Fig. 5.



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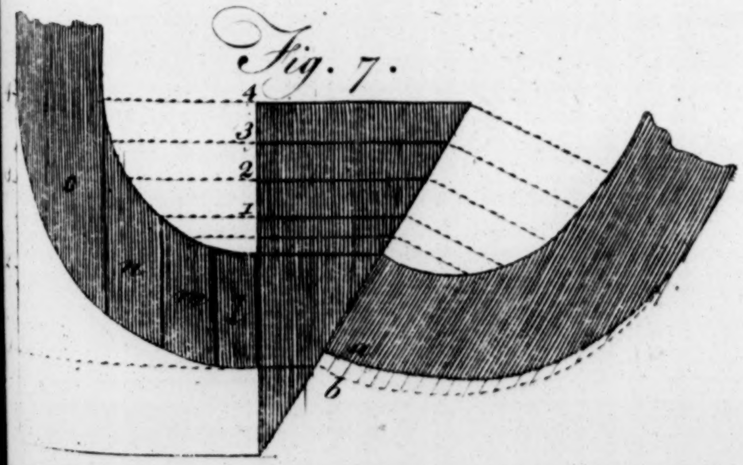

I. Bell Sculpt.

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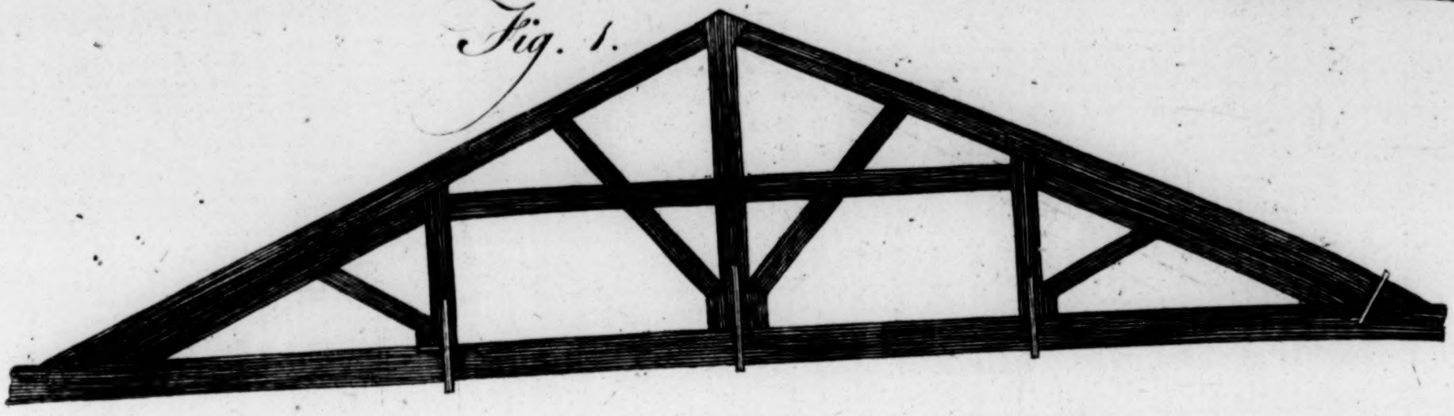
Fig. 1.



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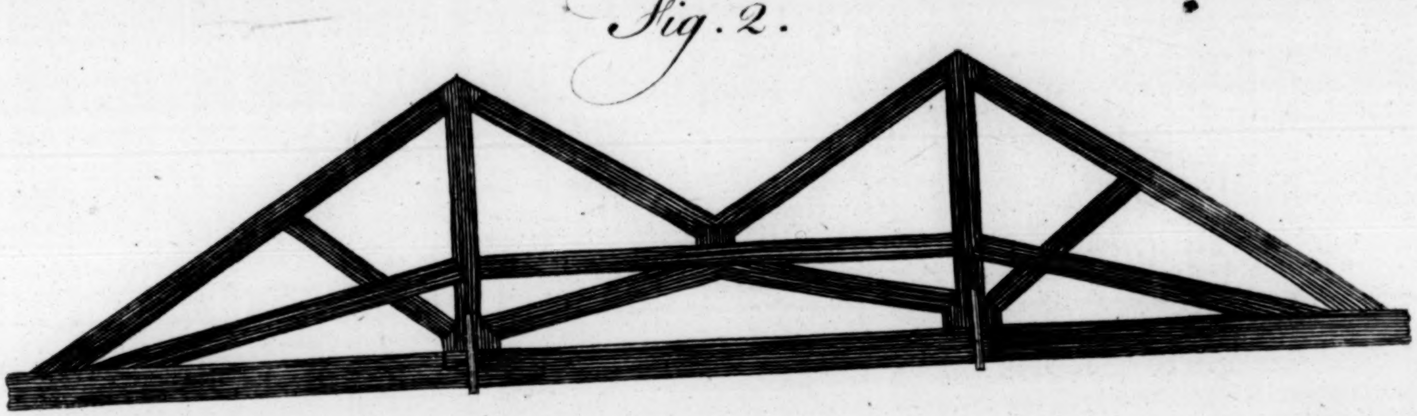

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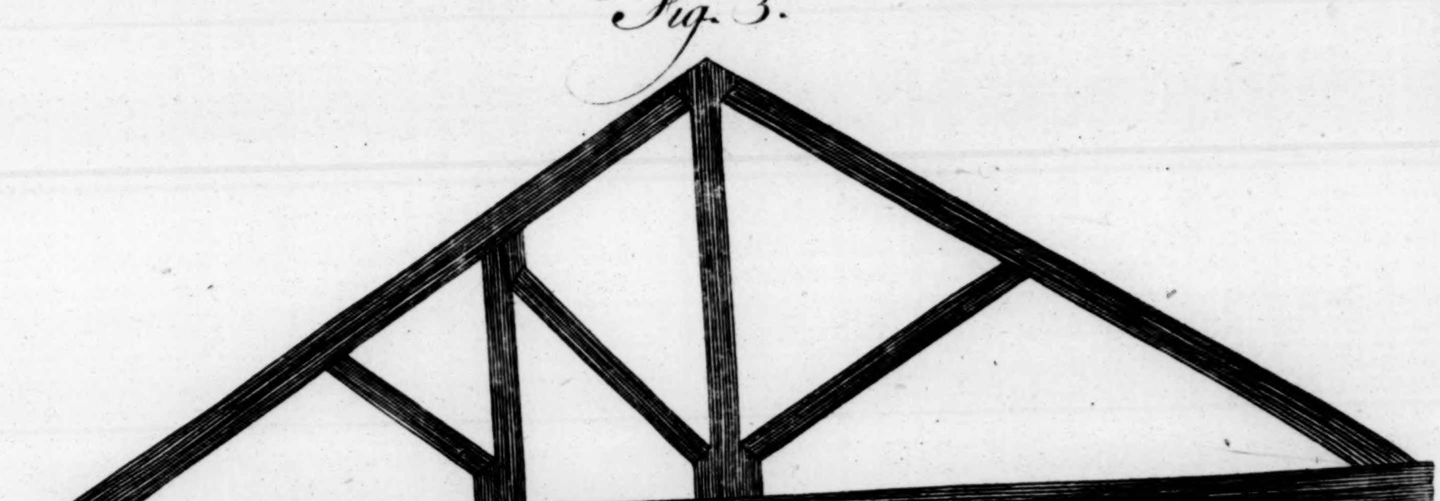

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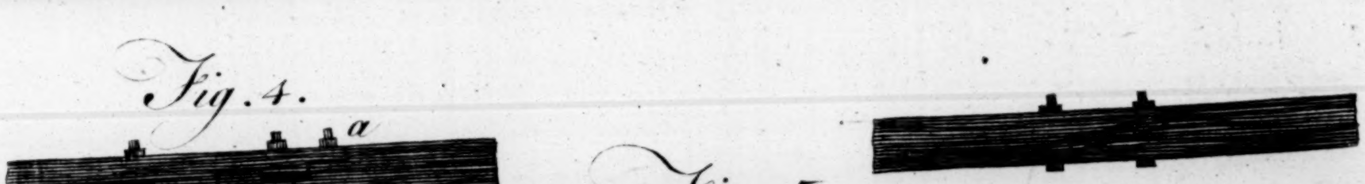

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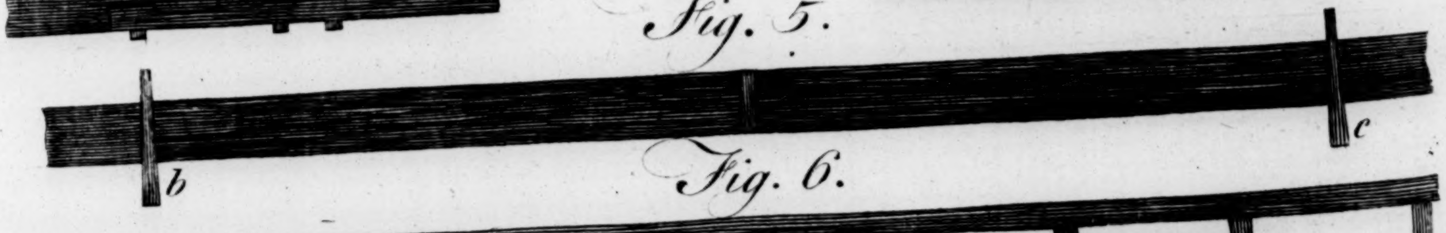
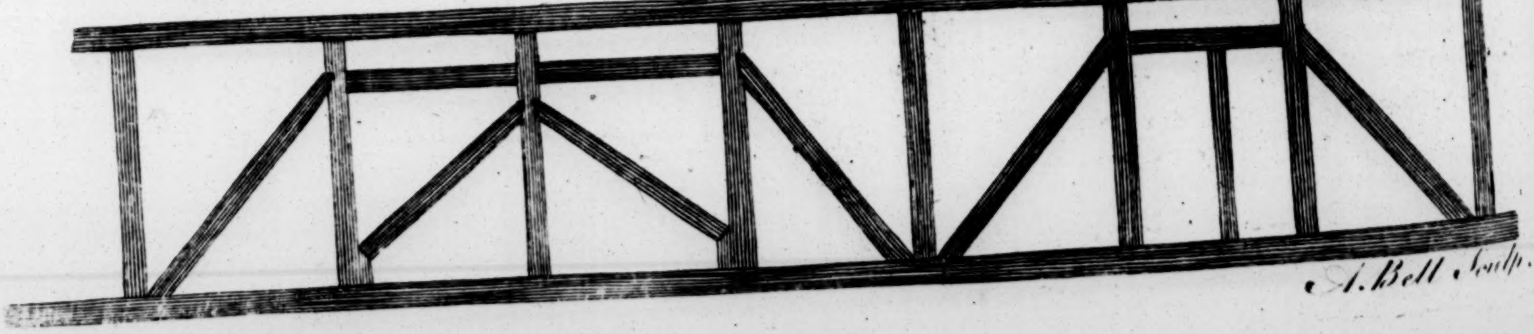


Fig. 6.



A. Bell Sculp.

To find the rail.—Set five diviſions, as from *e* to *h*, which is the height of the five ſteps; draw the diagonal *h* to the plan of the rail; then take the diſtance *e f*, and transfer it to *g h*, and proceed in the ſame manner with the other ſeven diſtances.

To find the width of the rail-mould.—Draw the lines acroſs the plan of the rail, as at *k*; ſet that diſtance from the diagonal to *i*; and ſo proceed with the reſt, as was ſhewn in fig. 4.

Having formed the ſides of the rail perpendicular to its ground-plan, and having ſquared the lower end of the rail, then take a thin lath, and bend it with the rail, as is repreſented by *m* fig. 1.

This is the readieſt method of ſquaring a ſolid rail; but if the rail be bent in the thickneſſes, the noſing of the ſteps muſt be drawn upon a cylinder, or ſome other ſolid body of a ſufficient width to contain the width of the rail or ſtring-board.

r Repreſents the depth of the rail, touching the noſe of each ſtep. Take a ſufficient number of thickneſſes of this width, to make the thickneſs of your rail; glue them all together upon your cylinder or templet, confine them till they are dry, and the rail taken off is ready ſquared. Proceed in the ſame manner with the architrave, marked *a*.

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Chap. XIX. *Of Roofs.*

Plate XXIX. Fig. 1. Shews the form of a truſſed roof, with three ring-poſts, that may carry ſeventy feet, or upwards.

Fig. 2. Exhibits an *M* roof, capable of carrying as great an extent as the former. Indeed both theſe deſigns are capable of carrying almoſt any extent.

Fig. 3. Repreſents two different ſorts of truſſes.

Fig. 4. Shews the manner of piecing timber. Sometimes the joint may be extended as far as *a*, with another bolt through it. To the right is ſhewn a different ſort of joint.

Fig. 5. Shews the manner of truſſing a girder. If the truſſes are full long, with the pieces *b* and *c* you may make them as light as you pleaſe.

Fig. 6. Repreſents the manner of truſſing partitions.

Part II. PRACTICE of ARCHITECTURE.

Having thus deſcribed and given rules for the moſt generally received proportions of the different parts of buildings, both of the uſeful and ornamental kind, we muſt next give an account of the method of erecting different kinds of edifices; and here the judgment of the architect muſt neceſſarily be very much employed, as no fixed rules have been laid down by which he can be directed in all caſes. As a neceſſary preliminary, however, to the conſtruction, we muſt firſt conſider,

100

Chap. I. *The Situations of Houſes.*

Though it muſt be, in many caſes, impoſſible to chuſe ſuch a ſituation as might be agreeable either to the architect or the proprietor, yet, where a choice can be made, there are certainly a great many circumſtances that will determine one ſituation to be preferable to another. Theſe circumſtances depend entirely on the perſon who is to inhabit the houſe. A farmer, for inſtance, ought to dwell in the moſt centrical part of his farm; an independent gentleman muſt regard the healthineſs, the neighbours with whom he can converſe, the proſpect from his houſe, and alſo the aſpect of the ground near it. To anſwer theſe purpoſes of health and pleaſure, an open elevated ſituation is the beſt, as the air is there pure, and the proſpect extenſive; but too elevated a ſituation is diſagreeable, as being both difficult of acceſs, and expoſed to cold and bleak winds. To build in bottoms between hills is both unhealthful and unpleaſant, the houſe being in a manner buried, and the ground near it generally marſhy from the rain-water which runs down from the hills, which renders the air unwholeſome. As a garden alſo is a very neceſſary article to a country habitation, the ſoil is by no means a matter of indifference; and therefore it may be concluded, that an elevated ſituation on a gravelly loam, near ſome running water, is the beſt ſituation for a country houſe.

Chap. II. *Of the Conſtruction of Edifices in general.*

The proper ſituation of a houſe, or any other building, being choſen, according to its intended nature, the next thing to be conſidered is to lay the foundation in a proper manner. The only ſecurity of a houſe, or any other building whatever, is in having a good foundation, and no error is ſo dangerous as that which is committed here; as the ſhrinking of the foundation but the breadth of a ſtraw may cauſe a rent of five or ſix inches wide in the ſuperſtructure. To guard againſt errors of this kind, the qualities of the ground for a conſiderable depth muſt be carefully obſerved.

101
Qualities of the ground neceſſary to be examined.

The beſt foundation is that which conſiſts of gravel or ſtone; but, in order to know whether the inferior ſtrata are ſufficient for the ſupport of the building, it will be adviſeable to ſink wells at ſome little diſtance. By attending to what is thrown up in digging theſe, the architect will be acquainted with what lies under the ſtony or gravelly bed which on the ſurface promiſes ſo much ſecurity, and will know what meaſures to take.

102
Rocky ground ſometimes dangerous.

But though a ſtony or gravelly bottom is undoubtedly the moſt ſure and firm, where all is ſound beneath, there is no kind of ground which may prove more fallacious, or occaſion ſuch terrible accidents. The reaſon of this is, that ſuch kind of ground often contains abſolute vacuities; nor is rock itſelf, though a foundation upon a rock is ſtrong even to a proverb, free from dangers of the ſame kind. Caverns are very frequent in rocky places; and ſhould an heavy building be erected over one of theſe, it might ſuddenly fall down altogether. To guard againſt accidents of this kind, Palladio adviſes the throwing down great weights forcibly on the ground, and obſerving whether it ſounds hollow, or ſhakes; and the beating of a drum upon it, by the ſound of which an accuſtomed ear will know whether the earth is hollow or not.

Where the foundation is gravel, it will be proper to examine the thickneſs of the ſtratum, and the qualities of thoſe that lie under it, as they have appeared in digging. If the bed of gravel is thick, and the under ſtrata of a ſound and firm kind, there needs no aſſiſtance; if otherwiſe, we muſt have recourſe to various methods in order to ſupply the defect.

103 Sandy or boggy ground how managed.

The other matters which may occur for a foundation are clay, ſand, common earth, or rotten boggy ground. Clay will often both raiſe and ſink a foundation; yet it has a ſolidity which, with proper management, is very uſeful. The marſhy, rotten, or boggy ground is of all others the worſt; yet even upon this great buildings may be raiſed with perfect ſafety, provided proper care be taken. In caſe of boggy earths, or unfirm ſand, piling is one of the moſt common methods of ſecuring a foundation; and, notwithſtanding the natural diſadvantage of the earth, piles, when properly executed, are one of the firmeſt and moſt ſecure foundations.

104 Foundations near waters dangerous.

105 Defect in St Peter's at Rome.

In foundations near the edge of waters, we ſhould always be careful to ſound to the very bottom, as many terrible accidents have happened from the ground being undermined by rivers. The ſame method is to be followed when the ground on which we build has been dug or wrought before. It ought never to be truſted in the condition in which it is left: but we muſt dig through it into the ſolid and unmoved ground, and ſome way into that, according to the weight and bigneſs of the intended edifice. The church of St Peter's at Rome is an inſtance of the importance of this laſt obſervation. That church is in great part built upon the old circus of Nero; and the builders having neglected to dig through the old foundation, the ſtructure is conſequently ſo much the weaker. The walls were judged of ſtrength enough to bear two ſteeples upon the corners of the frontiſpiece; but the foundation was found too weak when it was impoſſible to remedy the defect perfectly.

106 Drains how made.

107 Seſspools.

Before the architect, however, begins to lay the foundation of the building, it will be proper to conſtruct ſuch drains as may be neceſſary for carrying off the rain, or other refuſe water that would otherwiſe be collected and lodge about the houſe. In making of drains for carrying off this water, it will be neceſſary to make large allowances for the different quantities that may be collected at different times. It muſt alſo be conſidered, that water of this kind is always loaded with a vaſt quantity of ſediment, which by its continual falling to the bottom will be very apt to choak up the drain, eſpecially at thoſe places where there happen to be angles or corners in its courſe. The only method of preventing this is by means of certain cavities diſpoſed at proper diſtances from one another. Into theſe the ſediment will be collected, and they are for that reaſon called *ſeſpools*. With regard to theſe, the only directions neceſſary are, that they be placed at proper diſtances, be ſufficiently large, and placed ſo as to be eaſily cleaned. It is a good rule to make a ſeſpool at each place where the water enters the drain; as by this means a conſiderable quantity of ſediment will be prevented from entering the channel at all. Others are to be made at proper diſtances, eſpecially where there are any angles. They muſt be made ſufficiently large; the bigger, in moderation, the better; and they muſt alſo be covered in ſuch a manner as to be eaſily got at in order to be cleaned. But, as putrid water is exceedingly noxious, it will be neceſſary to carry up a brick funnel over every ſeſpool, in order to prevent the collection of the putrid effluvia, which would otherwiſe occaſion the death of the perſon who cleaned it.

108 Proportio of Drains.

All drains ought to be arched over at top, and may be moſt conveniently built of brick. According to their different ſizes, the following proportions of height and thickneſs may be obſerved. If the drain is 18 inches wide, the height of the walls may be one foot, and their thickneſs nine inches; the bottom may be paved with brick laid flatwiſe, and the arch turned four inches. If the drain is 22 inches wide, the ſide walls are then to be one foot three inches in height, and the reſt conſtructed as before. If it is 14 inches wide, the height of the walls may be 9 inches, and the ſweep of the arch four. A drain of a yard wide ſhould have the ſame height, and the arch turned over it ought to be 9 inches thick. Upon the ſame principles and proportions may other drains of any ſize be conſtructed.

109 Foundatio of buildi how laid.

The ſewers and drains being conſtructed in a manner proportioned to the ſize of the intended building, the architect may next proceed to lay the foundation of the walls. Here the firſt care muſt be, that the floor of the foundation be perfectly ſmooth and level. The Italians begin with laying over it an even covering of ſtrong oak plank; and upon that they lay, with the moſt exact care, the firſt courſe of the materials. Whether we take this method, or begin upon the naked floor, all muſt be laid with the moſt exact truth by rule and line. When the board plat is laid, a courſe of ſtone is the beſt firſt bed, and this is to be laid without mortar; for lime would make the wood decay, which otherwiſe, in a tolerably good ſoil, will laſt for ages. After this, all the courſes ſhould follow with the ſame perfect evenneſs and regularity. If the materials are brick, they ſhould be laid on with an equal, and not too great, quantity of mortar; if ſtone, they ought to be placed regularly, and in the ſame ſituation in which they lay in the quarry: for many ſtones, which will bear any weight flatwiſe, and in their natural poſition, are of ſuch a grain, that they will ſplit otherwiſe. The joinings of the under courſe muſt be covered by the ſolid of the next courſe all the way up; and the utmoſt care muſt be taken that there be no vacuity left in the wall, for the weight will moſt certainly cruſh it in. The leſs mortar there is in a foundation, the better. Its uſe is to cement the bricks and ſtones together; and the evener they are, the leſs will be required for that purpoſe. Where mortar is uſed to fill up cavities, it becomes part of the wall; and not being of equal ſtrength with the ſolid materials, it takes from the firmneſs of the building. For the ſame reaſon, nothing can be more abſurd than to fill up a foundation with looſe ſtones or bricks thrown in at random; and where this is done, the ruin of the building is inevitable. Where the foundation of a principal wall is laid upon piles, it will be neceſſary alſo to pile the foundations of the partitions, though not ſo ſtrongly.

110 Thickn and dim tions of of walls,

The thickneſs of foundation-walls in general ought to be double that of the walls which they are to ſupport. The looſer the ground, the thicker the foundation wall ought to be; and it will require the ſame addition alſo in proportion of what is to be raiſed upon it. The plane of the ground muſt be perfectly level, that the weight may preſs equally every where: for when it inclines more to one ſide than another, the wall will ſplit. The foundations muſt diminiſh as they riſe, but the perpendicular is to be exactly kept in the upper and lower parts of the wall; and this caution ought to be obſerved all the way up with the ſame ſtrictneſs. In ſome ground, the foundation may be arched; which will ſave materials and labour, at the ſame time that the ſuperſtructure has an equal ſecurity. This practice is peculiarly ſerviceable where the foundation is piled.

111 Diminution of the thickneſs of walls.

As the foundation-walls are to diminiſh in thickneſs, ſo are thoſe which are built upon them. This is neceſſary in order to ſave expence, but is not abſolutely ſo to ſtrengthen the wall; for this would be no leſs ſtrong though it was continued all the way to the top of an equal thickneſs, provided the perpendicular was exactly kept. In this the ancients were very expert; for we ſee, in the remains of their works, walls thus carried up to an exorbitant height. It is to be obſerved, however, that, beſides perfect truth in their perpendiculars, they never grudged iron work, which contributed greatly to the ſtrength of their buildings. The thickneſs and diminution of walls is in a great meaſure arbitrary. In common houſes built of brick, the general diminution from the bottom to the top is one half the thickneſs at the bottom; the beginning is two bricks, then a brick and an half, and laſtly one brick, thickneſs. In larger edifices, the walls muſt be made proportionally thicker; but the diminution is preſerved much in the ſame manner. Where ſtones are uſed, regard muſt be had to their nature, and the propriety of their figures for holding one another. Where the wall is to be compoſed of two materials, as ſtone and brick, the heavieſt ought always to be placed undermoſt.

112 Angles how ortified.

113 indows mproper ear the corers.

There is one farther particular regarding the ſtrength of a plain wall, and that is, the fortifying its angles. This is beſt done with good ſtone on each ſide, which gives not only a great deal of ſtrength, but a great deal of beauty. Pilaſters properly applied are a great ſtrengthening to walls. Their beſt diſtance is about every 20 foot, and they ſhould riſe five or ſix inches from the naked of the wall. A much ſlighter wall of brick with this aſſiſtance, is ſtronger than a heavier and maſſier one built plain. In brick walls of every kind, it is alſo a great addition to their ſtrength to lay ſome chief courſes of a larger and harder matter; for theſe ſerve like ſinews to keep all the reſt firmly together, and are of great uſe where a wall happens to ſink more on one ſide than another. As the openings in a wall are all weakenings, and as the corners require to be the ſtrongeſt parts, there ſhould never be a window very near a corner. Properly, there ſhould always be the breadth of the opening firm to the corner. In the moſt perfect way of forming the diminution of walls, the middle of the thinneſt part being directly over the middle of the thickeſt, the whole is of a pyramidal form; but where one ſide of the wall muſt be perpendicular and plain, it ought to be the inner, for the ſake of the floors and croſs walls. The diminiſhed ſide, in this caſe, may be covered with a faſcia or cornice, which will at once be a ſtrength and ornament.

114 imneys.

Along with the conſtruction of walls, that of the chimneys muſt alſo be conſidered; for errors in the conſtruction of theſe will render the moſt elegant building extremely diſagreeable. The common cauſes of ſmoaking are either that the wind is too much let in above at the mouth of the ſhaft, or the ſmoke is ſtifled below: and ſometimes a higher building, or a great elevation of the ground behind, is the ſource of the miſchief; or, laſtly, the room in which the chimney is may be ſo ſmall or cloſe, that there is not a ſufficient current of air to drive up the ſmoke. Almoſt all that can be done while the walls are conſtructing to prevent ſmoke is, to make the chimney vent narrower at bottom than at top: yet this muſt not be carried to an extreme; becauſe the ſmoke will then linger in the upper part, and all the force of the draught will not be able to ſend it up. —As for the methods of curing ſmoky chimneys in houſes already built, ſee the article Chimney.

115 Roofs.

After the walls are finiſhed, the roof is the next conſideration: but concerning it very little can be ſaid; only that its weight muſt be proportioned to the ſtrength of the walls. It muſt alſo be ſo contrived as to preſs equally upon the building; and the inner walls muſt bear their ſhare of the load as well as the outer ones. A roof ought neither to be too maſſy, nor too light; as being neceſſary for keeping the walls together by its preſſure, which it is incapable of doing while too light; and if too heavy, it is in danger of throwing them down. Of theſe two extremes, however, the laſt is to be accounted the worſt.

116 Floors.

With regard to the floors, they are moſt commonly made of wood; in which caſe, it will be neceſſary that it ſhould be well ſeaſoned by being kept a conſiderable time before it is uſed. The floors of the ſame ſtory ſhould be all perfectly on a level; not even a threſhold riſing above the reſt: and if in any part there is a room or cloſet whoſe floor is not perfectly level, it ought not to be left ſo, but raiſed to an equality with the reſt; what is wanting of the true floor being ſupplied by a falſe one.

In mean houſes, the floors may be made of clay, ox blood, and a moderate portion of ſharp ſand. Theſe three ingredients, beaten thoroughly together and well ſpread, make a firm good floor, and of a beautiful colour. In elegant houſes, the floors of this kind are made of plaſter of Paris, beaten and ſifted, and mixed with other ingredients. This may be coloured to any hue by the addition of proper ſubſtances; and, when well worked and laid, makes a very beautiful floor. Beſides theſe, halls, and ſome other ground-rooms, are paved or floored with marble or ſtone; and this either plain or dotted, or of a variety of colours: but the univerſal practice of carpetting has in a great meaſure ſet aſide the beſtowing any ornamental workmanſhip upon floors. In country buildings, alſo, floors are frequently made of bricks and tiles. Theſe, according to their ſhapes, may be laid in a variety of figures; and they are alſo capable of ſome variation in colour, according to the nature of the earth from which they were made. They may be laid at any time; but for thoſe of earth or plaſter, they are beſt made in the beginning of ſummer, for the ſake of their drying.

CHAP. III. *Of the Diſtribution of the Apartments of Houſes, with other conveniencies.*

As houſes are built only for the ſake of their inhabitants, the diſtribution of the apartments muſt of neceſſity be directed by the way of life in which the in-

117 Plan of a farm-houſe.

habitants are engaged. In the country, this is commonly farming; and here, beſides the houſe for the family, there is alſo neceſſary a barn for the reception of the produce of the ground, a ſtable for cattle, a cart-houſe for keeping the utenſils under cover, and ſheds for other uſes.—To accompliſh theſe purpoſes, let a piece of ground be taken of five times the extent of the front of the houſe, and incloſed in the leaſt expenſive manner. Back in the centre of this let the houſe be placed, and in the front of the ground the barn and the ſtable, with the adjoining ſheds. Theſe are to be ſet, one on each ſide, to the extreme meaſure of the incloſed ground: they will thus fill up a part of the entrance, and will leave all about the houſe ſome incloſed ground by way of yard. From the barn to the ſtable may be extended a fence with a gate in the middle, and this gate ought to front the door of the houſe.

This much being ſettled, the plan of the houſe and out-buildings may be made as follows. The door may open into a plain brick paſſage, at the end of which may be carried up a ſmall ſtair-caſe. On one ſide of the paſſage may be a common kitchen; and on the other ſide a better or larger room, which will ſerve the family by way of parlour. Beyond this may ſtand on one ſide the pantry, and on the other the dairy room, the laſt being twice the ſize of the former. They are placed on the ſame ſide with the parlour, on account of the heat of the kitchen, which renders it improper to be near them. On the kitchen ſide, a brew-houſe may very conveniently be placed. More rooms may be added on the ground-floor as occaſion requires; and the upper ſtory is to be divided into bed-chambers for the family, with garrets over them for the ſervants.—A houſe of this kind is repreſented 2d Plate XXXIX. fig. 1.; and (fig. 2.) one of a ſomewhat better kind, where a private gentleman who has a ſmall family may find conveniency.

118 Of an elegant country ſeat.

3d Plate XXXIX. fig. 1. repreſents a gentleman's country-ſeat, built on a more elegant plan. Here the front may extend 65 feet in length, the depth in the centre being 40 feet, and in each of the wings 45. The offices may be diſpoſed in wings; the kitchen in the one, and the ſtables in the other; both of which, however, may correſpond in their front with the reſt of the building, which they ought alſo to do with one another. Theſe wings may have a projection of 13 feet from the dwelling-houſe, to which they ought to be connected, not by ſtraight lines, but by curves, as repreſented fig. 2.

The beſt proportion of theſe offices to a houſe extending 65 feet in front, is 35 feet. If they are ſmaller, the houſe will look gigantic; if larger, they will leſſen its aſpect. To a front of 35 feet, a depth of 48 is a very good proportion. There ought alſo to be a covered communication between the dwelling-houſe and offices, which muſt not appear only to be a plain blank wall, but muſt be ornamented with gates, as in the figure. The arch by which the offices are joined to the dwelling-houſe muſt be proportioned to the extent of the buildings; and there cannot be a better proportion than five feet within the angles of the buildings. By this means the wings, which have only a projection of 13 feet, will appear to have one of 18, and the light will be agreeably broken.

With regard to the internal diſtribution of a houſe of this kind, the under ſtory may be conveniently divided into three rooms. The hall, which is in the centre, will occupy the whole of the projecting part, having a room on each ſide. The length of the hall muſt be 24 feet, and its breadth 12: the rooms on each ſide of it muſt be 16 feet long, and 11 wide. Of theſe two front rooms, that on the right hand may be conveniently made a waiting-room for perſons of better rank, and that on the left hand a dreſſing-room for the maſter of the houſe. Behind the hall may run a paſſage of four feet and an half, leading to the apartments in the hinder part of the houſe, and the ſtair-caſe. Theſe may be diſpoſed as follows. Directly behind the hall and this paſſage the ſpace may be occupied by a ſaloon, whoſe length is 24 feet, and its breadth 17. On the left hand of the paſſage, behind the hall, is to be placed the grand ſtair-caſe; and as it will not fill the whole depth, a pleaſant common parlour may terminate on that ſide of the houſe. On the other ſide, the paſſage is to lead to the door of the great dining parlour, which may occupy the whole ſpace.

119 Another. 3d Plate XXXIX.

A plan of a houſe of the ſame kind, but ſomewhat different in the diſtribution, is repreſented fig. 2. The front here extends 68 feet, and the wings project 28 feet; their depth is 48, and their breadth 36. The hall may be 26 feet long, and 17 broad. On the left hand of the hall may be a waiting-room 16 feet long, and 10 broad; behind which may be a handſome dining-room. The paſſage into this waiting-room ſhould be at the lower end of the hall; and it muſt have another opening into the room behind it. On the right hand of the hall is the place of the great ſtair-caſe, for which a breadth of 16 feet three inches is to be allowed. In the centre of the building, behind the hall, may be a drawing-room 26 feet long, and 16 broad; and behind the ſtair-caſe will be room for a common parlour of 16 feet ſquare. The paſſage of communication between the houſe and wings may be formed into colonnades in a cheap manner behind: a flight of ſteps, raiſed with a ſweep, occupying the centre of each, and leading up to a door, and the covering being no more than a ſhed ſupported by the plaineſt and cheapeſt columns.

The two wings now remain to be diſpoſed of. That on the right hand may contain the kitchen and offices belonging to it, and the other the ſtables. The front of the right-hand wing may be occupied by a kitchen entirely, which will then be 30 feet long, and 16½ wide; or it may be made ſmaller, by ſetting off a ſmall room to the right. Twenty-two feet by 16 will then be a good bigneſs. The other room will then have the ſame depth of 16 feet, and the width to the front may be 7½. Beyond the kitchen may ſtand the ſtair-caſe, for which 7½ feet will be a proper allowance; and to the right of this may be a ſcullery 12 feet 10 inches deep from the back front by 7 in breadth. To the left of the ſtairs may be a ſervants hall 16 feet ſquare, and behind that a larder 12 feet 10 by 14 feet 6. In the centre of the other wing may be a double coach-houſe: for which there ſhould be allowed the whole breadth of the wing, with 10 feet 6 inches in the clear; and on each ſide of this may be the ſtables. The external decorations of the front and wings will be better underſtood from the figure than they can be by any deſcription.

120 Of Mr Ch teris's hou

4th Plate XXXIX. ſhews the plan and elevation of the houſe of Francis Charteris, Eſq; at Newmills. The proportions

Fig. 1.

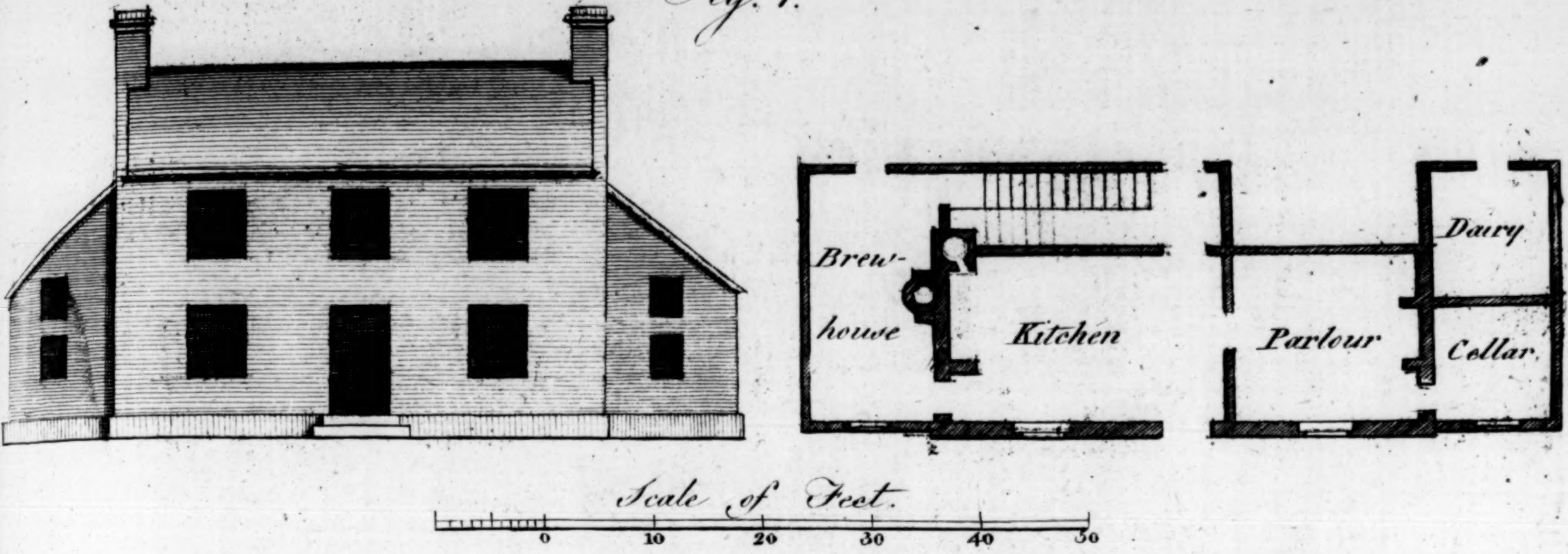
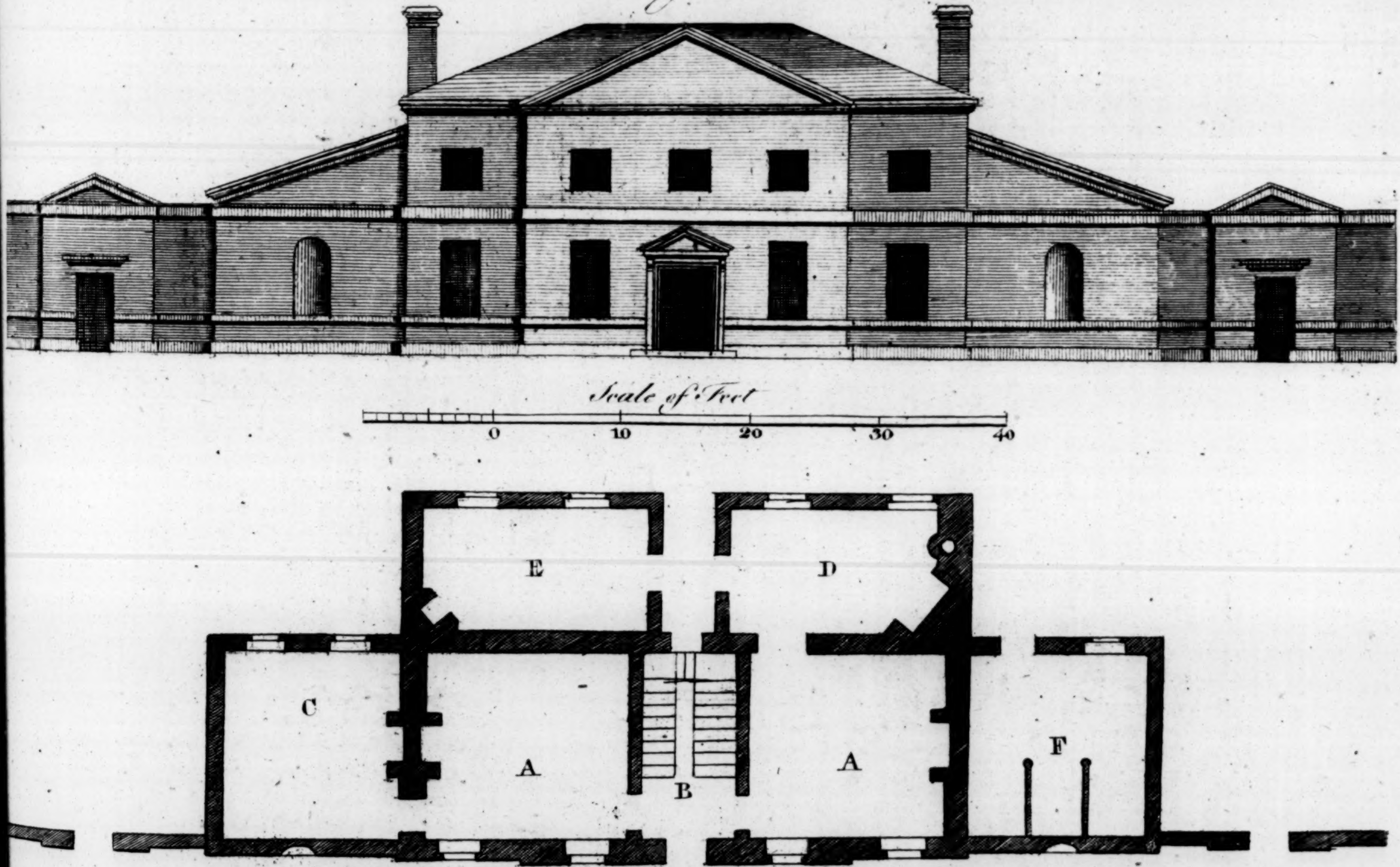

Brew-house
Kitchen
Parlour
Dairy
Cellar
Scale of Feet
0
10
20
30
40
50

Fig. 2.

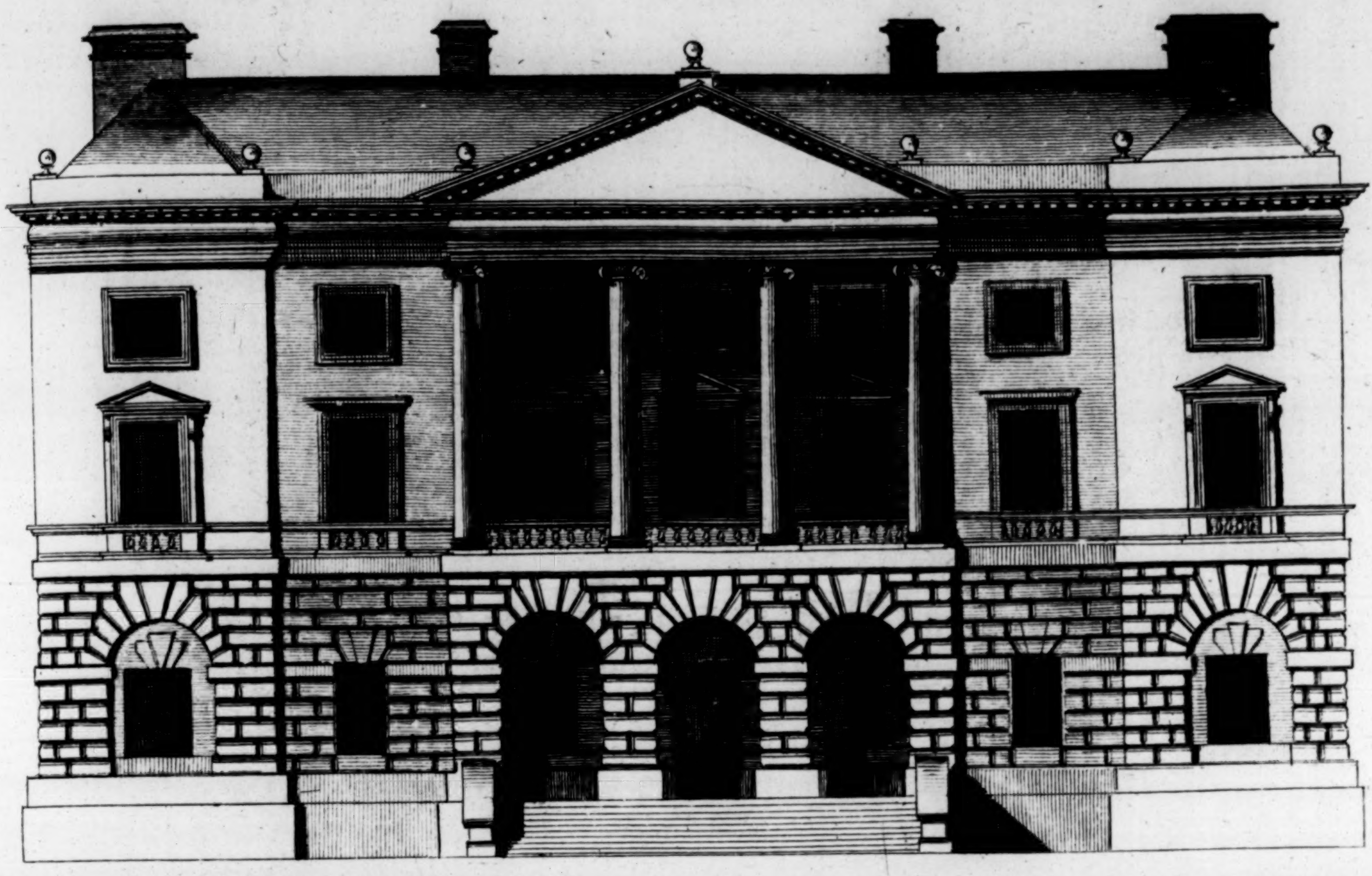

Scale of Feet
0
10
20
30
40
E
D
C
A
B
A
F

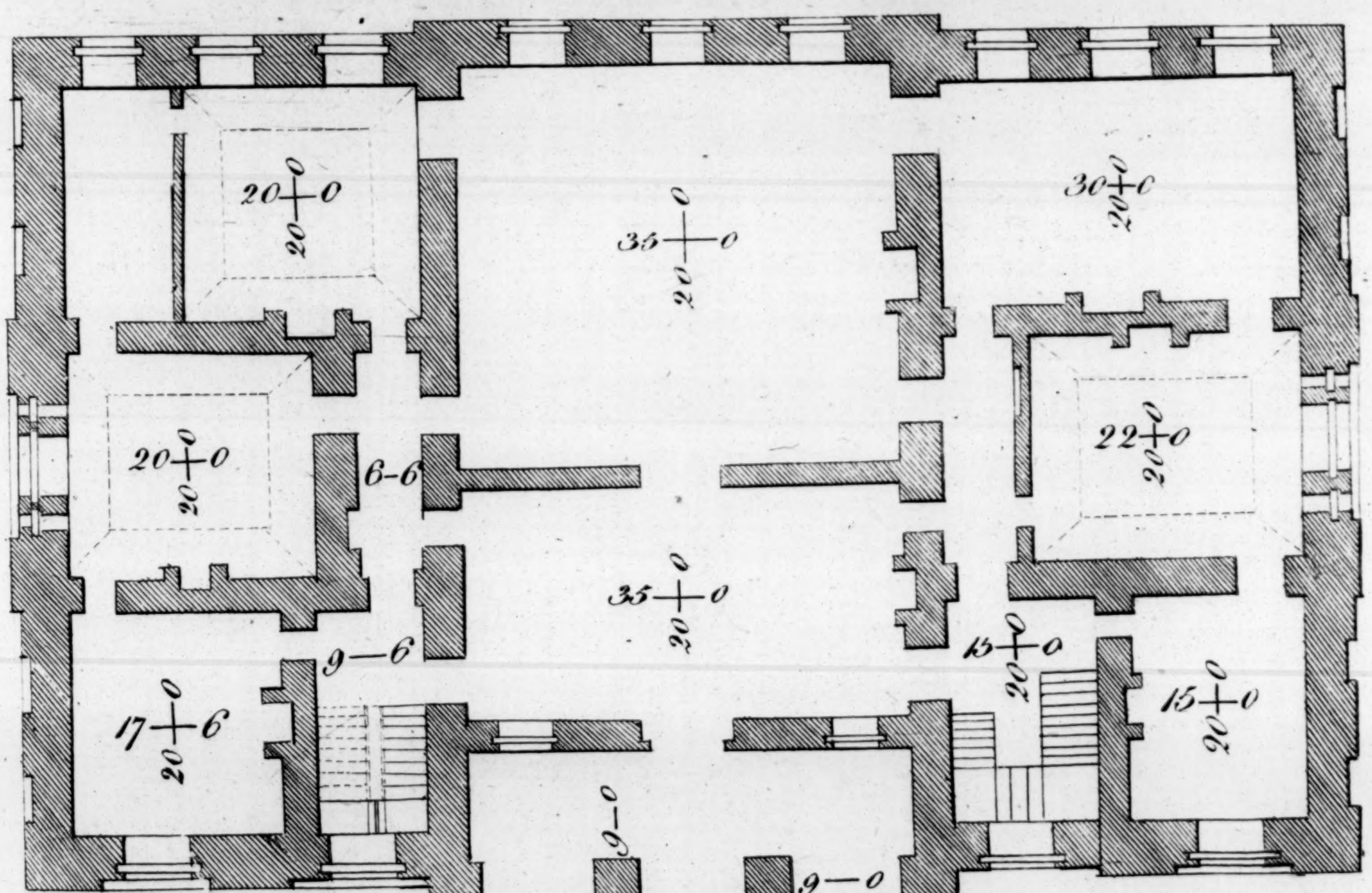
AA are two Parlours. feet 15. D Kitchen. } are Sheds.
B Stair Case. E Wash house. }
C Study. F Stable.

A. Bell Sculp.

3 MA 53

4th Plate XXXIX.





20—0
20
35—0
20
30—0
20
20—0
20
6-6
22—0
20
35—0
20
9—6
15—0
20
15—0
20
17—6
20
9—0
9—0

A Bell Sculpt.

3 MA 55

portions of the rooms are marked in the plan; and the front, being decorated with columns of the Ionic order, will ſufficiently ſhew in what manner any of the five orders may be induced with propriety and elegance.

Chap. IV. *Of Aquatic Buildings.*

1. Of Bridges.

121 These are conſtructed either of wood or ſtone; of which the laſt are evidently the ſtrongeſt and moſt durable, and therefore in all caſes to be preferred where the expence of erecting them can be borne. The proper ſituation for them is eaſily known, and requires no explanation; the only thing to be obſerved is, to make them croſs the ſtream at right angles, for the ſake of the boats that paſs through the arches, with the current of the river; and to prevent the continual ſtriking of the ſtream againſt the piers, which in a long courſe may endanger their being damaged and deſtroyed in the end.

Bridges built for a communication of high roads, ought to be ſo ſtrong and ſubſtantial as to be proof againſt all accidents that may happen, to have a free entrance for carriages, afford an eaſy paſſage to the waters, and be properly adapted for navigation, if the river admits of it. Therefore the bridge ought to be at leaſt as long as the river is wide in the time of its greateſt flood: becauſe the ſloping of the water above may cauſe too great a fall, which would prove dangerous to the veſſels, and occaſion the under graveling the foundation of the piers and abutments; or, by reducing the paſſage of the water too much in time of a great flood, it might break through the banks of the river, and overflow the adjacent country, which would cauſe very great damages; or, if this ſhould not happen, the water might riſe above the arches, and endanger the bridge to be overſet, as has happened in many places.

When the length of the bridge is equal to the breadth of the river, which is commonly the caſe, the current is leſſened by the ſpace taken up by the piers: for which reaſon, this thickneſs ſhould be no more than is neceſſary to ſupport the arches; and it depends, as well as that of the abutments, on the width of the arches, their thickneſs, and the height of the piers.

122 Proper form of arches. The form of the arch is commonly ſemicircular; but when they are of any great width, they are made elliptical, becauſe they would otherwiſe become too high. This has been done at the Pont Royal, at Paris, where the middle arch is 75 feet, and its height would have been 37.5 feet, inſtead of which it is only 24 by being made elliptical.

Another advantage of much more importance ariſes from the oval figure, which is, that the quantity of maſonry of the arches is reduced in the ſame proportion as the radius of the arch is to its height. That is, if the radius is 36 feet, and the height of the arch 24, or three fourths of the radius, the quantity of maſonry of the arches is likewiſe reduced to three-fourths; which muſt leſſen the expence of the bridge conſiderably. Notwithſtanding theſe advantages, however, the lateſt experiments have determined ſegments of circles to be preferable to curves of any other kind; and of theſe the ſemicircle is undoubtedly the beſt, as preſſing moſt perpendicularly on the piers.

When the height of the piers is about ſix feet, and the arches are circular, experience has ſhewn, ſays Mr Belidor, that it is ſufficient to make the thickneſs of the piers the ſixth part of the width of the arch, and two feet more; that is, the thickneſs of the piers of an arch of 36 feet, ought to be 8 feet; thoſe of an arch of 48 feet, to be 10.

123 Thickneſs of the piers. When the arches are of a great width, the thickneſs of the piers may be reduced to the ſixth part of that width; but the depreſſion of the two feet is not done at once; that is, in an arch of above 48 feet, 3 inches are taken off for every 6 feet of increaſe of the width of the arch. For inſtance, the thickneſs of the piers ſupporting an arch of 72 feet wide, ſhould be 14 feet, according to the preceding rule; but by taking off 3 inches for every 6 feet, above an arch of 48 wide, the thickneſs of the piers is reduced to 13 feet: conſequently, by following the ſame rule, the thickneſs of the piers ſupporting an arch of 16 fathoms wide, will be 16 feet; all the others above that width are the ſixth part of the width.

After this, Mr Belidor gives a rule for finding the thickneſs of the piers which ſupport elliptic arches, and makes them ſtronger than the former: the abutments he makes one ſixth part more than the piers of the largeſt arch. But it is plain, that theſe rules are inſufficient, being merely gueſs-work, determined from ſome works that have been executed.

124 Of the arch-ſtones. The thickneſs of the arch-ſtones is not to be determined by theory, nor do thoſe authors who have written on the ſubject agree amongſt themſelves. Mr Gautier, an experienced engineer, in his works, makes the length of the arch-ſtones, of an arch 24 feet wide, two feet; of an arch 45, 60, 75, 90 wide, to be 3, 4, 5, 6, feet long reſpectively, when they are hard and durable, and ſomething longer when they are of a ſoft nature: on the contrary, Mr Belidor ſays, they ought to be always one twenty-fourth part of the width of the arch, whether the ſtone be hard or ſoft; becauſe, if they are ſoft, they weigh not ſo much.

But that the length of the arch-ſtones ſhould be but a foot in an arch of 24 feet wide, 2, 3, 4, in arches of 48, 72, 96, feet, ſeems incredible; becauſe the great weight of the arches would cruſh them to pieces, by the preſſure againſt one another; and therefore Mr Gautier's rule appears preferable: as he made the length of the arch-ſtones to increaſe in a ſlower proportion, from 10 to 45 feet wide, than in thoſe above that width, we imagine that the latter will be ſufficient for all widths, whether they are great or little: therefore we ſhall ſuppoſe the length of the arch-ſtones of 30 feet in width to be two feet, and to increaſe one foot in 15, that is, 3 feet in an arch of 45 feet, 4, 5, 6, in an arch of 60, 75, and 90 feet; and ſo the reſt in the ſame proportion.

Table containing the thickneſs of piers of bridges.

	6	9	12	15	18	21	24
20	4.574	4.918	5.16.	5.350	5.492	5.610	5 698
25	5.490	5.913	6.216	6.455	6.645	6.801	7.930
30	6.386	6.816	7.225	7.513	7.746	7.939	8.102
35	7.258	7.786	8.200	8.532	8.807	9.037	9.233
40	8.404	8.691	9.148	9.523	9.835	10.101	10.328
45	8.965	9.579	10.077	10.489	10.837	11.136	11.394
50	9.805	10.454	10 987	11.435	11.817	12.146	12.434
55	10.640	11.245	11.882	12.364	13 019	13.149	13.218
60	11.400	12.110	12.718	13.281	13.723	14.109	14.314
65	12.265	13.025	13.648	14.185	14.654	15.082	15.433
70	13.114	13.869	14.517	14.049	15.573	16.011	16.400
75	14.000	14.705	15 336	15.965	16.480	16.940	17.354
80	14.747	15.542	16.234	16.842	17.381	17.864	18.298
85	15.513	16.328	17.041	17.674	18.237	18.742	19.198
90	16.373	17.201	17.929	18.578	19.157	19.679	20.152
95	17.184	17.826	18.772	19.438	20.036	20.577	21.068
100	17.991	18.848	19.610	20.293	20.908	21.466	21.976

125 Explanation of the table.

The firſt horizontal line expreſſes the height of the piers in feet, from 6 to 24 feet, each increaſing by 3; the firſt vertical column, the width of arches from 20 to 100 feet, for every 5 feet.

The other columns expreſs the thickneſs of piers in feet and decimals, according to the reſpective height at the head of the column, and the width of the arch againſt it in the firſt column.

Thus, for example, let the width of the arch be 60 feet, and the height of the piers 12; then the number 12.718, under 12, and againſt 60, expreſſes the thickneſs of the piers, that is 12 feet, and 8.6 inches: we muſt obſerve again, that the length of the key-ſtone is 2 feet in an arch of 30 feet wide; 3, 4, 5, 6, in an arch of 45, 60, 75, 90; that of 20 feet wide, one foot 4 inches; and the length of any other width is found by adding 4 inches for every 5 feet in width.

As this table contains the thickneſſes of piers in reſpect to arches that are commonly uſed in practice, we imagined, that to carry it farther would be needleſs; becauſe the difference between the thickneſs of the piers of any contiguous arches being but ſmall, thoſe between any two marked here, may be made equal to half the ſum of the next below and above it: thus the thickneſs of the piers of an arch 52 or 53 feet wide is nearly equal to 10.222, half the ſum of the thickneſſes 9.805 and 10.64 of the arches 50 and 55 feet wide, when the height of the piers is 6 feet.

126 Form of piers.

Rectangular piers are ſeldom uſed but in bridges over ſmall rivers. In all others, they project the bridge by a triangular priſm, which preſents an edge to the ſtream, in order to divide the water more eaſily, and to prevent the ice from ſheltering there, as well as veſſels from running foul againſt them: that edge is terminated by the adjacent ſurfaces at right angles to each other at Weſtminſter-bridge, and make an acute angle at the Pont Royal of about 60 degrees; but of late the French terminate this angle by two cylindric ſurfaces, whoſe baſes are arcs of 60 degrees, in all their new bridges.

127 Slope of the bridge on each ſide.

When the banks of the rivers are pretty high, the bridge is made quite level above, and all the arches of an equal width; but where they are low, or for the ſake of navigation a large arch is made in the middle of the ſtream, then the bridge is made higher in the middle than at the ends: in this caſe, the ſlope muſt be made eaſy and gradual on both ſides, ſo as to form above one continued curve line, otherwiſe it appears diſagreeable to the eye. Mr Belidor will have the deſcent of that ſlope to be one twenty-fourth part of the length; but this is undoubtedly too much, as one fiftieth part of the length is quite ſufficient for the deſcent.

128 Width, &c.

The width commonly allowed to ſmall bridges is 30 feet: but in large ones near great towns, theſe 30 feet are allowed clear for horſes and carriages, beſides a banquet at each ſide for foot paſſengers of 6 to 9 feet each, raiſed about a foot above the common road; the parapet-walls on each ſide are about 18 inches thick, and 4 feet high; they generally project the bridge with a corniſh underneath; ſometimes balluſtrades of ſtone or iron are placed upon the parapet, as at Weſtminſter; but this is only practiſed where a bridge of a great length is made near the capital of a country.

The ends of bridges open from the middle of the two large arches with two wings, making an angle of 45 degrees with the reſt, in order to make their entrance more free and eaſy; theſe wings are ſupported by the ſame arches of the bridge next to them being continued in the manner of an arch, of which one pier is much longer than the other.

How the work is to be carried on.

129 Methods of laying the foundation.

As the laying the foundation of the piers is the moſt difficult part of the whole work, it is neceſſary we ſhould begin with an eaſy caſe, that is, when the depth of the water does not exceed 6 or 8 feet; and then proceed to thoſe which may happen in a greater depth of water.

130 By batardeaus.

One of the abutments with the adjacent piers is incloſed by a dyke called *batardeau* by the French, of a ſufficient width for the work, and room for the workmen. This batardeau is made by driving a double row of piles, whoſe diſtance is equal to the depth of water, and the piles in each row are 3 feet from each other; they are faſtened together on the outſide by bonds of 6 by 4 inches: this being done, frames of about 9 feet wide are placed on the inſide to receive the boards which are to form the incloſure: the two uprights of theſe frames are two boards of an inch and half thick, ſharpened below to be driven into the ground, and faſtened together by double bonds, one below, and the other above, each ſeparated by the thickneſs of the uprights; theſe bonds ſerve to ſlide the boards between: after theſe frames have been driven into the ground as hard as can be, then the boards themſelves are likewiſe driven in till they reach the firm ground underneath.

Between every two piles tie-beams are faſtened to the bonds of the piles, to faſten the inſide wall to the outſide one; theſe tie-beams are let into the bonds and bolted to the adjacent piles: this being done, the bottom is cleared from the looſe ſand and gravel, by a machine like thoſe uſed by ballaſt-heavers; and then well prepared clay is rammed into this coffer very tight and firm, to prevent the water from oozing through.

Sometimes theſe incloſures are made with piles only driven cloſe to each other; at others, the piles are notched or dove-tailed one into the other; but the moſt uſual method is to drive piles with grooves in them, 5 or 6 feet diſtant from each other, and boards are let down between them.

This being done, pumps and other engines are uſed to draw the water out of the incloſure, ſo as to be quite dry; then the foundation is dug, and the ſtones are laid with the uſual precautions, obſerving to keep ſome of the engines always ſtanding, in order to draw out the water that may ooze through the batardeau.

The foundation being cleared, and every thing ready to begin the work; a courſe of ſtones is laid, the outſide all round with the largeſt ſtretchers and headers that can be had, and the inſide filled with aſhlers well jointed, the whole laid in terraſs mortar: the facings are crampt together, and ſet in lead; and ſome cramps are alſo uſed to faſten the facings with the inſide. The ſame manner is to be obſerved throughout all the courſes to the height of low-water mark; after which the facings alone are laid in terraſs mortar, and the inſide with the beſt of the common ſort. When the foundation is carried to the height of low-water mark, or to the height where the arches begin, then the ſhaft or middle wall is to be carried up nearly to the height of the arches, and there left ſtanding till all the piers are finiſhed, in order that the maſonry may be ſufficiently dry and ſettled before the arches are begun.

131 Proper form of the baſe.

As the piers end generally with an arch at each end, it is cuſtomary to lay the foundation in the ſame manner: which is not ſo well as to continue the baſe rectangular quite to the ends of the piers, and as high as low-water mark; both becauſe the foundation becomes then ſo much broader, and alſo becauſe the water will not be able to get under it: for when the current ſets againſt a flat ſurface, it drives the ſand and mud againſt it, ſo as to cover it entirely; whereas if a ſharp edge be preſented to the ſtream, it carries every thing away, and expoſes the foundation to the continual action of the water, which in courſe of time muſt deſtroy it.

After the intervals between the arches are filled up with ſtones laid in a regular manner without mortar, and the gravel is laid over them; two drains or gutters are to be made lengthwiſe over the bridge, one on each ſide next to the foot-path, about 6 feet wide and a foot deep; which being filled with ſmall pebble ſtones, ſerve to carry off the rain-water that falls on the bridge, and to prevent its filtering through the joints of the arches, as often happens.

How to build in water with COFFERS.

THE former method of laying the foundation by means of batardeaus is very expenſive, and often meets with great difficulties: for when the depth of water is 8 feet or more, it is ſcarcely poſſible to make the batardeaus ſo tight as to prevent the water from oozing through them; and in that caſe the number of engines required, as well as the hands to work them, become very expenſive; and if part of the batardeau ſhould break by ſome extraordinary wind or tide, the workmen would be expoſed to very great danger.

132 Method of building Weſtminſter bridge.

The next and beſt method therefore is to build with coffers, when it is practicable, ſuch as were uſed at Weſtminſter bridge. Here the height of water was 6 feet at a medium when loweſt, and the tide roſe about 10 feet at a medium alſo: ſo that the greateſt depth of water was about 16 feet. At the place where one of the piers of the middle or great arch was to be, the workmen began to drive piles of about 13 or 14 inches ſquare, and 34 feet long, ſhod with iron, ſo as to enter into the gravel with more eaſe, and hooped above to prevent their ſplitting in driving them: theſe piles were driven as deep as could be done, which was 13 or 14 feet below the ſurface of the bed of the river, and 7 feet diſtant from each other, parallel to the ſhort ends of the pier, and at about 30 feet diſtant from them: the number of theſe piles was 34, and their intent to prevent any veſſels or barges from approaching the work, and in order to hinder boats from paſſing between them, booms were placed ſo as to riſe and fall with the water.

This being done, the ballaſt-men began to dig the foundation under the water, of about 6 feet deep, and 5 wider all round than the intended coffer was to be, with an eaſy ſlope to prevent the ground from falling in: in order to prevent the current from waſhing the ſand into the pit, ſhort grooved piles were driven before the two ends and part of the ſides, not above 4 feet higher than low-water mark, and about 15 feet diſtant from the coffer: between theſe piles, rows of boards were let into the groves down to the bed of the river and fixed there.

The bottom of the coffer was made of a ſtrong grate, conſiſting of two rows of large timbers, the one longwiſe, and the other croſswiſe, bolted together with wooden trunnels, ten feet wider than the intended foundation. The ſides of the coffer were made of fir timbers laid horizontally cloſe one over another, pinned with oaken trunnels, and framed together at the corners, excepting at the two ſaliant angles, where they were ſecured with proper irons, ſo that the one half might be looſened from the other if it ſhould be thought neceſſary; theſe ſides were lined on the inſide as well as on the outſide with three-inch planks placed vertically; the thickneſs of thoſe ſides was 18 inches at the bottom, reduced to 15 above, and they were 16 feet high; beſides, knee timbers were bolted at the angles, in order to ſecure them in the ſtrongeſt manner. The ſides were faſtened to the bottom by 28 pieces of timber on the outſide, and 18 within, called *ſtraps*, about 8 inches broad, and 3 or 4 inches thick, reaching and lapping over the ends of the ſides: the lower part of theſe ſtraps had one ſide cut dove-tail faſhion, in order to fit the mortiſes made near the edge of the bottom to receive them, and were kept in their places by iron wedges; which being drawn out when the ſides were to be taken away, gave liberty to clear the ſtraps from the mortiſes.

Before the coffer was launched, the foundation was examined, in order to know whether it was level; for which purpoſe ſeveral gauges were made, each of which conſiſted of a ſtone of about 15 inches ſquare, and 3 thick, with a wooden pole in the middle of about 18 feet long. The foundation being levelled and the coffer fixed directly over the place with cables faſtened to the adjacent piles, the maſons laid the firſt courſe of the ſtones for the foundation within it; which being finiſhed, a ſluice made in the ſide was opened near the time of low-water; on which the coffer ſunk to the bottom; and if it did not ſet level, the ſluice was ſhut, and the water pumpt out, ſo as to make it float till ſuch time as the foundation was levelled: then the maſons crampt the ſtones of the firſt courſe, and laid a ſecond; which being likewiſe crampt, a third courſe was laid: then the ſluice being opened again, proper care was taken that the coffer ſhould ſettle in its due place. The ſtone-work being thus raiſed to within two feet of the common low-water mark, about two hours before low-water the ſluice was ſhut, and the water pumped out ſo far as that the maſons could lay the next courſe of ſtone, which they continued to do till the water was riſen ſo high as to make it unſafe to proceed any farther: then they left off the work, and opened the ſluice to let in the water. Thus they continued to work night and day at low-water, till they had carried their work ſome feet higher than the low-water mark: after this, the ſides of the coffer were looſened from the bottom, which made them float; and then were carried aſhore to be fixed to another bottom, in order to ſerve for the next pier.

It muſt be obſerved, that the coffer being no higher than 16 feet, which is equal to the greateſt depth of water, and the foundation being 6 feet under the bed of the river; the coffer was therefore 6 feet under water when the tide was in; but being loaded with three courſes of ſtones, and well ſecured with ropes faſtened to the piles, it could not move from its place. By making it no higher, much labour and expence were ſaved; yet it anſwered the intent full as well as if it had been high enough to reach above the higheſt flood.

The pier being thus carried on above low-water mark, the maſons finiſhed the reſt of it during the intervals of the tides in the uſual way; and after all the piers and abutments were finiſhed in a like manner, the arches were begun and completed as mentioned before: the whole bridge was built in about ſeven years, without any accidents happening either in the work or to the workmen, which is ſeldom the caſe in works of this nature.

133 Materials employed.

It may be obſerved, that all the piers were built with ſolid Portland ſtone, ſome of which weighed four tons. The arch-ſtones were likewiſe of the ſame ſort: but the reſt of the maſonry was finiſhed with Kentiſh *rag-ſtones;* and the paths for foot paſſengers were paved with *purbec*, which is the hardeſt ſtone to be had in England, excepting Plymouth marble.

134 This method ſometimes impracticable.

This method of building bridges is certainly the eaſieſt and cheapeſt that can be thought of, but cannot be uſed in many caſes: when the foundation is ſo bad as not to be depended upon without being piled, or the depth of water is very great, with a ſtrong current and no tide, it cannot then be practiſed. For, if piles are to be uſed, it will be next to impoſſible to cut them off in the ſame level five or ſix feet below the bed of the river, notwithſtanding that ſaws have been invented for that purpoſe: becauſe if they are cut off ſeparately, it will be a hard matter to do it ſo nicely that the one ſhall not exceed the other in height; and if this is not done, the grating or bottom of the coffer will not be equally ſupported, whereby the foundation becomes precarious: neither can they be cut off all together; for piles are to be driven as far as the bottom of the coffer extends, which at Weſtminſter bridge was 27 feet; the ſaw muſt have three feet play, which makes the total length of the ſaw 30 feet; now if either the water is deeper than it is there, or the arches are wider, the ſaw muſt ſtill be longer; ſo that this method is impracticable in any ſuch caſes.

In a great depth of water that has a ſtrong current and no tide, the coffers muſt reach above the water, which makes them very expenſive, and unweildly to manage, as well as very difficult to be ſecured in their places, and kept ſteady: ſo that there is no probability of uſing them in ſuch a caſe.

135 Ruſſian method.

In ſome caſes, when there is a great depth of water, and the bed of the river is tolerably level, or where it can be made ſo by any contrivance, a very ſtrong frame of timber about four times as large as the baſe of the piers may be let down with ſtones upon it round the edges to make it ſink: after fixing it level, piles muſt be driven about it to keep it in its place; and then the foundation may be laid in coffers as before, which are to be kept ſteady by means of ropes tied to the piles.

This method has frequently been uſed in Ruſſia; and though the bed of the river is not very ſolid, yet ſuch a grate, when once well ſettled with the weight of the pier upon it, will be as firm as if piles had been driven under the foundation; but to prevent the water from gulling under the foundation, and to ſecure it againſt all accidents, a row of dove-tail piles muſt be driven quite round the grating: this precaution being taken, the foundation will be as ſecure as any that can be made.

136 French method.

The French engineers make uſe of another method in raiſing the foundations of maſonry under water; which is, to drive a row of piles round the intended place, nearer to, or farther from each other, according as the water is more deep or ſhallow: theſe piles, being ſtrongly bound together in ſeveral places with horizontal tie-beams, ſerve to ſupport a row of dove-tail piles driven within them: when this is done, and all well ſecured according to the nature of the ſituation and circumſtances, they dig the foundation by means of a machine with ſcoops, invented for that purpoſe, until they come to a ſolid bed of gravel or clay; or if the bed of the river is of a ſoft conſiſtence to a great depth, it is dug only to about 6 feet, and a grate of timber is laid upon it, which is well ſecured with piles driven into the oppoſite corners of each ſquare, not minding whether they exceed the upper ſurface of the grate much or little.

When the foundation is thus prepared, they make a kind of mortar called *beton*, which conſiſts of twelve parts of pozolano or Dutch terraſs, ſix of good ſand, nine of unſlaked lime the beſt that can be had, thirteen of ſtone ſplinters not exceeding the bigneſs of an egg, and three parts of tile-duſt, or cinders, or elſe ſcales of iron out of a forge: this being well worked together

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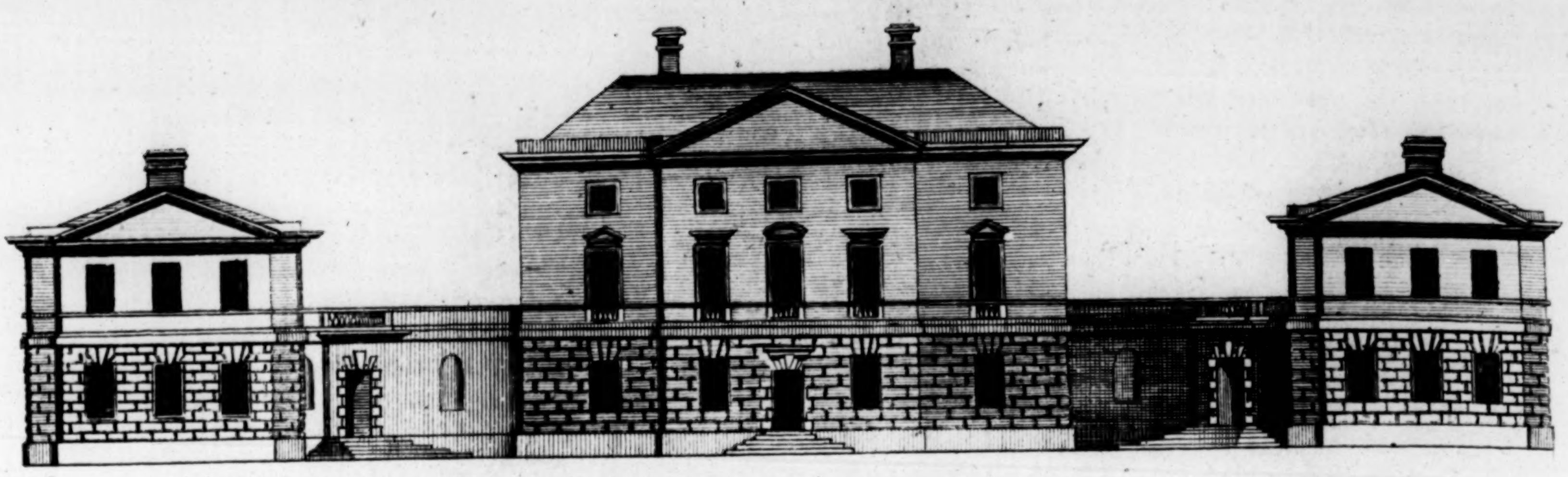
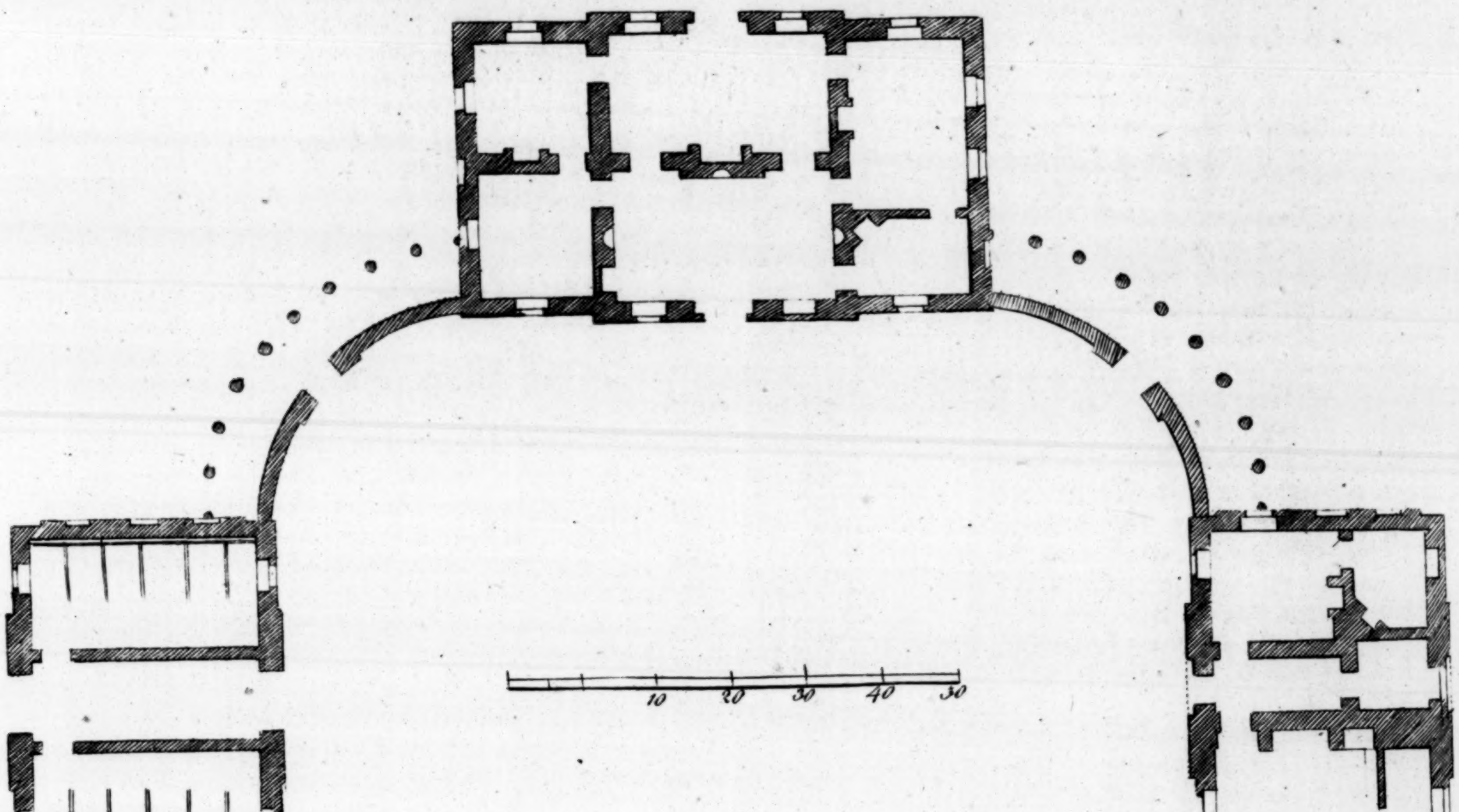
3d_ Plate XXXIX

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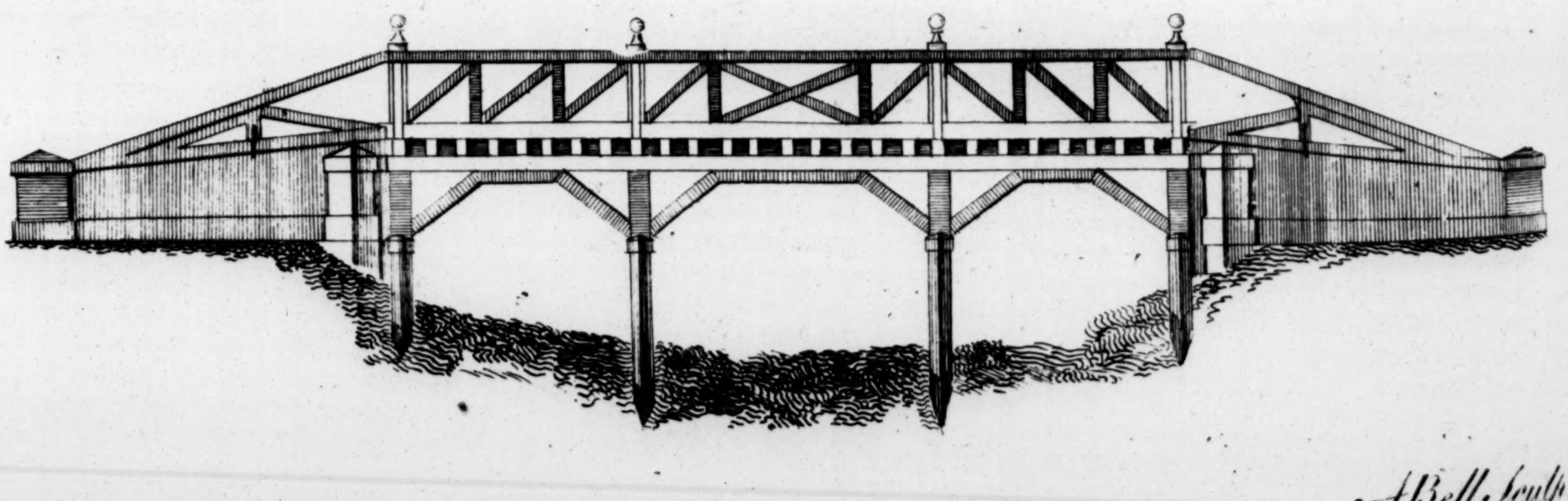

A Bell Sculp!

together muſt be left ſtanding for about 24 hours, or till it becomes ſo hard as not to be ſeparated without a pick-ax.

This mortar being thus prepared, they throw into the coffer a bed of ruble-ſtone, not very large, and ſpread them all over the bottom as nearly level as they can; then they ſink a box full of this hard mortar, broken into pieces, till it come within a little of the bottom; the box is ſo contrived as to be overſet or turned upſide down at any depth; which being done, the pieces of mortar ſoften, and ſo fill up the vacant ſpaces between the ſtones; by theſe means they ſink as much of it as will form a bed of about twelve inches deep all over: then they throw in another bed of ſtone, and continue alternately to throw one of mortar and one of ſtone till the work approaches near the ſurface of the water where it is levelled, and then the reſt is finiſhed with ſtones in the uſual manner.

Mr Belidor ſays, in the ſecond part of his hydraulics, vol. ii. p. 188, that Mr Milet de Montville having filled a coffer, containing 27 cubic feet, with maſonry made of this mortar, and ſunk it into the ſea, it was there left ſtanding for two months, and when it was taken out again it was harder than ſtone itſelf.

137 Impoſſibility of building bridges in ſome caſes.

We have hitherto mentioned ſuch ſituations only where the ground is of a ſoft nature: but where it is rocky and uneven, all the former methods prove ineffectual; nor indeed has there yet been any one propoſed which can be always uſed upon ſuch occaſions, eſpecially in a great depth of water. When the water is not ſo deep but that the unevenneſs of the rock can be perceived by the eye, piles ſtrongly ſhod with iron may be raiſed and let fall down, by means of a machine, upon the higher parts, ſo as to break them off piece by piece, till the foundation is tolerably even, eſpecially when the rock is not very hard; which being done either this or any other way that can be thought of, a coffer is made without any bottom, which is let down and well ſecured, ſo as not to move from its place: to make it ſink, heavy ſtones ſhould be fixed on the outſide; then ſtrong mortar and ſtones muſt be thrown into it; and if the foundation is once brought to a level, large hewn ſtones may be let down ſo as to lie flat and even: by theſe means the work may be carried on quite up to the ſurface of the water. But when the water is ſo deep, or the rock ſo hard as not to be levelled, the foundation muſt be founded, ſo as to get nearly the riſings and fallings; then the lower part of the coffer muſt be cut nearly in the ſame manner, and the reſt finiſhed as before. It muſt however be obſerved, that we ſuppoſe a poſſibility of ſinking a coffer; but where this cannot be done, no method that we know of will anſwer.

138 rajan's idge over e Danube ſcribed.

Among the aquatic buildings of the ancients none appears to have been more magnificent than Trajan's bridge. Dion Caſſius gives the following account of it: "Trajan built a bridge over the Danube, which in truth one cannot ſufficiently admire; for though all the works of Trajan are very magnificent, yet this far exceeds all the others: the piers were 20 in number, of ſquare ſtone; each of them 150 feet high above the foundation, 60 feet in breadth, and diſtant from one another 170 feet. Though the expence of this work muſt have been exceeding great, yet it becomes more extraordinary by the river's being very rapid, and its bottom of a ſoft nature: where the bridge was built, was the narroweſt part of the river thereabout, for in moſt others it is double or treble this breadth; and although on this account it became ſo much the deeper and the more rapid, yet no other place was ſo ſuitable for this undertaking. The arches were afterwards broken down by Adrian; but the piers are ſtill remaining, which ſeem as it were to teſtify that there is nothing which human ingenuity is not able to effect." The whole length then of this bridge was 1590 yards; ſome authors add, that it was built in one ſummer, and that Apollodorus of Damaſcus was the architect, who left behind him a deſcription of this great work.

139 Wooden bridges.

Where ſtone bridges cannot be erected on account of the expence, very ſtrong and durable ones may be conſtructed of wood: in which caſe, they ought to be ſo framed, as that all the parts may preſs upon one another like the arch of a ſtone bridge; and thus, inſtead of being weakened by great weights paſſing over them, they will become the ſtronger. How this is to be accompliſhed, will be better underſtood from 3^d Plate XXXIX. fig. 3. which repreſents a wooden bridge conſtructed after this manner, than it can be by any deſcription.

2. Of Harbours.

140 Situation proper for harbours.

In theſe, the firſt thing to be conſidered is the ſituation; which may be ſome large creek or baſon of water, in or near the place where the harbour is intended to be made, or at the entrance of a large river, or near the ſea: for a harbour ſhould never be dug entirely out of dry land, unleſs upon ſome extraordinary occaſions, where it is impoſſible to do otherwiſe, and yet a harbour is abſolutely neceſſary. When a proper place is found, before it is fixed upon, it muſt be conſidered whether ſhips can lie there ſafe in ſtormy weather, eſpecially when thoſe winds blow which are moſt dangerous upon that coaſt; whether there be any hills, riſing ground, or high buildings, that will cover it; in theſe caſes, the ſituation is very proper: but if there be nothing already that will cover the ſhips, it muſt be obſerved whether any covering can be made at a moderate expence, otherwiſe it would be uſeleſs to build a harbour there.

The next thing to be conſidered is, whether there be a ſufficient depth of water for large ſhips to enter with ſafety, and lie there without touching the ground; and if not, whether the entrance and inſide might not be made deeper at a moderate expence: or, in caſe a ſufficient depth of water is not to be had for large ſhips, whether the harbour would not be uſeful for ſmall merchantment; for ſuch a one is often of great advantage, when ſituated upon a coaſt much frequented by ſmall coaſting veſſels.

The form of the harbour muſt be determined in ſuch a manner, that the ſhips which come in when it is ſtormy weather may lie ſafe, and ſo as there may be ſufficient room for as many as paſs that way: the depths of water where the piers are to be built muſt be taken at every 10, 15, or 20 feet diſtance, and marked upon piles driven here and there, in order that the workmen may be directed in laying the foundation.

141 Materials.

This being done, it muſt be conſidered what kind of materials are to be uſed, whether ſtone, brick, or wood. When ſtones are to be had at a moderate price, they ought to be preferred, becauſe the work will be much ſtronger, more laſting, and need fewer repairs, than if made with any other materials: but when ſtones are ſcarce, and the expence becomes greater than what is allowed for building the harbour, the foundation may be made of ſtone as high as low-water mark, and the reſt finiſhed with brick. If this manner of building ſhould ſtill be too expenſive, wood muſt be uſed; that is, piles are driven as cloſe as is thought neceſſary, which being faſtened together by croſs-bars, and covered with ſtrong oaken planks, form a kind of coffer, which is filled with all kinds of ſtones, chalk, and ſhingles.

142 French method of building.

The manner of laying the foundation in different depths of water, and in various ſoils, requires particular methods to be followed. When the water is very deep, the French throw in a great quantity of ſtones at random, ſo as to form a much larger baſe than would be required upon dry land; this they continue to within 3 or 4 feet of the ſurface of the water, where they lay the ſtones in a regular manner, till the foundation is raiſed above the water: they then lay a great weight of ſtones upon it, and let it ſtand during the winter to ſettle; as likewiſe to ſee whether it is firm, and reſiſts the force of the waves and winds: after that, they finiſh the ſuperſtructure with large ſtones in the uſual manner.

143 A preferable one.

As this method requires a great quantity of ſtones, it can be practiſed only in places where ſtones are in plenty; and therefore the following one is much preferable. A coffer is made with dove-tail piles of about 30 yards long, and as wide as the thickneſs of the foundation is to be; then the ground is dug and levelled, and the wall is built with the beſt mortar.

As ſoon as the mortar is tolerably dry, thoſe piles at the end of the wall are drawn out, the ſide-rows are continued to about 30 yards farther, and the end incloſed; then the foundation is cleared, and the ſtones laid as before. But it muſt be obſerved, that the end of the foundation finiſhed is left rough, in order that the part next to it may incorporate with it in a proper manner; but if it is not very dry, it will incline that way of itſelf, and bind with the mortar that is thrown in next to it: this method is continued till the whole pier is entirely finiſhed.

It muſt likewiſe be obſerved, that the piers are not made of one continued ſolid wall; becauſe in deep water it would be too expenſive: for which reaſon, two walls are built parallel to each other, and the interval between them is filled up with ſhingle, chalk, and ſtone. As theſe walls are in danger of being thruſt out or overſet, by the corps in the middle, together with the great weight laid at times on the pier, they are tied or bound together by croſs-walls at every 30 or 40 yards diſtance, by which they ſupport each other in a firm and ſtrong manner.

In a country where there is a great plenty of ſtones, piles may be driven in as deep as they will go, at about two or three feet diſtance; and when the foundation is ſunk and levelled, large ſtones may be let down, which will bed themſelves: but care muſt be taken to lay them cloſe, and ſo as to have no two joints over each other; and when the wall is come within reach, the ſtones muſt be crampt together.

144 Another method with coffers.

Another method practiſed, is to build in coffers much after the ſame manner as has been done in building the piers of Weſtminſter-bridge; but as in this caſe the ends of the coffers are left in the wall, and prevent their joining ſo well as to be water-tight, the water that penetrates through and enters into the corps may occaſion the wall to burſt and to tumble down. Another inconveniency ariſing from this manner of building is, that as there are but few places without worms, which will deſtroy wood where-ever they can find it; by their means the water is let into the pier, and conſequently makes the work liable to the ſame accident as has been mentioned above.

145 Ruſſian method.

To prevent theſe inconveniences, the beſt method is, to take the wood away, and joggle the ends of the walls together with large ſtones, pouring terraſs-mortar into the joints; when this is done, the water between the two walls may be pumpt out, and the void ſpace filled up with ſtone and ſhingle as uſual: or if theſe joggles cannot be made water-tight, ſome dove-tail piles muſt be driven at each end as cloſe to the wall as can be done, and a ſtrong ſail-cloth put on the outſide of them, which, when the water is pumpt out, will ſtick ſo cloſe to the piles and wall, that no water can come in. This method is commonly uſed in Ruſſia.

146 Thickneſs of piers.

The thickneſs of a pier depends on two conſiderations: it ought to be both ſuch as may be able to reſiſt the ſhock of the waves in ſtormy weather; and alſo to be of a ſufficient breadth above, that ſhips may be laden or unladen whenever it is thought neceſſary. Now, becauſe the ſpecific gravity of ſea-water is about one half that of brick, and as 2 to 5 in compariſon of ſtone; and ſince the preſſure of ſtagnated water againſt any ſurface is equal to the weight of a priſm of water whoſe altitude is the length of that ſurface, and whoſe baſe is a right angled iſoſceles triangle, each of the equal ſides being equal to the depth of the water; therefore a pier built with bricks, whoſe thickneſs is equal to the depth of the water, will weigh about four times as much as the preſſure of the water againſt it; and one of ſtone of the ſame breadth, about 6 times and a quarter as much. Now this is not the force to be conſidered, ſince this preſſure is the ſame within as without the pier: but it is that force with which the waves ſtrike againſt the piers, and that depends on the weight and velocity of the waves, which can hardly be determined; becauſe they vary according to the different depths of water, the diſtance from the ſhore, and according to the tides, winds, and other cauſes. Conſequently the proper thickneſs of the piers cannot be determined by any other means than by experience.

Practitioners ſuppoſe, that if the thickneſs of a pier is equal to the depth of the water, it is ſufficient; but for a greater ſecurity they allow 2, 3, or 4 feet more. This might probably do, if piers were built with ſolid ſtones crampt together; but as this is hardly ever the caſe, and on the contrary, as the inſide is filled up with ſhingle, chalk, or other looſe materials, their rule is not to be depended upon: beſides it makes the ſpace above too narrow for lading and unlading the ſhips, unleſs in a great depth of water; ſo that it does not appear that their method can be followed, excepting in a very few caſes where the water has but very little motion.

When ſtone can be had, no other materials ſhould be uſed, becauſe they being of a larger bulk than brick, will better reſiſt the waves by their own weight, till ſuch time as the mortar is grown hard; for after this is effected, brick will reſiſt better againſt the action of ſea-water than ſoft ſtones.

The wall muſt be built with terraſs mortar from the bottom to the height of low-water mark, and the reſt finiſhed with cinder or tile-duſt mortar, which has been found ſufficiently good in thoſe places where the wall is wet and dry alternately. The upper part of the pier ſhould be paved with flat hewn ſtones laid in ſtrong mortar, in order to prevent any water from penetrating into it: iron rings ought alſo to be fixed here and there at proper diſtances, to faſten the ſhips, and prevent them from ſtriking againſt the pier when agitated by the waves.

Wooden fenders or piles ſhould be driven at the inſide cloſe to the wall, and crampt to it with iron, to prevent the ſhips from touching them, and from being worn by the continual motion. Where the ſea breaks againſt the piers with great violence, breakers ſhould be made at proper diſtances; that is, two rows of piles are driven nearly at right angles to the piers for the length of about 12 or 15 feet, and at about 8 or 10 feet diſtant from each other; and then another to join the two former: theſe piles being covered with planks, and the inſide being filled with ſhingle and ruble-ſtones, then the top is paved with ſtones of about a foot in length, ſet long-wiſe to prevent the waves from tearing them up. This precaution is abſolutely neceſſary where the water ruſhes in very ſtrongly.

Military ARCHITECTURE, the ſame with what is otherwiſe called *fortification*. See FORTIFICATION.

Naval ARCHITECTURE, the art of building ſhips *.

* See *Ship-building*.

ARCHITALASSUS, or admiral-ſhell, a ſynonime of a ſpecies of voluta. See VOLUTA.

ARCHITRAVE, in architecture, that part of a column which lies immediately upon the capital, being the loweſt member of the entablature *.

* See *Architecture*, n°40. chap. i. and Pl. XXVI.

Over a chimney, this member is called the *mantle-piece*; and over doors or windows, the *hyperthyron*.

ARCHIVAULT, in architecture, implies the inner contour of an arch, or a band adorned with mouldings, running over the faces of the arch-ſtones, and bearing upon the impoſts. It has only a ſingle face in the Tuſcan order, two faces crowned in the Doric and Ionic, and the ſame mouldings as the architrave in the Corinthian and Compoſite.

ARCHIVE, or ARCHIVES, an apartment in which are depoſited the records, charters, and other papers of a ſtate or community.

ARCHMARSHAL, the grand marſhal of the empire, a dignity belonging to the elector of Saxony.

ARCHONS, in Grecian antiquity, were magiſtrates appointed after the death of Codrus *. They were choſen from the moſt illuſtrious families, till the time of Ariſtides, who got a law paſſed, by which it was enacted, that, in electing theſe magiſtrates, leſs regard ſhould be paid to birth than to merit.

* See the article *Attica*.

The tribunal of the archons was compoſed of nine officers. The firſt was properly the *archon*; by whoſe name the year of his adminiſtration was diſtinguiſhed. The title of the ſecond was *king*; that of the third, *polemarchus*: to theſe were added ſix *theſmothetæ*. Theſe magiſtrates, elected by the ſcrutiny of beans, were obliged to prove, before their reſpective tribes, that they had ſprung, both in their father's and their mother's ſide, for three deſcents, from citizens of Athens. They were likewiſe to prove that they were attached to the worſhip of Apollo, the tutelary god of their country; that they had in their houſe an altar conſecrated to Apollo; and that they had been reſpectfully obedient to their parents; an important and ſacred part of their character, which promiſed that they would be faithful ſervants to their country. They were likewiſe to prove, that they had ſerved in a military capacity the number of years which the republic required of every citizen: and this qualification gave the ſtate experienced officers; for they were not allowed to quit the army till they were forty years old. Their fortune too, of which they were to inform thoſe before whom they were examined, was a warrant for their fidelity.

After the commiſſioners, who were appointed to inquire into their character and other requiſites, had made a report of them, they were then to ſwear that they would maintain the laws; which obligation if they neglected, they engaged to ſend to Delphi a ſtatue of the weight of their bodies. According to a law of Solon, if an archon got drunk, he was condemned to pay a heavy fine, and ſometimes even puniſhed with death. Such magiſtrates as the Athenian archons were well entitled to reſpect. Hence it was eternal infamy to inſult them; and hence Demoſthenes obſerved, that to treat the theſmothetæ with diſreſpect, was to ſhow diſreſpect to the republic.

Another qualification indiſpenſably required of the ſecond officer of this tribunal, who was called the *king*, was, that he had married the daughter of an Athenian citizen, and that he had eſpouſed her a virgin. This was exacted of him, ſays Demoſthenes, becauſe part of his duty was to ſacrifice to the gods, jointly with his wife, who, inſtead of appeaſing, would have irritated them, if ſhe had not poſſeſſed both thoſe honours.

The inquiry into the private title of the nine archons was very ſevere; and this attention was the more neceſſary, as they had a right to take a ſeat in the Areopagus, after they had quitted their office, and given an account of their adminiſtration.

When any obſcurity occurred in the laws, relative to religion and the worſhip of the gods, the interpretation was ſubmitted to the tribunal of the archons.

Ariſtotle obſerves, that Solon, whoſe aim was to make his people happy, and who found their government in his time ariſtocratical, by the election of the nine archons, who were annual magiſtrates, tempered their power, by eſtabliſhing the privilege of appealing from them to the people, called by lot to give their ſuffrage, after having taken the oath of the Heliaſtæ, in a place near the panathenæum, where Hiſſus had formerly calmed a ſedition of the people, and bound them to peace by an oath.

The archons were the principal officers, not only in civil, but likewiſe in ſacred matters, and eſpecially in the myſteries of Bacchus. The archons, however, who were ſurnamed *eponymi*, were chiefly employed in civil affairs; yet they preſided at the great feaſts, and held the firſt rank there. Hence they are ſometimes ſtiled *prieſts*.

ARCHONTICI, in church-hiſtory, a branch of Valentinians, who maintained that the world was not created by God, but by angels called *Archontes*.

ARCHTREASURER, the great treaſurer of the German empire, a dignity belonging to the duke of Brunſwick, king of Great Britain.

ARCHYTAS of Tarentum, a philoſopher of the Pythagorean ſect, and famous for being the maſter of Plato, Eudoxas, and Philolaus, lived about 408 years before Chriſt. He was an excellent mathematician, particularly in that part of the ſcience which regards mechanics: he is ſaid to have made a wooden pigeon that could fly, and to be the firſt that brought down mathematics to common uſes. He is ſaid to be the inventor of the ten categories. He aſſerted, that God was the beginning, the ſupporter, and the end, of all things. There are two epiſtles preſerved in Diogenes Laertius, one from Archytas to Plato, and another from Plato to Archytas. He acquired great reputation in his legiſlative capacity. He likewiſe commanded the army ſeven times, and was never defeated; but was at laſt caſt away in the Adriatic Sea, and thrown upon the coaſt of Apulia.

ARCIS-SUR-AUBE, a ſmall handſome town of France, in Champagne, ſeated on the river Aube. E. Long. 4. 15. N. Lat. 48. 40.

ARCO, a ſtrong town and caſtle in the Trentin, belonging to the houſe of Auſtria. It was taken by the French in 1703, and abandoned ſoon after. It ſtands on the river Sarca, near the north extremity of the lake Garda. E. Long. 9. 55. N. Lat. 45. 52.

ARCONA, a ſtrong town ſituated on the iſland of Rugen in the Baltic. It ſtood on a high promontory, with the eaſt, north, and ſouth ſides defended by ſteep and lofty precipices, and the weſt by a wall fifty feet high, proportionably thick, and ſecured by a deep and broad ditch. It was, however, taken and ruined, in 1168, by Valdemar king of Denmark. One of the conditions impoſed by the conqueror was, that the inhabitants ſhould deſtroy a temple they had erected to St Vitis, and deliver up the vaſt treaſure belonging to this tutelary ſaint. Another was, that they ſhould pay 40 ſilver yokes for oxen, by way of tribute, and enter as ſoldiers in the Daniſh ſervice when called upon.

ARCOS, a ſtrong city of Andaluſia, in Spain, ſeated on a high craggy rock, at the bottom of which runs the Guadeleto. Its ſtrength lies not only in its ſituation, but in the works erected for its defence, and it is inacceſſible on every ſide but one. The governor reſides in an old caſtle, from whence there is a delightful proſpect, which extends very far into the neighbouring country. W. Long. 2. 10. N. Lat. 36. 40.

ARCTIC, in aſtronomy, an epithet given to the north pole; and likewiſe to a circle of the ſphere, parallel to the equator, and twenty-three degrees thirty minutes diſtant from the north pole.

ARCTICA, in ornithology, a ſynonime of a ſpecies of larus. See LARUS.

ARCTIUM, BURDOCK; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants.

Species, &c. Of this genus there are three ſpecies, the lappa or common burdock, the tomentoſum, and the perſonata. All theſe are troubleſome weeds, ſo require no direction for their culture. The roots, however, laſt but two years; and therefore they are more eaſily deſtroyed than ſuch weeds as have perennial roots. The tender ſtems of the common kind, deprived of the bark, may be boiled and eat like 'ſparagus. When raw, they are good with oil and vinegar. Boys catch bats by throwing the prickly heads of this ſpecies up into the air. Cows and goats eat this herb; ſheep and horſes refuſe it; ſwine are not fond of it.—This ſpecies is alſo uſed medicinally. The ſeeds have a bitteriſh ſubacrid taſte: they are recommended as very efficacious diuretics, given either in the form of emulſion, or in powder to the quantity of a dram. The roots taſte ſweetiſh, with a ſlight auſterity and bitteriſhneſs; they are eſteemed aperient, diuretic, and ſudorific; and ſaid to act without irritation, ſo as to be ſafely ventured upon in acute diſorders *.

ARCTOTIS, a genus of the polygamia neceſſaria order, belonging to the ſyngeneſia claſs of plants. It is commonly called *anemoſpermos*, from the reſemblance of its ſeeds to thoſe of the anemone.

Species. Of this genus there are 11 ſpecies, all of them natives of Ethiopia, or the Cape of Good Hope. Of theſe the anguſtifolia, with ſpear-ſhaped leaves, and the aſpera, with wing-ſhaped woolly leaves, are moſt remarkable for their beauty, having rays of a fine yellow or deep gold colour. They flower in May and June.

Culture. All the ſpecies of arctotis may be propagated by cuttings; which ſhould be frequently renewed, as the old plants are ſubject to decay in winter. They may be planted in any of the ſummer months, in a bed of light freſh earth; obſerving to ſhade them from the ſun, until they have taken root. They may then be planted in pots filled with earth of the ſame kind, ſetting them in a ſhady place until the plants are ſettled in their new earth; after which, they ſhould be expoſed to the open air until the latter end of October, or longer, if the weather is favourable, when they muſt be removed into the green houſe. They will require to be ſhifted into other pots, at leaſt two or three times every ſummer; and the pots ſhould be frequently removed, to prevent the plants from ſtriking their roots through the holes.

ARCTURUS, in aſtronomy, a fixed ſtar of the firſt magnitude in the conſtellation Arctophylax, or Bootes. See BOOTES.

Arcturus riſes on the firſt day of September, and ſets on the thirteenth day of May; and has been ſuppoſed rarely to appear without bringing ſome ſtorm.

ARCUATION, in gardening, the method of raiſing trees by layers, which is done in the following manner:

Strong mother-plants or ſtools muſt be planted in a clear border, and in a ſtraight line, about ſix feet aſunder. When theſe have ſhot five or ſix main branches from the root, and as many collateral branches, the former muſt be bent to the ground, and there faſtened. The ſmall branches muſt be covered three inches deep upon the joints, and have a large baſon of earth made round them to hold the water.

About the middle of September, they may be opened,

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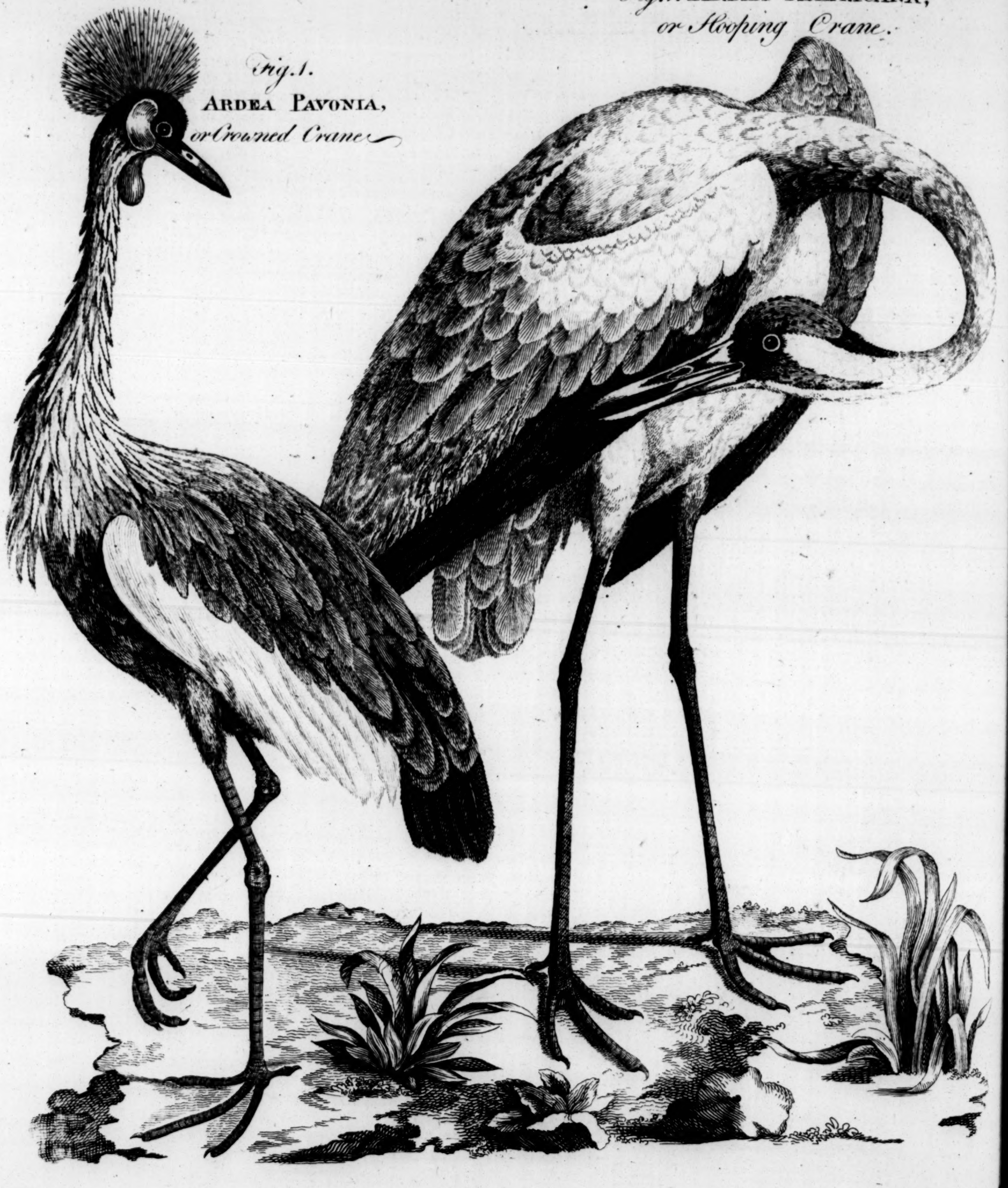
* See *Materia Medica*, nº 101.

3 MA 53

Plate XL.

Fig. 1. ARDEA AMERICANA, *or Hooping Crane.*

Fig. 1. ARDEA PAVONIA, *or Crowned Crane*



A Bell Sculpt.

ed, and, if they have taken root, may be immediately removed into the nurſery; but if they have not ſufficiently extended their roots, they muſt be ſuffered to remain till the ſpring, and then tranſplanted.

ARCUTIO, a machine conſiſting of hoops, uſed in Florence by nurſes, in order to prevent the child from being overlaid. Every nurſe is obliged to lay her child in an arcutio, under the pain of excommunication.

ARDAMON, or **Ardama**, in antiquity, a veſſel of water placed at the door of a perſon deceaſed, till the time of burial, as a token that the family was in mourning, and to ſerve to ſprinkle and purify perſons as they came out of the houſe.

ARDASSES, the coarſeſt of all the ſilks in Perſia.

ARDEA, in ornithology, a genus of the order of grallæ. The general characters of this order are theſe: The bill is ſtraight, ſharp, long, and ſomewhat compreſſed, with a furrow that runs from the noſtrils towards the point; the noſtrils are linear; and the feet have four toes. Under this genus Linnæus comprehends the grus or crane, the ciconia or ſtork, and the ardea or heron, of other authors.

Plate XL. fig. 1. The firſt ſpecies is the pavonia, or crowned crane, which has an erect briſtly creſt, with the temples and two wattles naked. The head is black; the creſt is yellowiſh, and tipped with black at the top; the wings are white; and the feathers of the tail black, and of an equal length. It is a native of Africa.

2. The grus, or common crane of Engliſh authors, has a naked papillous crown; the prime feathers of the wings are black; the body is aſh-coloured; the prime feathers of the tail are ragged. It is a native of Europe and Africa. It winters in Lithuania and Podolia: *Trans Pontum fugat, et terris immittit apricis.* Virg. This bird commonly reſts upon one foot.—This ſpecies ſeems to have been formerly a native of Britain; as we find in Willoughby, page 52. that there was a penalty of twenty pence for deſtroying an egg of this bird; and Mr Ray informs us, that in his time they were found during the winter in large flocks in Lincolnſhire and Cambridgeſhire: but at preſent the inhabitants of thoſe counties are ſcarcely acquainted with them; ſo that theſe birds ſeem now to have forſaken our iſland.

Fig. 2. 3. The Americana, or hooping crane of Edwards, is a native of America: The crown of the head and temples are naked and papillous; the forehead, nape of the neck, and prime wing-feathers, are black; but the body is white: The under part of the head, as far as the lower chap, is red; the beak is yellowiſh, and jagged at the point; the feet are red, and the prime tail-feathers white. Early in the ſpring great multitudes of them frequent the lower parts of the rivers near the ſea, and return to the mountains in the ſummer. They make a remarkable hooping noiſe.

4. The ciconia, or white ſtork of Ray, has naked eye-balls, and black prime wing-feathers. The ſkin below the feathers, as alſo the beak, feet, and claws, are of a blood-colour. It is a native of Europe, Aſia, and Africa; but is ſeldom or never to be met with in Italy. The ciconia feeds upon amphibious animals. It is ſuch an enemy to ſerpents, that it is reckoned almoſt a crime to kill a ſtork. From this favourable treatment, they are ſeen in Holland and the Low Countries walking unconcerned in the middle of the ſtreets. Storks are birds of paſſage; they ſpend the ſummer in Europe, and diſappear all at once, and go off to Egypt, Ethiopia, &c. before winter, and do not return till about the middle of March.

5. The major, or common heron, has a black creſt depending from the back part of the head, an aſh-coloured body, and a black line and belt on the neck and breaſt. It is a native of Europe. This bird is remarkably light in proportion to its bulk, ſcarce weighing three pounds and a half: the length is three feet two inches; the breadth five feet four inches. The body is very ſmall, and always lean; and the ſkin ſcarce thicker than what is called *gold-beater's ſkin*. It muſt be capable of bearing a long abſtinence, as its food, which is fiſh and frogs, cannot be readily got at all times. It commits great devaſtation in our ponds; but being unprovided with webs to ſwim, nature has furniſhed it with very long legs to wade after its prey. It perches and builds in trees, and ſometimes in high cliffs over the ſea, commonly in company with others, like rooks. It makes its neſt of ſticks, lines it with wool; and lays five or ſix large eggs of a pale green colour. During incubation, the male paſſes much of its time perched by the female. They deſert their neſts during the winter, excepting in February, when they reſort to repair them. It was formerly in this iſland a bird of game, heron-hawking being ſo favourite a diverſion of our anceſtors, that laws were enacted for the preſervation of the ſpecies, and the perſon who deſtroyed their eggs was liable to a penalty of twenty ſhillings for each offence. Not to know the hawk from the heron-ſhaw was an old proverb [*], taken originally from this diverſion; but in courſe of time ſerved to expreſs great ignorance in any ſcience. This bird was formerly much eſteemed as a food; made a favourite diſh at great tables, and was valued at the ſame rate as a pheaſant. It is ſaid to be very long-lived: by Mr Keyſler's account it may exceed 60 years [†]; and by a recent inſtance of one that was taken in Holland by a hawk belonging to the Stadtholder, its longevity is again confirmed, the bird having a ſilver plate faſtened to one leg, with an inſcription, importing it had been before ſtruck by the elector of Cologne's hawks in 1735.—The cinerea of Linnæus is the female of this ſpecies.

6. The garzetta, or egret, is creſted behind; the body is white, the beak black, and the feet greeniſh. It is a moſt elegant bird. It weighs about one pound; and the length is 24 inches, to the end of the legs 32. It is a native of the eaſt. But that formerly it was very frequent in Britain, appears by ſome of the old bills of fare: in the famous feaſt of Archbiſhop Neville, we find no leſs than a thouſand aſterides [‡], egrets or egrittes, as it is differently ſpelt. Perhaps the eſteem they were in as a delicacy during thoſe days occaſioned their extirpation in our iſlands; abroad they are ſtill common, eſpecially in the ſouthern parts of Europe, where they appear in flocks. The ſcapulars and the creſt were formerly much eſteemed as ornaments for caps and head-pieces; ſo that aigrette and egret came to ſignify any ornament to a cap, though originally the word was derived from *aigre, a cauſe de l' aigreur de ſa voix* [*].

Pl. XLII. fig. 1. 6. The herodias, or criſtata maxima of Cateſby, is creſted behind, has a duſky-coloured back, reddiſh thighs, and the breaſt ſpeckled with oblong black ſpots.

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[*] In after times this proverb was abſurdly corrupted to, He does not know a *hawk* from a *hand-ſaw*.

[†] *Keyſler's Travels*, vol. I. p. 70.

[‡] *Godwin de Præſul. Angl. com.* Leland's *Collect.*

[*] *Belon av.* 195.

It is four feet and a half when erect; the bill is about eight inches from the angle of the mouth to the end of it; and the creſt is made up of long, narrow, brown feathers, the longeſt being five inches in length, which it can erect and let fall at pleaſure. It is a native of Virginia, and feeds not only upon fiſh and frogs, but on lizards, efts, &c.

7. The ſtellaris, or bittern, has a ſmooth head; it is variegated through the whole body with dark-coloured ſpots of different figures and ſizes. It is a native of Europe, and inhabits chiefly the fen-countries. It is met with ſkulking among the reeds and ſedge; and its uſual poſture is with the head and neck erect, and the beak pointed directly upwards. It will ſuffer perſons to come very near it without riſing; and has been known to ſtrike at boys and at ſportſmen, when wounded and unable to make its eſcape. It flies principally about the duſk of the evening, and then riſes in a very ſingular manner, by a ſpiral aſcent, till it is quite out of ſight. It makes a very ſtrange noiſe when it is among the reeds, and a different and very ſingular one as it riſes on the wing in the night. It builds its neſt with the leaves of water-plants on ſome dry clump among the reeds, and lays five or ſix eggs of a cinerous green colour. This bird and the heron are very apt to ſtrike at the fowler's eyes, when only maimed. The food of the bittern is chiefly frogs; not that it rejects fiſh, for ſmall trouts have been met with in their ſtomachs. In the reign of Henry VIII. it was held in much eſteem at our tables; and valued at one ſhilling. Its fleſh has much the flavour of a hare, and nothing of the fiſhineſs of that of the heron.

8. The violacea, or creſted bittern of Cateſby, has a white creſt; the body is variegated with black and white, and bluiſh below. Theſe birds are ſeen in Corolina in the rainy ſeaſons: but in the Bahama Iſlands, they breed in buſhes growing among the rocks in prodigious numbers, and are of great uſe to the inhabitants there; who, while theſe birds are young and unable to fly, employ themſelves in taking them for the delicacy of their food. They are, in ſome of theſe rocky iſlands, ſo numerous, that in a few hours two men will load one of their *calapatches*, or little boats, taking them perching from off the rocks and buſhes, they making no attempt to eſcape, tho' almoſt full grown. They are called by the Bahamians *crab-catchers*, crabs being what they moſtly ſubſiſt on; yet they are well-taſted, and free from any rank or fiſhy favour.

Linnæus enumerates 19 other ſpecies.

ARDEA, a town of Latium, the royal reſidence of Turnus, king of the Rutuli, (Livy); ſo called, either from the augury of the heron, (Hyginus); or from the exceſſive heat of the country, (Martial). It was a marſhy, ſickly ſituation, (Strabo, Seneca). It was built by Danaë, the mother of Perſeus, (Virgil); about five miles diſtant from the ſea, and 20 from Rome: now a hamlet. It was a Roman colony, (Livy). The inhabitants are called *Ardeates*. E. Long. 17. 49. Lat. 41. 30.

ARDEBIL, or **ARDEVIL**, a town of Perſia, in the province of Aderbijan. It was taken and burnt by Jenghiz Khan in 1222, when moſt of the inhabitants were deſtroyed: but it has been ſince re-built; and is ſtill ranked for dignity among the beſt cities of the kingdom, on account of its having been the reſidence and burying-place of ſome of the Perſian kings; particularly, the ſepulchre of Sheik Sefi is at this place, to which the people reſort in pilgrimage. He founded a place, which they call his kitchen, with a revenue ſufficient to maintain a thouſand poor people, and to feed them three times a day. Three or four of the largeſt principal ſtreets have ſhops, and are planted on each ſide with elms and linden trees, to keep off the exceſſive heat of the ſun; but the houſes are poorly built, with bricks dried in the ſun: yet moſt of them, that are not in the bazars or market-places, have the pleaſure and conveniency of a garden full of trees bearing fruit; and there are large ſpots in the outparts of the town, where the houſes are at a diſtance from each other, and the ſpaces between planted with trees, which render the city of a large extent. The meidan, or great ſquare, is 300 paces long, and 150 broad, having ſhops all round, which, when this place was in a flouriſhing condition, were ſtored with all manner of valuable commodities.

Through the city there paſs two branches of a rivulet, which have been ſometimes ſo enlarged by the melting of the ſnow on the mountains, that they have been forced to make canals to divert the ſtream. In the reign of Sha Abbas, it broke down the dykes, and carried away a great number of houſes. The city is without walls, and is ſeated in the midſt of a large plain encompaſſed with mountains, the higheſt of which lies weſtward, and is always covered with ſnow. Theſe render the air ſometimes extremely hot, and at others intolerably cold, which occaſion epidemical diſtempers, that carry off great numbers of people. The ſoil produces no fruit near the city but apples, pears, and peaches; and yet is good both for corn and paſture. The ſheep are ſo numerous, that 100,000 have paſſed over the city-bridge in a day. There are here ſeveral ſorts of mineral waters, which ſerve both for common bathing, and for the cure of various diſeaſes; one of theſe is a ſulphureous ſpring, whoſe exhalations render the circumambient air extremely diſagreeable. There are three ſprings, which produce as hot water as if it was boiling, and from which waters are conveyed to the public baths in the city. About half a league from the city, on the right hand of the public road, there is a pool of ſtanding water, which is covered all over with ſalt like ice. E. Long. 47. 30. N. Lat. 37. 55.

ARDEN, the common name of foreſts among the Celtæ, from the wildly extenſive one which ranged for 500 miles in length acroſs the country of Gaul, or covered more than half the county of Warwick in Britain, and the ſites of which ſtill retain the appellation of *Arden*, to the much ſmaller one of the ancient Mancenion, that covered and ſurrounded the ſite of the preſent Mancheſter. Written *Arduen* by Cæſar and Tacitus in ſpeaking of the foreſt in Gaul, and *Ardven* by Oſſian in mentioning the woods of Caledonia, it cannot be compounded of *ar* the prepoſitive article in Celtic, and the ſubſtantive *den*, as Baxter and Camden aſſert it to be; but is formed of *ard* an adjective, and *ven* the ſame as *den*. The meaning of the name therefore is not, as Mr Baxter renders it, ſimply *the hills*, or even, as the ingenious tranſlator of Oſſian interprets it, the *high hill*. *Ard* ſignifies either *high* or *great*, and *ven* or *den* either an *hill* or *wood*. *Arduen*,

Arduen, or *Arden*, then, means a conſiderable wood. Hence, only, the name became applicable to ſuch very different ſites, as the *plains* of Warwickſhire and the *hills* of Scotland: and it was given, not only to the moſt extenſive foreſts, to that which was the greateſt in Gaul *, or ſo conſiderable in Britain; but to many that were important only within their own contracted diſtricts, as the wood of Mancenion abovementioned, and others. See MANCHESTER.

ARDENBURG, a town of the Netherlands, in Dutch Flanders, and formerly the moſt conſiderable in that country; but has been diſmantled by the Dutch. E. Long. 3. 30. N. Lat. 51. 16.

ARDENNE, a foreſt in France, formerly of vaſt extent; but the trees are in many places grubbed up, and where they ſtood are built cities, towns, and abbeys. At preſent it extends from Thionville, near the country of Liege, to Donchery and Sedan, on the confines of Champagne. The roads are ſo narrow in ſome places, that two waggons cannot paſs each other; and therefore the waggoners are obliged to provide themſelves with bells or horns to give one another notice to ſtop in time.

ARDENTES, in middle age writers, an appellation given to thoſe afflicted with the Ignis Sacer, or Eryſipelas. They were thus called, as ſeeming to be ſcorched or burnt with the diſeaſe. Hence alſo the abbey of St Genevieve at Paris is called *Domus Ardentium*, by reaſon, as it is ſaid, that great numbers were cured of that diſtemper at the ſhrine of this ſaint, in the reign of Lewis VI.

ARDES, a town of France, in Lower Auvergne, and the principal place of the duchy of Mercœur. It ſerves as a mart for the commodities and trade between Upper and Lower Auvergne. E. Long. 3. 10. N. Lat. 45. 22.

ARDRAH, a ſmall territory or kingdom of Africa, in Guinea properly ſo called. It lies at the bottom of the gulph of St Thomas, and has a town called *Ardres*, ſuppoſed to be the capital. The inhabitants are very licentious, and have neither temple, nor any place for religious worſhip. However, they are very courageous; and their king was abſolute till lately that the king of Dahomay made war upon this and the neighbouring territories, brought them under ſubjection, and burnt the towns, particularly Ardres. The air is very unwholeſome to Europeans; yet the natives live to a great age; but the ſmall-pox makes great deſtruction among them. This country is fertile in Indian corn, palm-wine, plants, and fruits, which laſt all the year; and they make a great deal of ſalt.

ARDRES, a ſmall but ſtrong town of France, in Lower Picardy. Here was an interview between Francis I. and Henry VIII. king of England in 1520. It is ſeated in the midſt of a moraſs. E. Long. 2. 0. N. Lat. 50. 35.

ARDS, barony of, in the county of Down in Ireland: it is a narrow ſlip of land, in ſome places three, and in none above ſix miles broad; but the ſoil is for the moſt part tolerably good. It lies between the lake of Strangford and the ſea, and in the ſouth part it is oppoſite to Lecale. Sir Thomas Smith obtained a patent for this barony from Queen Elizabeth, and ſent his natural ſon with a colony to poſſeſs it; but he was intercepted and ſlain by an Iriſhman. After Sir Thomas's death, Ards was granted by James I. to ſome of the Scots nobility.

ARDUBA, an ancient city of the Pannonians. It was taken by Germanicus about the 7th year of the Chriſtian æra; but its reduction was more owing to the diſagreement that reigned among the inhabitants, than to the valour of the Romans. The greater part of the citizens were for ſubmitting; but the women, more fond of their ancient laws and liberties than the men, joined ſome Roman deſerters, and, falling upon their huſbands, killed a great number of them: but being at laſt overcome by the men, who then ſubmitted to the Romans, the women either threw themſelves headlong from the tops of the walls, or, ſetting fire to their houſes, burnt themſelves and their children to death.

AREA, in geometry, denotes the ſuperficial content of any figure. See GEOMETRY.

AREBO, or AREBON, a town on the ſlave-coaſt of Guinea, in Africa, ſeated at the mouth of the river Formoſo. The Engliſh had once a factory there, as the Dutch have ſtill. It is a large oblong place, indifferently well peopled, and furniſhed with houſes built of reeds and leaves. E. Long. 5. 5. N. Lat. 5. 0.

ARECA, in botany, a genus of the order of palmæ pennatifoliæ. The male has no calix, but three petals, and nine ſtamina; the female has no calix; the corolla has three petals, and the calix is imbricated. There is only one ſpecies, viz. the cathecu, a native of India. This has no branches, but its leaves are very beautiful: they form a round tuft at the top of the trunk, which is as ſtraight as an arrow. It grows to the height of 25 or 35 feet, and is a great ornament in gardens. The ſhell, which contains the fruit, is ſmooth without, but rough and hairy within, in which it pretty much reſembles the ſhell of the cocoa-nut. Its ſize is equal to that of a pretty large walnut. Its kernel is as big as a nutmeg, to which it bears a great reſemblance without, and has alſo the ſame whitiſh veins within when cut in two. In the centre of the fruit, when it is ſoft, is contained a greyiſh and almoſt liquid ſubſtance, which grows hard in proportion as it ripens. The fruit when ripe is aſtringent, but not unpalatable, and the ſhell is yellowiſh. Of this fruit there is a prodigious conſumption in the Eaſt Indies, there being ſcarce any perſon, from the richeſt to the pooreſt, who does not make uſe of it; and the trade they drive in it is incredible. The chief uſe that is made of areca is to chew it with the leaves of betel, mixing with it lime made of ſea-ſhells *. In order to chew it, they cut the areca into four quarters, and take one quarter of it, which they wrap up in a leaf of betel, over which they lay a little of the lime; afterwards they tie it, by twiſting it round. This bit prepared for maſtication, is called *pinang;* which is a Malayan word, uſed all over the Eaſt Indies. The pinang provokes ſpitting very much, whether it be made with dried or freſh areca; the ſpittle is red, which colour the areca gives it. This maſtication cools the mouth, and faſtens the teeth and gums. When they have done chewing the pinang, they ſpit out the groſs ſubſtance that remains in the mouth. They are under a miſtake who imagine that freſh areca melts entirely in the mouth. Nor is it a leſs miſtake to think that the teeth which are tinged red during the time of chewing, always retain that colour. As ſoon as they have done chewing the pinang, they waſh their mouth

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* See Ardenne.

* Cornelius le Brun aſſerts that they rub the leaves of betel with a red drug of Siam or with white chalk.

with freſh water, and then their teeth are white again. The Europeans who live at Batavia, or Malaca, and in the Sunda and Molucca iſlands, uſe pinang as much as the Indians do; and by waſhing their teeth they preſerve them white. Some pretend that areca ſtrengthens the ſtomach, when the juice of it is ſwallowed, as moſt of the Indians do. Another property aſcribed to it is, its curing or carrying off all that might be unwholeſome or corrupt in the gums. When eaten by itſelf, as is ſometimes done by the Indians, it impoveriſhes the blood, and cauſes the jaundice; but is not attended with theſe inconveniences when mixed in the uſual way with betel.

The Sameſe call it *plou* in their language. The beſt areca of the Indies comes from the iſland of Ceylon. The Dutch Eaſt-India company ſend a great deal of it in their ſhips into the kingdom of Bengal. There grows in Malabar a ſort of red areca, which is very proper for dying in that colour. The ſame company ſend ſome of it from time to time to Surat and Amadabat, for the uſe of the dyers in the dominions of the Grand Mogul.

ARELATE, or ARELATUM, is a town of Gallia Narbonenſis, ſituated on the Rhone, denoting a town on, or beyond, a marſh, according to the particular ſituation of the ſpeaker; called *Arelate Sextanorum*, (Pliny, Mela, Coin), becauſe it had a colony of the ſixth legion. Writers of the lower age call it *Arelas, atis*, (Prudentius, Auſonius). There was a double Arelas, one on each ſide of the river and joined by a bridge, (Auſonius); that on the left ſide is thought to have been built by Conſtantine. Tiberius's father was ſent by Julius Cæſar at the head of the colony, (Suetonius); and hence the appellation *Julia Paterna*, as appears from an inſcription. It was the favourite place of the Romans, and greatly ornamented; and hence called *Gallula Roma*, (Auſonius). It is now called *Arles* *. E. Long. 5. 5. Lat. 43. 40.

* See *Arles*.

AREMBERG, a ſmall town of Germany, in the circle of Weſtphalia, defended by a caſtle. It is the capital of a county of the ſame name, and was erected into a principality by the emperor Maximilian II. in favour of John de Ligne, lord of Barbazon, who took the name of Aremberg. It is ſeated on the river Ayr. E. Long. 7. 3. N. Lat. 50. 27.

ARENA, in Roman antiquity, a place where the gladiators fought; ſo called from its being always ſtrewed with ſand, to conceal from the view of the people the blood ſpilt in the combat.

ARENARII, in antiquity, gladiators who combated with beaſts in the arena, or amphitheatre. The arenarii were ſlaves of the loweſt rank; ſo that, though manumitted, they were not capable of being Roman citizens. They were the ſame with what were otherwiſe called *Beſtiarii*.

ARENARIUM, in eccleſiaſtical writers, denotes a cemetery or burying-ground. The arenaria were properly a kind of pits, or holes, under ground, wherein the ancient Chriſtians not only buried their dead, but held their religious aſſemblies in times of perſecution.

ARENSBERG, a ſmall town of Germany, in the circle of Weſtphalia, upon the river Roer. E. Long. 8. 20. N. Lat. 51. 25.

ARENSBOURG, an epiſcopal and maritime town of Livonia in Sweden, ſeated in the iſle of Oſel, in the Baltic Sea. E. Long. 22. 40. N. Lat. 58. 15.

AREOLA, among anatomiſts, the coloured circle ſurrounding the nipple of the breaſt.

AREOPAGUS, a ſovereign tribunal at Athens, famous for the juſtice and impartiality of its decrees, to which the gods themſelves are ſaid to have ſubmitted their differences. It was in the town, on a rock or hill oppoſite to the citadel*. The word ſignifies ſtrictly, *rock of Mars*.

* See the article *Athens*.

Plutarch attributes the eſtabliſhment of the Areopagus to Solon. Other authors think differently: and with good reaſon; for it appears undeniable, that this tribunal was inſtituted before Solon. But the beſt authorities allow him the honour of its reſtoration. The city of Athens, governed till this time by tribunals of a circumſcribed juriſdiction, which were multiplied by the moſt trifling accidents and circumſtances, took no fixed political or civil form, however cloſely united the members of thoſe tribunals were by their general views towards the public good and by the common love of their country. As each of thoſe tribunals could only act in proportion to the power delegated to it, it was impoſſible that ſo many different and unequal impreſſions ſhould give to the great machine of the ſtate that uniform and regular movement which, by an impulſe always the ſame, would keep each part in the ſituation it ſhould maintain with relation to the whole.

To effect this univerſal and harmonious power, it was neceſſary to unite the different channels of public authority, which, by being too much diſtributed, loſt its force. This authority Solon collected, and placed it all in the court of Areopagus, which conſequently became the main ſpring of the government. The judges of this court, who, under Draco, decided only in caſes of murder, now took cognizance of crimes of every kind; and the ſame tribunal which inflicted capital puniſhment on murder, poiſoning, burning of houſes, theft, &c. ſtruck at the roots of thoſe crimes, by arraigning idleneſs, luxury, and debauchery. Equally attentive to ſtimulate the indolence of the young, and the languor of the old, theſe ſage judges rouſed in the one the laudable ambition to ſerve the ſtate, and reſtored to the others their former activity. Satisfied that extremes produce the ſame effects, they thought the republic had as much to fear from the exceſs of wealth as from the gripe of poverty. Hence they exacted a minute account of the effects of every individual. Hence their great ſeverity to thoſe idle citizens who, inſtead of being uſeful members in a ſtate, are its bane and its diſhonour. Iſocrates draws a moſt beautiful and ſtriking picture of thoſe venerable and aſtoniſhing men, and of the order and harmony which flouriſhed in Athens by their wiſe adminiſtration.

The judges of the Areopagus, ſays that author, were more induſtrious to prevent crimes, by repreſenting them in an odious light, than to eſtabliſh modes of puniſhment. It was their opinion, that the enemies of the ſtate were the inſtruments deſtined by the gods to puniſh the wicked; but that it was their province to correct and reform public and private manners. They were vigilantly attentive to the conduct of all the citizens, but particularly to that of the youth. They well knew that the impetuoſity of juvenile paſſion gave the moſt violent ſhocks to health and growing virtue; that it was the duty of inſpectors of education to ſoften the auſterity of moral diſcipline with innocent pleaſure; and that no recreations were more eligible than bodily exerciſes, which enable a young man to give a good education its full play, which improve health, give a pleaſurable and agreeable vivacity, and even fortify the mind. The fortunes of the Athenians were too unequal to admit the ſame mode of education; and therefore the youth were trained in a manner ſuitable to the rank and circumſtances of their reſpective families. Thoſe of the inferior claſſes were taught agriculture and commerce; from this principle, that idleneſs is followed by indigence, and that indigence excites to the moſt daring and atrocious crimes. Having thus endeavoured, by wiſe precautions, to preclude the entrance of moral evil, they thought they had little to fear.

Exerciſes of the body, ſuch as horſemanſhip and hunting, were objects of education to the youth of liberal fortune. In this ſage diſtribution, their great aim was to prevent the poor from committing crimes, and to facilitate to the rich the acquiſition of virtue. Not ſatisfied with having eſtabliſhed good laws, they were extremely careful to ſee that they were obſerved. With this view, they had divided the city into quarters, and the country into cantons. Thus every thing paſſed under their eyes; nothing eſcaped them; they were acquainted with the private conduct of every citizen. Thoſe who had been guilty of any irregularity were cited before the magiſtrates, and were reprehended, or puniſhed in proportion to their miſdemeanour.

Theſe ſame Areopagites obliged the rich to relieve the poor. They repreſſed the intemperance of the youth by a ſevere diſcipline. Corruption in magiſtrates was ſuppreſſed by the puniſhments denounced againſt it; and the old men, at the ſight of the employments of the young, felt themſelves animated with a degree of juvenile vigour and activity.

Religion came likewiſe under the cognizance of the Areopagites. Plato durſt never, as we are told by Juſtin Martyr, divulge his private opinion concerning the Deity. He had learned from the Egyptians the doctrine of Moſes. It appeared to him the beſt, and he embraced it with ardour. But his dread of the Areopagites, who were attached to the prevailing ſyſtem, would not permit him even to name the author of ſentiments which oppoſed the common tradition.

The public edifices, the cleanneſs of the ſtreets, the pay of the ſoldiers, the diſtribution of the public money; in a word, whatever intereſted the republic, was under the direction of the Areopagus. The people themſelves, jealous as they were of their power, did nothing without conſulting this aſſembly, and ſuffered it, without a murmur, to amend their precipitate decrees. Yet this authority, however great it may ſeem, was ſubject to the laws; by them rewards and puniſhments were determined; and thoſe reſpectable judges gave an account of the exerciſe of their truſt to public cenſors, who were placed betwixt them and the people, to prevent the ariſtocracy from growing too powerful.

The moſt important qualifications were required in thoſe who entered into the Areopagus. Solon made a law, by which they who had not been archons for a year ſhould not be admitted members of the Areopagus. To give more force to his law, he ſubjected himſelf to it, and was only admitted on that title. This was but the firſt ſtep; thoſe annual magiſtrates, after having given law to the republic, were interrogated on their adminiſtration. If their conduct was found irreproachable, they were admitted Areopagites with eulogium; but the ſmalleſt miſconduct excluded them from that honour for ever. What adminiſtration was not to be expected from a tribunal ſo well compoſed? what veneration was not due to men of ſuch rare talents and virtue? Such reſpect was paid them, that people preſumed not to laugh in their preſence; and ſo well eſtabliſhed was their reputation for equity, that thoſe whom they condemned, or diſmiſſed without granting their petition, never complained that they had been unjuſtly treated.

The edifice of the Areopagus was extremely ſimple; and its roof, which was at firſt of the moſt common materials, remained in that ſtate till the time of Auguſtus. This we learn from Vitruvius. Oreſtes was the firſt who thought of embelliſhing it. He raiſed in it an altar to Minerva. He likewiſe adorned it with two ſeats of ſolid ſilver; on one of which the *accuſer* ſat, and the *accuſed* on the other. The one ſeat was conſecrated to *Injury*, and the other to *Impudence*. This religious ſketch was brought to perfection by Epimenides, who erected altars to thoſe allegorical deities, and ſoon after a temple, which Cicero mentions in his ſecond book of laws. This temple correſponded with *that* which Oreſtes had built to the *Furies*, who brought him to Athens, and procured him the protection of Minerva. Epimenides dedicated it a ſecond time to the Furies, or *ſevere Godeſſes*, as they were termed by the Athenians. A man was thought loſt without reſource, and a victim to every human ill, if he enforced a perjury by invoking the ſacred name of thoſe tremendous divinities.

Thoſe who employed their thoughts in ſolving the myſteries of Paganiſm, imagined that the Eumenides had their temple ſo near the court Areopagus, that they might enlighten the judges by their inſpiration, and, by their continual aſſiſtance, prevent them from committing thoſe errors to which human weakneſs is liable. To propitiate thoſe terrible deities, and to procure their favour for the Areopagus, they were worſhipped with great punctuality and devotion; and the ſenate itſelf appointed their prieſts. Demoſthenes had been nominated to preſide over their ſacrifices; and he thought it very extraordinary, that he, to whom the republic had confided ſo important an office, ſhould be publicly impeached.

It was natural to aſſociate with the Eumenides the other deities who ſhared with them the ſovereign empire over the dead. Epimenides placed in their temples the ſtatues of Pluto, of Mercury, and of Tellus. They were all, according to Pauſanias, of an agreeable form. Each of them was placed upon an altar, on which the citizens, or ſtrangers, who had been acquitted by the Areopagus, made their grateful offerings.

But it was not to gratitude alone that theſe ſeveral deities owed all the incenſe that ſmoked upon their altars. They who had been accuſed before the ſenate, haraſſed with ſuperſtition, and uncertain how theſe deities would be affected towards them, were laviſh of ſacrifices to obtain their clemency, by which they hoped their judges would likewiſe be influenced.

The tomb of Oedipus was another of the ornaments of the Areopagus. It was in the eutward court of the Areopagus, where a barge was likewiſe placed, which made a part of the pomp at the public games.

Whatever homage and implicit obedience the court of Areopagus might derive from all this religious parade, the public good was always dearer to them than any lower advantages they might have drawn from the altars and temples with which they were ſurrounded.

The ſenate aſſembled in a hall built on the ſummit of a hill, which was aſcended with difficulty by the old men bent with age. However, as for ſome time they only aſſembled on the three laſt days of each month, they bore with patience this inconvenient ſituation. But public affairs multiplied to ſuch a degree, that they were obliged to add to the three former ſittings, a fourth, which was held on the ſeventh day of the month, and which was ſoon ſucceeded by an aſſembly every day. Their meetings were ſo regular, that they were not interrupted by the moſt ſolemn feſtivals, till Cephiſodorus was archon, who, in the third year of the 105th Olympiad, made a decree, which obliged the Areopagites to celebrate, after the example of the other courts, the Apaturian feaſts, which laſted five days.

This aſſiduous and painful exerciſe of their office made the Areopagites feel all the inconvenience of the ſituation of their tribunal, and determined them to remove it to a part of the city, called the *Royal Portico*. It was a ſquare, expoſed to all the inclemencies of the weather. When the judges, who aſſembled there in profound ſilence, had taken their places, they were incloſed by a thread, or rather a cord, drawn around them.

They held their aſſemblies in the night, that their attention to public affairs might not be diverted by external objects,—and (adds Lucian) that they might only be influenced by the arguments, and not by the preſence and action, of the ſpeakers. This circumſtance explains a paſſage in Athenæus, who tells us, that none knew the numbers nor faces of the Areopagites. The cuſtom of adminiſtring juſtice in the open air was not peculiar to them. It was followed by all the other tribunals, when they tried for murder; for two reaſons: —1ſt, That the judges, the ſworn protectors of innocence, might not be hurt by being under cover with criminals, whoſe hands were polluted with blood. 2dly, That the accuſer and the accuſed might not be under the ſame roof.

When all the members of the ſenate were convened, a herald enjoined ſilence, and ordered the people to retire. As ſoon as they had departed, the aſſembly proceeded to buſineſs; and as they deemed the leaſt preference a flagrant injuſtice, the cauſes which they were to determine were drawn by a kind of lottery; and the ſame chance which brought them up, diſtributed them to different numbers of judges, ſmall or great, according to the importance of the ſeveral cauſes.

In early times, the parties themſelves ſtated their cauſe in a ſimple manner. The eloquence of advocates was thought a dangerous talent, fit only to varniſh crimes. But afterwards the Areopagus, on this point, relaxed from their ſeverity;—at firſt the accuſed, and ſoon after the accuſers, were permitted to engage thoſe to make the attack and the defence, whoſe profeſſion it was to exert the art of ſpeaking, for others, with accuracy and elegance.

Sextus Empericus ſeems not to have ſufficiently diſtinguiſhed times, where he ſays, that the court of Areopagus did not ſuffer thoſe who were to be tried at their bar to avail themſelves of the abilities of others. What undoubtedly led him into that miſtake, was, an inviolable cuſtom of that tribunal, which prohibited, in pleadings, all that warm and pictureſque oratory which ſeduces the judgment and inflames the paſſions. When the ſuffrages were collected, each perſon gave his in ſilence. They voted with a ſmall flint, which they held betwixt the thumb and the two next fingers, and which they put into one of the two urns that ſtood in a corner of the hall. One ſtood before the other. The firſt was called the *urn of death;* the ſecond, the *urn of compaſſion*. That of death was of braſs, and was termed *proper;* that of compaſſion was of wood, and was termed *improper*. The judges commonly brought their flint to the aſſembly, and put it into the urn; but, that all the ſuffrages might be collected, the herald took the two urns, and preſented them, one after another, to every ſenator, commanding him, in the name of the republic, no longer to defer his acquittal, or condemnation.

For this method of giving ſentence, which was called κρυϐδην ψηφος, becauſe it kept the vote of each perſon undiſcovered, the Thirty Tyrants, to make themſelves maſters of the deciſions of the Areopagus, ſubſtituted another, by means of which they knew exactly the opinion of each of the judges: for they obliged them to bring their flints publicly, and lay them upon two tables placed before them, the ſituation of which was quite oppoſite to that of the urns; for the firſt of thoſe tables was that of *life*, and the ſecond that of *death*.

The firſt ſubſtances with which they gave their ſuffrages were not ſmall pieces of the bones of a hog, as ſome authors aſſert, but ſea-ſhells, for which pieces of braſs of the ſame form, termed *ſpondyla*, were afterwards ſubſtituted. The ſubſtances with which they voted were diſtinguiſhed by their form and colour. Thoſe which condemned were black, and perforated in the middle; the others were white, and not perforated. The precaution of piercing the black ones tends to prove, what we have already obſerved, that the court of Areopagus ſat in the night: for what end did it ſerve to pierce the black ſhells, or flints, if the judges could have ſeen them and the white ones, and conſequently have diſtinguiſhed their colours by the aſſiſtance of the light? But as they paſſed ſentence in the dark, it is evident that a difference beſides that of colour was neceſſary, to know the black ones from the white. The judges were likewiſe permitted to multiply at pleaſure the diſtinctions between ſigns, which eſſentially diſtinguiſhed the fates of men.

After the ſuffrages were collected, they were taken out of the two urns, and put into a third vaſe of braſs. They were then counted; and as the number of white or of black flints was higher or inferior, one of the judges drew with his nail a ſhorter or a longer line, on a tablet, with a waxen ſurface, on which the reſult of each cauſe was marked. The ſhort line expreſſed acquittal; the long, condemnation.

With regard to the emoluments of the judges, they were as moderate as thoſe of the advocates. The length of the proceſs did not enhance its expence; and when the deciſion of a cauſe was poſtponed till the next day, the committee were only paid an obolus on that day. Hence Mercury, in Lucian, is ſurpriſed that ſuch ſenſible old men as the ſenators of Areopagus were, ſhould ſell at ſo low a price the trouble of aſcending ſo high.

As to the number of the judges which compoſed the Areopagus, ſome authors, attentive only to a part of Solon's regulations, by which he enacted, that for the future, none but the nine archons ſhould be admitted members of the Areopagus, have imagined that this tribunal was filled anew every year, and that it never conſiſted of more than nine magiſtrates. This opinion, and ſome others, are refuted by the circumſtantial account which Diogenes Laertius gives us of the condemnation of Socrates. This great man had wiſhed to ſubſtitute a rational hypotheſis for the fabulous and extravagant ſyſtem of religion which prevailed in his time. His project, however laudable, appeared impious in the eye of ſuperſtition. Information was laid againſt him before the Areopagus, and he had as many accuſers as fellow-citizens. After the charges and the anſwers were heard, they proceeded to ſuffrages; the opinions were divided, but not equally, for the number of thoſe who condemned him exceeded by 281 the number of thoſe who declared him innocent. He made an ironical reply to this iniquitous ſentence, by telling his judges, that he took it for granted, they would admit him to a maintenance in the Prytanæum. On this ſarcaſm, 80 of thoſe who had voted in his favour forſook him, went over to the oppoſite party, and condemned him to die. Here then we have 361 judges who condemn; to whom if we add thoſe who perſiſt in acquitting him, the number muſt be very conſiderable.

Of all the judgments of the Areopagus, the moſt famous one, excepting that of Mars, was the ſentence which they paſſed on Oreſtes. His trial, which happened under Demophon the 12th king of Athens, in 375 of the Attic æra, owed all its fame to a remarkable circumſtance, that gave riſe to a cuſtom which was obſerved ever afterwards. Oreſtes had killed his mother; he was accuſed before the Areopagus, and cited to appear in that court. He would have loſt his life in conſequence of the equal diviſion of the votes, had not Minerva, moved with his misfortunes, declared herſelf for thoſe who had abſolved him, and joined her ſuffrage to theirs. Thus Oreſtes was ſaved. In veneration to this miracle, the Areopagites, whenever the ſuffrages were equally divided, decided in favour of the accuſed, by granting him what they termed *the ſhell of Minerva*. Cephalus and Dædalus were condemned by the Areopagus long before the time of Oreſtes.

We find in ancient authors ſome deciſions of this tribunal, which bear the ſtrongeſt marks of juſtice, though their objects are not intereſting. We ſhall here quote an anecdote from Aulus Gellius, and Valerius Maximus, of a woman who was accuſed of having poiſoned her huſband and her ſon. She was taken, and brought before Dolabella, who was then proconſul of Aſia. She was no ſooner in his preſence, than ſhe owned the fact; and added, that ſhe had very good reaſons for putting her huſband and her ſon to death.—"I had, (ſaid ſhe), to my firſt huſband, a ſon whom I tenderly loved, and whoſe virtues rendered him worthy of my affection. My ſecond huſband, and the ſon whom I bare to him, murdered my favourite child. I thought it would have been unjuſt to have ſuffered thoſe two monſters of barbarity to live. If you think, Sir, that I have committed a crime, it is your province to puniſh it; I certainly ſhall never repent of it." This affair embarraſſed Dolabella. She was afterwards ſent to the Areopagus; and that court, when they had examined her a long time, ordered her and her accuſer to appear before them again a hundred years after, from the firſt day of her trial.

We muſt not, however, ſuppoſe that the Areopagus always preſerved its old reputation; for ſuch is the conſtitution of human affairs, that perfection, with regard to them, is a violent, and conſequently a tranſitory, ſtate. Pericles, who lived about 100 years after Solon, to flatter the people and win them to his party, uſed his utmoſt efforts to weaken the authority of the Areopagus, which was then diſliked by the multitude. He took from it the cognizance of many affairs which had before come under its juriſdiction; and, to forward his deſign of humbling it, employed the eloquence of Ephialtes, whoſe talents were formidable, and who was an avowed enemy to the great men of Athens.

The Areopagus itſelf ſeemed to ſecond the endeavours of a man who projected its ruin, and by its miſconduct haſtened its fall. The old rules of the court, by which none were admitted its members but thoſe whoſe unexceptionable conduct would ſupport its majeſty, ſeemed too ſevere. They grew leſs delicate in their choice; and preſuming that the faults with which they diſpenſed, would ſoon be reformed in the ſociety of ſo many good examples, vice imperceptibly crept among them: corruption, at firſt ſecret and timid, grew inſenſibly open and daring, and made ſuch progreſs, that the moſt ſhameful crimes were ſoon exhibited on the ſtage; and they were not copied from the low and abandoned multitude, but from thoſe ſenators, once the venerable and auſtere cenſors of idleneſs and of vice. Demetrius, the comic poet, wrote a piece, which he entitled *The Areopagite*, where he ſtrips the maſk off thoſe hypocritical legiſlators, who were now equally apt to be ſeduced by wealth and by beauty. So much had the Athenian ſenate degenerated in the days of Iſocrates, cir. 340 years before the Chriſtian æra.

Before this tribunal St Paul was called to give an account of his doctrine, and converted Dionyſius one of their number.

The end of this court of judicature is as obſcure as its origin, which was derived from very remote antiquity. It exiſted, with the other magiſtracies, in the time of Pauſanias, *i. e.* in the 2d century. The term of its ſubſequent duration is not aſcertained; but a writer, who lived under the emperors Theodoſius the elder and younger, in the 5th century, mentions it as extinct.

AREQUIBA, a city of Peru in South America, ſituated in W. Long. 73°. S. Lat. 17°. It is one of the moſt beautiful cities in all Peru, being delightfully ſituated in the valley of Quilca, 100 leagues from Lima, and 20 from the ſea, with which it communicates by a fine river. The entrance into the harbour is rather ſhallow for ſhips of great burden; but when once they are entered, they may ride ſecurely in 18 fathoms water. This city was founded in 1539, by order of Don Franciſco Pizarro, in a place known likewiſe by the name of *Arequiba;* but its ſituation being found diſadvantageous, the inhabitants obtained leave to remove to the place where the city now ſtands. The houſes are built with ſtone, and vaulted; and, contrary to what is uſual in warm countries, they are lofty, neatly furniſhed within, and finely decorated on the outſide. The inhabitants alſo are exempt from many diſeaſes common in other parts of Peru; which perhaps is owing to their keeping the ſtreets clean by means of canals which extend to the river. The temperature of the air is extremely good; and though ſometimes a ſlight froſt is perceivable, the cold is never exceſſive, nor the heat troubleſome, ſo that the ſurrounding fields are clothed with perpetual verdure. Theſe natural advantages, however, are conſiderably allayed by its being very ſubject to earthquakes, by which it has already been five times laid in ruins; notwithſtanding which, it is populous, and has amongſt its inhabitants ſome of the nobleſt families in America.

ARES, a word of Paracelſus's, by which he would expreſs that power of nature in the whole material world, by which ſpecies are divided into individuals.

ARETÆUS of Cappadocia, a Greek phyſician, of the ſect of the Pneumatiſts, lived in the reign of Auguſtus, according to ſome; according to others, under Trajan or Adrian. He wrote ſeveral treatiſes in the Ionian dialect, on acute diſeaſes, and other medicinal ſubjects; ſome of which are ſtill extant. The beſt edition of his works is that of Boerhaave, in Greek and Latin, with notes, printed in 1731; that of Wigan, printed at Oxford in 1723, in folio, is alſo much eſteemed.

ARETHUSA, in fabulous hiſtory, the daughter of Nereus and Coris, and the companion of Diana, who changed her into a fountain to deliver her from the purſuit of her lover Alpheus.

ARETHUSA, a celebrated fountain near the city of Syracuſe in Sicily, famous for the quantity of its waters, and the number of fiſhes it contained. Many fables were invented by the ancients concerning this fountain. They had alſo a notion that the river Alpheus run under or through the waters of the ſea, without mixing with them, from Peloponneſus to Sicily. Mr Brydone informs us, that it ſtill continues to ſend forth an immenſe quantity of water, riſing at once to the ſize of a river, but is entirely abandoned by the fiſhes it formerly contained in ſuch plenty. At ſome diſtance from Arethuſa is a fountain of freſh water which boils up very ſtrongly in the ſea, inſomuch that, after piercing the ſalt water, it may be ſometimes taken up very little affected by it. This fountain Mr Brydone thinks the ancients were ignorant of, or they would not have failed to uſe it as an argument for the ſubmarine journey of Alpheus. It is much more probable, however, that theſe large fountains owe their exiſtence to Mount Ætna.

ARETHUSA, in botany, a genus of the gynandria diandria claſs. The generic character is taken from the nectarium, which is tubular, ſituated at the bottom of the corolla; and the inferior labium of it is fixed to the ſtylus. There are four ſpecies of the arethuſa, all natives of America, except the capenſis, which is only found at the Cape of Good Hope.

ARETOLOGI, in antiquity, a ſort of philoſophers, chiefly of the Cynic or Stoic tribe, who, having no ſchool or diſciples of their own, haunted the tables of great men, and entertained them in their banquets with diſputations on virtue, vice, and other popular topics. Theſe are ſometimes alſo denominated *Circulatores Philoſophi.* In this ſenſe, the word is derived from the Greek αρετη, virtue, and λογος, diſcourſe. Some authors chuſe to derive the word from αρεϛος, *gratus*, agreeable; and define Aretologi, by perſons who ſtrive to divert and entertain their audience with jokes and pleaſant tales; which latter ſeems the more natural explication.

ARETIN (Guido), famous for his muſical improvements, lived in the 11th century. He was a native of Arezzo, a city in Tuſcany; and having been taught the practice of muſic in his youth, and probably retained as a choriſter in the ſervice of the Benedictine monaſtery founded in that city, he became a monk profeſſed, and a brother of the order of St Benedict.

In this retirement he ſeems to have devoted himſelf to the ſtudy of muſic, particularly the ſyſtem of the ancients, and, above all, to reform their method of notation. The difficulties that attended the inſtruction of youth in the church-offices were ſo great, that, as he himſelf ſays, ten years were generally conſumed barely in acquiring the knowledge of the plain-ſong; and this conſideration induced him to labour after ſome amendment, ſome method that might facilitate inſtruction, and enable thoſe employed in the choral office to perform the duties of it in a correct and decent manner. If we may credit thoſe legendary accounts that are extant in old monkiſh manuſcripts, we ſhould believe he was aſſiſted in his pious intention by immediate communications from heaven: ſome ſpeak of the invention of the ſyllables as the effect of inſpiration; and Guido himſelf ſeems to have been of the ſame opinion, by his ſaying it was revealed to him by the Lord; or, as ſome interpret his words, in a dream: but graver hiſtorians ſay, that being at veſpers in the chapel of his monaſtery, it happened that one of the offices appointed for that day was the hymn * to St John,

UT queant laxis *REſonare fibris*
MIra geſtorum *FAmuli tuorum*
SOLve pollutis *LAbiis reatum,*
Sancte Joannes.

During the performance of the hymn, he remarked the iteration of the words, and the frequent returns of UT, RE, MI, FA, SOL, LA: he obſerved likewiſe a diſſimilarity between the cloſeneſs of the ſyllable MI, and the broad open ſound of FA, which he thought could not fail to impreſs upon the mind a laſting idea of their congruity; and immediately conceived a thought of applying theſe ſix ſyllables to perfect an improvement either then actually made by him, or under conſideration, *viz.* that of converting the ancient tetrachords into hexachords.

Struck with the diſcovery, he retired to his ſtudy; and having perfected his ſyſtem, began to introduce it into practice: the perſons to whom he communicated it were the brethren of his own monaſtery, from whom it met with but a cold reception, which, in the epiſtle to his friend, he aſcribes undoubtedly to its true cauſe, envy: however, his intereſt with the abbot, and his employment in the chapel, gave him an opportunity of trying the efficacy of his method on the boys who were training up for the choral ſervice, and it exceeded the moſt ſanguine expectation. "To the admiration of all (ſays cardinal Baronius), a boy thereby learnt, in a few months, what no man, though of great ingenuity, could before that attain in ſeveral years."

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* Compoſed by Paul, a deacon of the church of Aquileia, about the year 770.

The fame of Guido's invention ſoon ſpread abroad, and his method of inſtruction was adopted by the clergy of other countries: we are told by Kircher, that Hermannus biſhop of Hamburg, and Elviricus biſhop of Oſnaburg, made uſe of it; and by the authors of the *Hiſtoire Litteraire de la France*, that it was received in that country, and taught in all the monaſteries in the kingdom. It is certain that the reputation of his great ſkill in muſic had excited in the pope a deſire to ſee and converſe with him; of which, and of his going to Rome for that purpoſe, and the reception he met with from the pontiff, he himſelf has given a circumſtantial account of in the epiſtle hereafter mentioned.

The particulars of this relation are very curious; and as we have his own authority, there is no room to doubt the truth of it. It ſeems that John XX. or, as ſome writers compute, the 19th pope of that name, having heard of the fame of Guido's ſchool, and conceiving a deſire to ſee him, ſent three meſſengers to invite him to Rome; upon their arrival, it was reſolved by the brethren of the monaſtery that he ſhould go thither attended by Grimaldo the abbot, and Peter the chief of the canons of the church of Arezzo. Arriving at Rome, he was preſented to the holy father, and by him received with great kindneſs. The pope had ſeveral converſations with him, in all which he interrogated him as to his knowledge in muſic; and upon ſight of an antiphonary which Guido had brought with him, marked with the ſyllables agreeable to his new invention, the pope looked on it as a kind of prodigy; and ruminating on the doctrines delivered by Guido, would not ſtir from his ſeat till he had learned perfectly to ſing off a verſe: upon which he declared, that he could not have believed the efficacy of the method, if he had not been convinced by the experiment he had himſelf made of it. The pope would have detained him at Rome; but labouring under a bodily diſorder, and fearing an injury to his health from the air of the place, and the heats of the ſummer, which was then approaching, Guido left that city upon a promiſe to reviſit it, and explain to his holineſs the principles of his new ſyſtem. On his return homewards, he made a viſit to the abbot of Pompoſa, a town in the duchy of Ferrara, who was very earneſt to have Guido ſettle in the monaſtery of that place; to which invitation it ſeems he yielded, being, as he ſays, deſirous of rendering ſo great a monaſtery ſtill more famous by his ſtudies there.

Here it was that he compoſed a tract on muſic, intitled *Micrologus*, i. e. "a ſhort diſcourſe;" which he dedicated to Theodald biſhop of Arezzo; and finiſhed, as he himſelf at the end of it tells us, under the pontificate of John XX. and in the 34th year of his age. Voſſius ſpeaks alſo of another muſical treatiſe written by him, and dedicated to the ſame perſon.

Moſt of the authors who have taken occaſion to mention Guido, ſpeak of the Micrologus as containing the ſum of his doctrine: but it is in a ſmall tract, intitled *Argumentum novi Cantus inveniendi*, that his declaration of his uſe of the ſyllables, with their ſeveral mutations, and in ſhort his whole doctrine of ſolmiſation, is to be found. This tract makes part of an epiſtle to a very dear and intimate friend of Guido, whom he addreſſes thus, "Beatiſſimo atque dulciſſimo fratri Michaëli;" at whoſe requeſt the tract itſelf ſeems to have been compoſed.

Whether Guido was the author of any other tracts, is not eaſy to determine. It nowhere appears that any of his works were ever printed, except that Baronius, in his *Annales Eccleſiaſtici, tom. XI. p.* 73, has given at length the epiſtle from him to his friend Michael of Pompoſa, and that to Theodald biſhop of Arezzo, prefixed to the Micrologus; and yet the writers on muſic ſpeak of the Micrologus as of a book in the hands of every one. Martini cites ſeveral manuſcripts of Guido; namely, two in the Ambroſian library at Milan, the one written about the twelfth century, the other leſs ancient; another among the archives of the chapter of Piſtoja, a city in Tuſcany; and a third in the Mediceo-Laurenziano library at Florence, of the 15th century: theſe are clearly the Micrologus. Of the epiſtle to Michael of Pompoſa, together with the *Argumentum novi Cantus inveniendi*, he mentions only one, which he ſays is ſomewhere at Ratiſbon. Of the ſeveral tracts abovementioned, the laſt excepted, a manuſcript is extant in the library of Baliol-college in Oxford. Several fragments of the two firſt, in one volume, are alſo among the Harleian manuſcripts now in the Britiſh Muſeum, N° 3199; but ſo very much mutilated, that they afford but ſmall ſatisfaction to a curious inquirer.

Aretin (Leonard), one of the moſt learned men of the 15th century, was ſecretary to the republic of Florence, and tranſlated from the Greek into Latin ſome of the Lives of Plutarch, and Ariſtotle's Ethics: he alſo compoſed three books of the Punic war, that may ſerve as a ſupplement to thoſe wanting in Livy; the hiſtory of the tranſactions in Italy during his time; that of ancient Greece; that of the Goths; that of the republic of Florence; and many other books. He died in 1443, aged 74.

Aretin (Francis), a man of great reading, and well acquainted with the Greek language. He tranſlated into Latin the Commentaries of St Chryſoſtom upon St John, and about 20 Homilies of the ſame father: he alſo tranſlated the Letters of Phalaris into Latin, and wrote a treatiſe *De balneis Puteolanis*. He ſtudied at Sienna, about the year 1443; and afterwards taught law there with ſuch reputation, that they called him the *Prince of Subtleties*, and his wit became a proverb. He diſplayed his talents chiefly in diſputes, in which nobody could withſtand him. He gave his opinions in law with ſo much confidence, as to aſſure thoſe who conſulted him, that they ſhould carry their cauſe: nor did experience contradict him; for it was a common ſaying at the bar, ſuch a cauſe has been condemned by Aretin, it muſt therefore be loſt. He taught alſo in the univerſity of Piſa, and in that of Ferrara. He was at Rome under the pontificate of Sixtus IV. but did not ſtay here long; for he ſoon perceived that the great hopes which he had built upon his reputation would come to nothing. This pope, however, declared he would have given him a cardinal's hat, had he not thought he ſhould have done a public injury by depriving the youth of ſuch an excellent profeſſor. When old age would not permit him to go through the duties of his office, they diſpenſed with his reading of lectures, and his ſalary was continued. He continued, however, ſometimes to mount the chair; and although his lectures had now but little ſpirit in them, yet he had ſtill many hearers on account of his reputation. One day when the ſtudents were gone to ſome public ſhews, there were but 40 perſons in his auditory: which ſo mortified him, that he threw away his book; and crying out, "Aretin ſhall never explain law to a few perſons," retired in a paſſion, and would teach no more. He was ſevere in his temper, and never kept a ſervant longer than a month or two; for it was a maxim of his, "That new-hired ſervants always ſerve beſt." He was honoured with the title of *knight*, and ſpent all his life in celibacy; and his way of living was ſo parſimonious, that he was thereby enabled to amaſs a great deal of wealth. He had deſigned this wealth for the maintenance of a college; but he altered his reſolution, and left it to his relations.

ARETIN (Peter), a native of Arezzo, who lived in the 16th century. He was famous for his ſatirical writings; and was ſo bold as to carry his invectives even againſt ſovereigns, and from thence got the title of the *Scourge of Princes*. Francis I. the emperor Charles V. moſt of the princes of Italy, ſeveral cardinals, and many noblemen, courted his friendſhip by preſents, either becauſe they liked his compoſitions, or perhaps from an apprehenſion of falling under the laſh of his ſatire. Aretin became thereupon ſo inſolent, that he is ſaid to have got a medal ſtruck, on one ſide of which he is repreſented with theſe words IL DIVINO ARETINO; and on the reverſe, ſitting upon a throne, receiving the preſents of princes, with theſe words, I PRINCIPI TRIBUTATI DA POPOLI, TRIBUTANO IL SERVIDOR LORO. Some imagine that he gave himſelf the title of *Divine*, ſignifying thereby that he performed the functions of a god upon earth, by the thunderbolts with which he ſtruck the heads of the higheſt perſonages. He uſed to boaſt, that his lampoons did more ſervice to the world than ſermons; and it was ſaid of him, that he had ſubjected more princes by his pen, than the greateſt had ever done by their arms. Aretin wrote many irreligious and obſcene pieces; ſuch are his dialogues, which were called *Ragionamenti*. There is likewiſe imputed to him another very obſcene performance, *De omnibus Veneris ſchematibus*. "It was about the year 1525 (ſays Mr Chevillier *) that Julio Romano, the moſt famous painter of Italy, inſtigated by the enemy of the ſalvation of mankind, invented drawings to engrave 20 plates: the ſubjects are ſo immodeſt, that I dare only name them. Peter Aretin compoſed ſonnets for each figure. George Vaſari, who relates this in his Lives of the Painters, ſays, he does not know which would be the greateſt impurity, to caſt one's eyes upon the drawings of Julio, or to dip into the verſes of Aretin." Some ſay that Aretin changed his libertine principles; but however this may be, it is certain that he compoſed ſeveral pieces of devotion. He wrote a Paraphraſe on the penitential Pſalms, and another on Geneſis; he wrote alſo the Life of the Virgin Mary, and that of St Catherine of Sienna, and of St Thomas Aquinas. He was author likewiſe of ſome comedies. He died in the year 1556, being about 65 years old.

AREZZO, a city of Italy, in Tuſcany, ſeated in the territory of Florence, on the declivity of a hill that overlooks the neighbouring plain, between the Citta di Caſtelli and Florence. It is an ancient city, and a biſhop's ſee; and was famous for a kind of earthen ware much eſteemed by the Romans. It was greatly fallen to decay when Coſmo de Medicis took it under his protection, ſince which it has been recovering gradually. It is famed for being the birth-place of Mecænas. E. Long. 12. 2. N. Lat. 43. 27.

ARGEA, or ARGEI, in Roman antiquity, thirty human figures, made of ruſhes, thrown annually by the prieſts or veſtals into the Tiber, on the day of the ides of May.

ARGEIA, or *Argolis*, a diſtrict of Peloponneſus, ſituated between Arcadia to the weſt, the Egean Sea to the eaſt, Laconica and the Sinus Argolicus to the ſouth, and to the north the territory of Corinth and the Sinus Saronicus, (Livy, Ptolemy); ſo called from Argos the capital: now *Romania di Morea*.

ARGEII, a people of Greece, ſo called by the Greeks, from *Argi*, or *Argos*; *Argivi*, by the Romans: Homer ſeems to call the Greeks in general *Argeii*, as alſo *Achæi*.

ARGEMONE, PRICKLY POPPY; a genus of the monogynia order, belonging to the polyandria claſs of plants. Of this genus there are three ſpecies, which are common in many parts of the Weſt Indies, and called by the Spaniards the *devil's fig*; but they are of no uſe, and have very little beauty.

ARGENCES, a town of France, in Lower Normandy, on the river Meance. W. Long. 0. 10. N. Lat. 49. 15.

ARGENT, the common French word for *ſilver*, of which metal all white fields or charges are ſuppoſed to conſiſt. Argent of itſelf is uſed in heraldry to ſignify purity, innocence, beauty, and gentleneſs; and, according to G. Leigh, if it is compounded with

Gul.	it ſignifies	boldneſs;
Azu.		courteſy;
Ver.		virtue;
Pur.		favour;
Sab.		religion.

ARGENTAC, a town of France, in the Limoſin, on the river Dordogne. E. Long. 2. 3. N. Lat. 45. 5.

ARGENTAN, a town of France, in Lower Normandy, and in the dioceſe of the Seez, with the title of a marquiſate. It is ſeated on an eminence, in the middle of a fertile plain, on the banks of the river Orne, and carries on a conſiderable trade. E. Long. 0. 5. N. Lat. 48. 54.

ARGENTARIA, a town of ancient Gaul, thought to ſtand in the place where the city Colmar now ſtands. It is remarkable for a great victory gained by the emperor Gratian over the Lentienſes, in the month of May, A. D. 378. The Romans, being but few in number, were at firſt overpowered, and obliged to give ground; but ſoon returning to the charge, they gained in the end a complete victory. Thirty thouſand of the barbarians, and among the reſt their king Triarius, were killed on the ſpot; and all the reſt, except 5000, taken priſoners.

ARGENTARIA CRETA, pure white earth, found in Pruſſia, and much-eſteemed for cleaning plate.

ARGENTEUIL, a town of the iſle of France, ſeated on the river Seine, five miles north-weſt of Paris. It is a very beautiful place, with fine vineyards. On the environs are quarries of the plaſter of Paris. In the Benedictine priory they pretend to have the ſeamleſs coat of Chriſt. E. Long. 2. 28. N. Lat. 48. 52.

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* *Origin de l'imprimerie de Paris, p. 224.*

ARGENTIERE, a ſmall iſland in the Archipelago, near Milo. It is about 18 miles in compaſs; and is full of barren mountains, producing nothing but barley, cotton, and a few grapes fit only for eating. The barley and cotton are ſown round the only village there is in the iſland. The ladies are handſome enough, have no other employment but making cotton ſtockings, and take up with the ſailors who put into the port. The men all uſe the ſea, and in time become good pilots. They have very little religion, are very ignorant, and of very bad morals. Juſtice is adminiſtered by an itinerant cadi, who is ſometimes the only muſſulman in the whole iſland. The only article relating to natural hiſtory is the Terra Cimolia ſo highly eſteemed by the ancients; it is a kind of white chalk, which is very heavy, without taſte, and crumbles eaſily: they uſe it in waſhing linen. E. Long. 23. 10. N. Lat. 36. 50.

ARGENTINA, in ichthyology, a genus of fiſhes belonging to the order of abdominales. The generic characters are theſe: The teeth are in the tongue as well as the jaws; the branchioſtege membrane has eight radii or rays; the anus is near the tail; and the belly-fins conſiſt of many rays. There are two ſpecies of argentina, *viz.* 1. The ſphyræna has 15 rays in the fin at the anus; the air-bladder of this ſpecies is conical on both ſides, and ſhines like ſilver: according to Mr Ray, falſe pearls are ſometimes made of it. 2. The carolina has likewiſe 15 rays in the fin near the anus; the tail is forked, and the lateral lines are ſtraight. It inhabits the freſh waters of Carolina.

ARGENTINUS, a deity worſhipped by the ancients, as the god of ſilver coin; as Æſculanus, whom they made his father, was the god of braſs money, which was in uſe before ſilver.

ARGENTON, a town and county of France, in the duchy of Berry, divided into two by the river Creuſe. Here was formerly a caſtle; but it was demoliſhed by Lewis XIV. E. Long. 1. 38. N. Lat. 40. 30.

ARGENTORA, *Argentina*, (Notitiæ); *Argentoratum*, (Ptolemy); *Argentoratus*, (Ammian); a city of the Tribocci; one of the fifty forts built by Druſus on the Rhine, (Florus): an appellation formed by the Romans from the German, *Argen Straſſen*, or *Straten*, "unſafe roads for travellers," from the maroding parties of the garriſons that infeſted the roads. Now *Straſburg**, in the lower Alſace, on the rivulet Ill, near the Rhine. E. Long. 7. 35. Lat. 48. 38.

* See Straſ-
g.

ARGENTUM. See SILVER.

ARGENTUM ALBUM, in our old cuſtoms, ſilver coin, or pieces of bullion that anciently paſſed for money. By Doomſday tenure, ſome rents to the king were paid in *argento albo*, common ſilver pieces of money; other rents in *libris urſis et penſatis*, in metal of full weight and purity: in the next age, that rent which was paid in money, was called *blanch fearm*, and afterwards *white-rent;* and what was paid in proviſions, was termed *black mail.*

ARGENTUM MUSIVUM is a maſs conſiſting of ſilver-like flakes, uſed for the colouring of plaſter-figures, and for other purpoſes, as pigment. It conſiſts of an amalgam of equal parts of tin, biſmuth, and mercury. It is to be mixed with white of eggs, or ſpirit varniſh, and then applied to the intended work, which is afterwards to be burniſhed.

ARGENTUM VIVUM, *Mercury*, or *Quickſilver*. See MERCURY; CHEMISTRY, n° 153, 205, 250, 414; and the references at MATERIA MEDICA, n° 121.

ARGILLA, clay, in natural hiſtory. See CLAY.

ARGIPPEANS, a part of the ancient Scythain nation. The men and the women were bald, humpbacked, and had great chins. Their language was totally peculiar to themſelves. Their dreſs was the ſame with that of the other Scythians. Their food was the fruit of a tree called *Pontica*, about as high as a fig-tree: it bore a kind of filbert; the kernel of which in form reſembled a bean. They ſucked from it a thick black liquor; and this liquor they ſometimes drank with milk. The groſſer part of this fruit, after it had been preſſed, ſerved them inſtead of animal food; for they had but few cattle, and were therefore unſkilled in the care of flocks and herds. They lay in winter under trees, over which they ſpread a white covering; this covering they uſed not in the ſummer. None dared to offer them any injury; for they were deemed ſacred. Therefore they had no arms; and were unacquainted with the art of war. They determined the differences and diſputes of their neighbours; and whoever fled to them from perſecution, found a ſafe aſylum; it would have been ſacrilege to hurt, to inſult him in their country.

ARGIVI. See ARGEII.

ARGO, in antiquity, a ſhip or veſſel celebrated among the poets, as being that wherein the Argonauts made their expedition.

ARGO *Navis*, or the ſhip, in aſtronomy, is the name of a conſtellation of fixed ſtars in the ſouthern hemiſphere. The number of ſtars is 8, in Ptolemy's catalogue; in Tycho's, 11; and in Mr Flamſtead's, 25.

ARGONAUTA, the name of a genus of ſhell-fiſh belonging to the order of vermes teſtacea. The ſhell conſiſts of one ſpiral involuted valve. There are two ſpecies of argonauta, *viz.* The argo, with a ſubdented carina, which is found in the Mediterranean and Indian oceans. This is the famous nautilus of other authors. The ſhell ſeems no thicker nor ſtronger than a piece of paper; and the fiſh that inhabits it is a ſepia. It has been imagined that men firſt learned the method of ſailing in veſſels from what they ſaw practiſed by this creature. When it is to ſail, it extends two of its arms on high; and between theſe ſupports a membrane, which it throws out on this occaſion: this ſerves for its ſail; and the two other arms it hangs out of the ſhell, to ſerve occaſionally either as oars, or as a ſteerage; but this laſt office is generally ſerved by the tail. When the ſea is calm, it is frequent to ſee numbers of theſe creatures diverting themſelves with ſailing about in this manner; but as ſoon as a ſtorm riſes, or any thing gives them diſturbance, they draw in their legs, and take in as much water as makes them ſomewhat heavier than the ſea-water in which they ſwim, and they then ſink to the bottom. The manner of their voiding this abundant water, when they would riſe again, is by a number of holes, of which their legs are full. 2. The cymbium, with a blunt plaited carina. This ſpecies is very ſmall, and is found in the Mediterranean.

ARGONAUTS, in Grecian antiquity, a company of illuſtrious Greeks, who embarked along with Jaſon, in the ſhip Argo, on an expedition to Colchis, with a deſign to obtain the golden fleece *.

ARGOS, an ancient name of Peloponneſus; from Argos, one of the kings, (Homer, Strabo).

Argos, the capital, and an inland town, of Argolis. It had different ſurnames; as *Achaicum*, from the country, or an ancient people, (Homer); *Inachium*, from the river Inachus, which runs by, (Pliny); *&c.* It had two citadels, (Livy); the one called *Lariſſa*, (Strabo); the other unnamed. At the ſiege of this city, Pyrrhus king of Epirus was killed by a tile thrown by an old woman. *Argos* was 26 ſtadia diſtant from Temenium, a maritime town, and 50 to the ſouth of Mycenæ: Now *Argo*. E. Long. 23. 5. Lat. 37. 30.

Argos Hippium, the ancient name of *Arpi;* but *Lampe* is a ſtill more ancient; afterwards called *Argyrippa*, and *Argippa*; built by, and the reſidence of, Diomedes, on the Cerbalus, (Virgil); afterwards a large and populous city, (Livy): A town of Apulia; now in ruins, and the place called *Arpe*.

ARGUIM, an iſland on the coaſt of Africa, about ſixteen miles diſtant from Cape Blanco, ſituated in W. Long. 16. 30. N. Lat. 20. 20. It is ſcarce two miles in length; notwithſtanding which, it was a bone of contention for 87 years between the Portugueſe, Dutch, Engliſh, and French; and, after a variety of fortune, has at laſt been totally abandoned.

This iſland was firſt diſcovered by the Portugueſe in 1444, when a fleet bound to the eaſt touched at Arguim, and from ſome little trade carried on with the natives, it was imagined that a ſettlement there might be of ſome advantage to Portugal. In conſequence of this opinion, a fort was erected on the iſland, and the Portugueſe enjoyed the peaceable poſſeſſion of it till 1638. At this time, the Dutch having received a minute account of the condition of the iſland, reſolved to attack it; and accordingly landed without moleſtation from the garriſon, which was too weak to oppoſe them. The Portugueſe, however, defended themſelves with great intrepidity, and at laſt ſurrendered upon honourable terms. The Dutch immediately ſet about repairing the fortifications, and ſecuring it in the beſt manner they could: however, in 1665, the fort was reduced almoſt to an heap of rubbiſh by an Engliſh ſquadron; but as the fortifications were totally deſtroyed, and only a ſmall garriſon left there, it was eaſily retaken by the Dutch the next year. They now redoubled their diligence in ſtrengthening the iſland, entering into alliance with Mooriſh chiefs, procuring a number of families to ſettle under protection of the fort, and giving extravagant prices for gums, in order to monopolize the gum-trade. By this means the gum-trade of the French Senegal company was almoſt entirely deſtroyed; upon which they fitted out a ſquadron, diſpoſſeſſed the Dutch, and had the iſland finally ceded to them by the treaty of Nimeguen.

Though the Dutch now ſeemed to be finally expelled, they reſolved not to part ſo eaſily with ſuch a valuable ſettlement. Under pretence of being ſubjects of the Elector of Brandenburg, therefore, they erected one of the forts which had been demoliſhed, and there maintained themſelves in ſpite of the utmoſt endeavours of the French company to diſpoſſeſs them. Numberleſs were the memorials, proteſts, reſcripts, &c. which were publiſhed on this occaſion, till a new war in 1701 put an end to them. In 1717, however, the French company having found all their remonſtrances ineffectual, fitted out a new ſquadron; but this armament did not arrive at Arguim before Feb. 26th 1721. The Dutch defended themſelves with ſuch intrepidity and conduct as had almoſt baffled the utmoſt efforts of the French; but the latter having found means to draw off a Mooriſh chief from his allegiance, the Dutch were obliged to evacuate Arguim, and retire to Portendic, where they fortified themſelves, determining to watch a favourable opportunity for recovering their ſettlement at Arguim. This was not long wanting, by means of the weakneſs of the garriſon, and the imprudence of Duval the French director; who, having quarrelled with the Moors, was ſurprized, defeated, and killed by them: in conſequence of which, the ſettlement fell again into the hands of the Dutch on the 11th of Jan. 1722. In 1723, the Dutch were attacked by another French ſquadron under the command of the Sieur Riguadiere. This gentleman boaſted that the fort could not hold out one day; but though he prevailed ſo far as to get poſſeſſion of the ciſterns which contained the water of the beſieged, he was at laſt ſhamefully repulſed, and forced to raiſe the ſiege with precipitation. The Dutch, however, did not long enjoy the poſſeſſion which they had ſo bravely defended; for, in 1725, their fort was entirely demoliſhed by the French under Du Caſſe, and has never ſince been re-built by any European nation.

ARGUMENT, in rhetoric and logic, an inference drawn from premiſes, the truth of which is indiſputable, or at leaſt highly probable. See Logic.

Argument, in matters of literature, denotes alſo the abridgment or heads of a book, hiſtory, comedy, chapter, &c. See Syllabus.

ARGUS, in fabulous hiſtory, was the ſon of Ariſtor, and had 100 eyes, 50 of which were always open. Juno made choice of him to guard Io, whom Jupiter had transformed into a white heifer; but Jupiter, pitying Io for being ſo cloſely confined, ſent Mercury, who, with his flute, charmed Argus to ſleep, ſealed up his eyes with his caduceus, and then cut off his head; when Juno, to reward his fidelity, turned him into a peacock, and placed his eyes in his tail.

Argus-Shell, a ſpecies of porcellain-ſhell, beautifully variegated with ſpots, reſembling in ſome meaſure thoſe in a peacock's tail.

ARGYLE (dukes of). See Campbell.

Argyle-shire, or *Argathilia*, in Scotland, which, together with Perthſhire and the Weſtern Iſlands, is ſaid to have conſtituted the ancient kingdom of the Scots, while the reſt of Caledonia was ſubject to the Picts and Romans, comprehends Kintyre, Knapdale, Argyle Proper, Cowal, Lorn, with the iſlands of Bute and Arran. It is bounded on the ſouth by the Iriſh ſea, and the Frith of Clyde; on the eaſt, by Perthſhire; on the north-eaſt, by Lochaber; and on the north-weſt, by ſeveral iſlands. The extent of it from ſouth to north, between the Mull of Kintyre and Lochaber, amounts to 90 miles; and the breadth, in ſome places, including the iſles, to 70. This country, like all other parts of the Highlands, affords a very wild and horrid proſpect of hills, rocks, and huge mountains, piled upon each other in a ſtupendous and dreadful diſorder; bare, bleak, and barren to the view; or at beſt covered with ſhagged heath, which appears

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* See the article *Theſſaly*.

black and diſmal to the eye, except in the ſummer, when it is variegated with an agreeable bloom of a purple colour. The coaſt of Argyle is rocky; yet indented with bays and inlets, that afford good harbours for ſhipping. The country is well watered by rivers, brooks, and lakes, abounding with fiſh; the vales and flat parts of it are cultivated for corn; the mountains feed an innumerable quantity of black cattle, which run wild among the hills in winter as well as ſummer; the heath and woods, of which there is a conſiderable number, afford ſhelter to deer, roebucks, and all ſorts of game in great plenty: the circumambient ſea, with its locks, bays, and harbours, pours forth myriads of fiſh; but the innate wealth of the country is dug from the bowels of the mountains in iron, copper, lead, and other metals and minerals.

Argyle is the ſeat of a provincial ſynod, conſiſting of five preſbyteries and 49 pariſhes; and gives the titles of duke and earl to the noble family of Campbell, the moſt powerful of all the Scottiſh nobility. The duke of Argyle is, by hereditary right, great maſter of the king's houſehold in Scotland, admiral of the Weſtern iſles, general of Denoon caſtle, and, before the juriſdictions were aboliſhed, enjoyed other hereditary offices, which rendered him too powerful as the ſubject of a limited monarchy. He ſtill poſſeſſes many royalties; his vaſſals, even of the name of Campbell, are ſo numerous, and his influence extends ſo far, that he could, on occaſion, bring 3 or 4000 fighting men into the field. Argyleſhire is in general peopled by this clan; and affords a great number of caſtles and ſeats belonging to gentlemen who hold of the duke, and boaſt themſelves deſcended from his family.

Argyle Proper is bounded by Knapdale and Cowal on the ſouth; Lochaber on the north; Lennox and the Grampian hills on the eaſt; and Lorne on the weſt. It lies between Lochfyn and Lochow; which laſt is a freſh-water lake, about a mile broad, but extending 24 in length, including 12 iſlands, on two of which there are the caſtles of Enconel and Glenurquhart. This lake, which gives the title of viſcount to the duke of Argyle, iſſues in the river Aw, which, after a courſe of ſix or ſeven miles, enters Loch Ettiff, and this falls into the weſt ſea, oppoſite to the iſle of Mull: all theſe abound with excellent trout and ſalmon. For a deſcription of the other diviſions of Argyleſhire, ſee Kintyre, &c.

ARGYROPOEIA, among alchemiſts, a pretended art of tranſmuting or changing other metals into ſilver.

ARGYRUNTUM, a maritime town of Illyria, (Ptolemy, Pliny). Now Novigrad, a town of Dalmatia. E. Long. 17. 30. Lat. 44. 30.

ARHUSEN, a dioceſe of North Jutland in Denmark, to the ſouth of Wiburg, about 60 miles in length, and 30 in breadth. It contains two capital cities, called *Arhuſen* and *Rander*; beſides ſeveral market-towns of leſs note, and upwards of 300 villages. Arhuſen, one of the capitals, is advantageouſly ſituated on the coaſt of the Baltic Sea, at the mouth of the river Guda, which runs through it; and it is ſurrounded with foreſts full of game. E. Long. 10. 0. W. Lat. 56. 10.

ARIADNÆA, in Grecian antiquity, two feſtivals at Naxos, in honour of two women named *Ariadne*. One of them being the daughter of king Minos, they had, in the ſolemnity dedicated to her, a ſhew of ſorrow and mourning; and, in memory of her being left by Theſeus near the time of child-birth, it was uſual for a young man to lie down and counterfeit all the agonies of a woman in labour. This feſtival is ſaid to be firſt inſtituted by Theſeus, to atone for his ingratitude to that princeſs.—The other Ariadne was thought to be of a gay and ſprightly temper; and therefore her feſtival was obſerved with muſic and other expreſſions of mirth and joy.

ARIADNE, daughter of Minos king of Crete. Theſeus being ſent to deſtroy the Minotaur *, Ariadne was ſo taken with him, that, as a teſtimony of her love, ſhe gave Theſeus a clue of thread to guide him out of the labyrinth. Theſeus, having killed the Minotaur, carried off the Athenians he had relieved, together with Ariadne; whom, however, he afterward forſook.

ARIANO, a town of Italy, in the kingdom of Naples, in the Ulterior Principality, with a biſhop's ſee. E. Long. 15. 19. N. Lat. 41. 8.

ARIANS, in church-hiſtory, a Chriſtian ſect, followers of Arius *. Their principles, according to Spanheim, were, That Chriſt is only called *God* by way of title; that he is leſs than the Father, who alone is eternal, and without beginning; that he is a creature, having had a beginning of exiſtence, and having no being before the beginning of all things: hence he was made God, and the Son of God by adoption, not by nature: that the Word was alſo ſubject to change; that the Father created all things by him as an inſtrument; and that he was the moſt excellent of all creatures: that the eſſence of the Father was different from the eſſence of the Son, neither was he coequal, nor con-ſubſtantial, with the Father: that the Holy Ghoſt was not God, but the creature of the Son, inferior in dignity to the Father and Son, and coworker in the creation.—In their doxology, the Arians aſcribed *Glory to the Father, through the Son, in the Holy Ghoſt.*

ARIAS MONTANUS, a learned Spaniſh divine, employed by Philip II. of Spain to publiſh another edition of the Bible, after that of cardinal Ximenes; which he finiſhed with applauſe, and died at Seville in 1598.

ARICA, a port-town of South America, in the province of Los Charaes, in Peru. It was formerly a conſiderable place: but the earthquakes, which are frequent here, have almoſt entirely ruined it; for there are no more than 150 families, which are moſt of them blacks, mulattoes, and Indians. Moſt of the houſes are made with canes or reeds, ſet upright, and bound together with cords or thongs; and as it never rains here, they are covered only with mats, which makes the place look at a diſtance like a heap of ruins.

The vale of Arica is about a league wide, and ſix leagues long, next the ſea, and is all a barren country, except the ſpot where the old town ſtood, which is divided into little meadows of clover graſs, and plots for ſugar-canes, with a few olive and cotton trees intermixt. This vale grows narrower as it runs eaſtward; and a league up there is a village, where they begin to cultivate pimento or Jamaica pepper, which is planted throughout all the reſt of the vale; and there are ſeveral farms, which produce nothing elſe, that bring in the

* See the article *Attica*.

* See *Arius*.

the value of 80,000 crowns yearly. The Spaniards of Peru are ſo uſed to this pepper, that they dreſs no proviſions without it. W. Long. 70. 15. S. Lat. 18. 26.

ARICONIUM, a town of the Silures, (Antonine); now Hereford, (Camden). W. Long. 2. 42. Lat. 52. 6.

ARIDAS, a kind of taffety, manufactured in the Eaſt Indies from a ſhining thread which is got from certain herbs, whence they are ſtyled *aridas of herbs*.

ARIDULLAM, in natural hiſtory, a kind of zarnich found in the Eaſt Indies. See ZARNICH.

ARIES, in zoology. See OVIS.

ARIES, in aſtronomy, a conſtellation of fixed ſtars, drawn on the globe, in the figure of a ram. It is the firſt of the twelve ſigns of the zodiac, from which a twelfth part of the ecliptic takes its denomination.

ARIMANIUS, the evil god of the ancient Perſians. The Perſian Magi held two principles; a good dæmon or god, and an evil one; the firſt the author of all good, and the other of all evil: the former they ſuppoſed to be repreſented by light, and the latter by darkneſs, as their trueſt ſymbols. The good principle they named *Yezad* or *Yezdan*, and *Ormozd* or *Hormizda*, which the Greeks wrote *Oromaſdes*; and the evil dæmon they called *Ahriman*, and the Greeks *Arimanius*. Some of the Magians held both theſe principles to have been from all eternity: but this ſect was reputed heterodox; the original doctrine being, that the good principle only was eternal, and the other created.—Plutarch * gives the following account of the Magian traditions in relation to theſe gods and the introduction of evil into the world, *viz.* That Oromazes conſiſted of moſt pure light, and Arimanius of darkneſs; and that they were at war with each other: that Oromazes created ſix gods; the firſt, the author of benevolence; the ſecond, of truth; the third, of juſtice, riches, and the pleaſure which attends good actions; and that Arimanius made as many, who were the authors of the oppoſite evils, or vices: that then Oromazes, triplicating himſelf, removed as far from the ſun as the ſun is from the earth, and adorned the heaven with ſtars, appointing the dog-ſtar for their guardian and leader: that he alſo created 24 other gods, and incloſed them in an egg; but Arimanius having alſo made an equal number, theſe laſt perforated the egg, by which means evil and good became mixed together. However, the fatal time will come, when Arimanius, the introducer of plagues and famine, muſt be of neceſſity utterly deſtroyed by the former, and annihilated; then the earth being made plain and even, mankind ſhall live in a happy ſtate, in the ſame manner, in the ſame political ſociety, and uſing one and the ſame language. Theopompus writes, that, according to the Magians, the ſaid two gods, during the ſpace of 3000 years, alternately conquer, and are conquered; that for other 3000 years, they will wage mutual war, fight, and deſtroy the works of each other, till at laſt Hades (or the evil ſpirit) ſhall periſh, and men become perfectly happy, their bodies needing no food, nor caſting any ſhadow, i. e. being perfectly tranſparent.

ARIMASPI, (Pliny), a people of Sarmatia Europea, to the ſouth of the Montes Riphæi, ſaid by Mela to have but one eye; a fable broached by Ariſteas Proconneſius, according to Herodotus.

ARIMINUM, a town of Umbria, or Romagna, at the mouth of the Ariminus, on the Gulf of Venice. The ſeizing on it by Cæſar gave riſe to the civil war. Now called *Rimini*. E. Long. 13. 30. Lat. 44. 8.

ARION, an excellent muſician and poet, inventor of dithyrambics. Periander entertained him at his court, where getting an eſtate, and returning to Corinth, the ſailors, for lucre of his money, threw him into the ſea; when, according to the poets, a dolphin, charmed with his muſic, took him on her back and carried him ſafe to ſhore.

ARION, an admirable horſe, much more famous in poetic hiſtory than Bucephalus in that of Alexander. Authors ſpeak variouſly of his origin, tho' they agree in giving him a divine one. His production is moſt commonly aſcribed to Neptune. This god, according to ſome, raiſed him out of the ground by a ſtroke of his trident; according to others, he begot him upon the body of the fury Erynnys; according to others, upon that of Ceres, whom he raviſhed in the form of a horſe, ſhe having previouſly aſſumed the form of a mare to elude his purſuit. This horſe was nurſed by the Nereids; and being ſometimes yoked with the ſea-horſes of Neptune to the chariot of this god, he drew him with incredible ſwiftneſs through the ſea. He had this ſingularity in him, that his right feet reſembled thoſe of a man. Neptune gave him to Capreus king of Haliartus. Capreus made a preſent of him to Hercules; who mounted him when he took the city of Elis, gained the prize with him in the race againſt Cygnus the ſon of Mars near Træcena, and at laſt made a preſent of him to Adraſtus. It is under this laſt maſter that Arion has ſignalized himſelf the moſt: he won the prize for racing at the Nemean games, which the princes who went to beſiege Thebes inſtituted in the honour of Archemorus; and was the cauſe that Adraſtus did not periſh in this famous expedition, as all the other chiefs did.

ARIOSTO (Lodovico), the famous Italian poet, and author of Orlando Furioſo, was born at the caſtle of Reggio in Lombardy in 1474. His father, who was major-domo to duke Hercules, lived to the extent of his fortune, ſo left but little at his death. Arioſto, from his childhood, ſhewed great marks of genius, eſpecially in poetry; and wrote a comedy in verſe on the ſtory of Pyramus and Thiſbe, which his brothers and ſiſters played. His father being utterly unlearned, and rather regarding profit than his ſon's inclination, compelled him to ſtudy the civil law, in which having plodded ſome years to no purpoſe, he quitted it for more pleaſing ſtudies; yet often lamented, as Ovid and Petrarch did before him, and our own Milton ſince *, that his father baniſhed him from the muſes. At the age of 24, Arioſto loſt his father, and found himſelf perplexed with family-affairs. However, in about ſix years he was, for his good parts, taken into the ſervice of Don Hippolito, cardinal of Eſte. At this time he had written nothing but a few ſonnets; but now he reſolved to make a poem, and choſe Bayardo's *Orlando Inamorato* for a ground-work. However, he was prevented writing for a great many years, and was choſen as a fit perſon to go on an embaſſy to Pope Julio II. where he gave ſuch ſatisfaction, that he was ſent again, underwent many dangers and difficulties, and at his return was highly favoured. Then, at his leiſure, he again applied himſelf to his poem: but, ſoon after, he incurred the cardinal's diſpleaſure for refuſing to accompany him into Hungary; by which he was ſo diſcouraged, that he deferred writing for 14 years, even till the cardinal's death. After that, he finiſhed by degrees, in great perfection, that which he began with great expectation. Duke Aſtolfo offered him great promotions if he would ſerve him; but, preferring liberty to grandeur, he refuſed this and other great offers from princes and cardinals, particularly from Leo X. from all whom he received notwithſtanding great preſents. The duke of Ferrara delighted ſo much in his comedies, of which he wrote five, that he built a ſtage on purpoſe to have them played in his court, and enabled our poet to build himſelf a houſe in Ferrara, with a pleaſant garden, where he uſed to compoſe his poems, which were highly eſteemed by all the princes in Italy, who ſent him many preſents; but he ſaid, "he would not ſell his liberty for the beſt cardinal's hat in Rome." It was but a ſmall, though convenient houſe: being aſked, why he had not built it in a more magnificent manner, ſince he had given ſuch noble deſcriptions of ſumptuous palaces, beautiful porticos, and pleaſant fountains, in his Orlando Furioſo? He replied, that words were cheaper laid together than ſtones. Upon the door was the following inſcription:

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* De Iſide et Oſiride, p. 369.

* See hi tin poe *Ad Pa*

Parva, ſed apta mihi, ſed nulli obnoxia, ſed non
Sordida, parta meo ſed tamen ære, domus.

Which Mr Harrington thus tranſlates:

This houſe is ſmall, but fit for me, but hurtful unto none;
But yet not ſluttiſh, as you ſee, yet paid for with mine own.

In his diet he was temperate, and ſo careleſs of dainties, that he was fit to have lived in the world when they fed upon acorns. Whether he was ever married, is uncertain. He kept company with one Alexandria, to whom, it was reported, he was married privately, and a lady Genevera, whom he ſlily mentions in the 24th book of his Orlando, as poets are apt to intermix with their fictions ſome real amours of their own. He was urged to go ambaſſador to pope Clement, but would by no means accept this embaſſy. He tranſlated the *Menecmi* of Plautus: and all his own comedies were ſo eſteemed, that they were frequently acted by perſons of the firſt quality; and when his Lena was firſt repreſented, Ferdinand of Eſte, afterwards Marquis of Maſſa, ſo far honoured the piece as to ſpeak the prologue. He began one of his comedies in his father's lifetime, when the following incident ſhews the remarkable talent he had for poetry. His father one day rebuked him ſharply, charging him with ſome great fault; but all the while he returned him no anſwer. Soon after, his brother began on the ſame ſubject; but he eaſily refuted him, and, with ſtrong arguments, juſtified his own behaviour. "Why then, ſaid his brother, did you not ſatisfy my father?" "In truth, ſaid Lodovico, I was thinking of a part in my comedy, and methought my father's ſpeech to me was ſo ſuited to the part of an old man chiding his ſon, that I forgot I was concerned in it myſelf, and conſidered it only to make it part of my play." It is alſo reported of Arioſto, that, coming by a potter's ſhop, he heard him ſinging a ſtave out of his Orlando, with ſo bad a grace, that, out of all patience, he broke with his ſtick ſeveral of his pots. The potter, in a pitiful tone, aſking what he meant by wronging a poor man that had never injured him. "You raſcal, (he replied), I have not done thee half the wrong thou haſt done me: for I have broken but two or three pots of thine, not worth ſo many halfpence; whereas thou haſt broken and mangled a ſtanza of mine worth a mark of gold."

Arioſto was tall, of a melancholy complexion, and ſo abſorbed in ſtudy and meditation, that he often forgot himſelf. His picture was drawn by Titian in a maſterly manner. He was honoured with the laurel by the hands of the emperor Charles V. He was naturally affable, always aſſuming leſs than was his due, yet never putting up a known injury even from his ſuperiors. He was ſo fearful on the water, that, whenever he went out of a ſhip, he would ſee others go before him; and, on land, he would alight from his horſe on the leaſt apprehenſion of danger. He was of an amorous diſpoſition, and left two natural ſons. He enjoyed the friendſhip of the moſt eminent men of learning of his time, moſt of whom he mentions with great reſpect in the laſt canto of his Orlando Furioſo. His conſtitution was but weakly, ſo that he was obliged to have recourſe to phyſicians the greateſt part of his life. He bore his laſt ſickneſs with great reſolution and ſerenity; and died at Ferrara the 8th of July, 1533, according to Sir John Harrington, being then fifty-nine years of age. He was interred in the church of the Benedictine monks, who, contrary to their cuſtom, attended his funeral. He had a buſt erected to him, and the following epitaph, written by himſelf, inſcribed upon his tomb:

Ludovici Arioſti humantur oſſa
Sub hoc marmore, ſeu ſub hac humo, ſeu
Sub quidquid voluit benignus hæres,
Sive hærede benignior comes, ſeu
Opportunius incidens viator:
Nam ſcire haud potuit futura: ſed nec
Tanti erat, vacuam ſibi cadaver
Ut urnam cuperet parare.
Vivens iſta tamen ſibi paravit,
Quæ ſcribi voluit ſuo ſepulchro,
Olim ſi quod haberet id ſepulchrum:
Ne cum ſpiritus hoc brevi peracto
Præſcripto ſpatio miſellos artus,
Quos ægre ante reliquerat, repoſcet,
Hac et hac cinerem huc et huc revellem
Dum noſcat proprium, diu vagetur.

ARIPO, a ſtrong town of Aſia, on the weſtern coaſt of the iſland of Ceylon, at the mouth of the river Sarunda. It belongs to the Dutch; and to the eaſt of it is a bank, where they fiſh for pearls. E. Long. 80. 25. N. Lat. 8. 42.

ARISH, a Perſian long meaſure, containing about 38 Engliſh inches.

ARISI, the Indian name for the plant which produces the rice. See ORYSA.

ARISTA, or AWN, among botaniſts, a long needle-like beard, which ſtands out from the huſk of a grain of corn, graſs, &c.

ARISTÆUS, ſon of Apollo and Cyrene, whom, for the many ſervices he had rendered to mankind by his knowledge of all profitable arts, the gods placed amongſt the ſtars; ſo that he is the Aquarius in the zodiac. The reſemblance of his hiſtory to that of Moſes has been curiouſly diſcuſſed by Huetius.

ARISTANDER, a famous ſoothſayer under Alexander the Great, over whom he gained a wonderful influence by the good ſucceſs of his art. He had already had the ſame employment at the court of king Philip; and it was he who explained better than his brethren the dream that this prince had after having married Olympias.

ARISTARCHUS, a Grecian philoſopher of Samos, one of the firſt that maintained that the earth turns upon its own centre. We are not ſure of the age in which he lived; and have none of his works but a *Treatiſe of the greatneſs and diſtance of the Sun and Moon*, tranſlated into Latin by Frederic Commandine, and publiſhed with Pappus's explanations in 1572.

ARISTARCHUS, a celebrated grammarian, much eſteemed by Ptolemy Philometor, who committed to him the education of his ſon. He applied himſelf chiefly to criticiſm, and made a reviſal of Homer's poems, but in too magiſterial a way; for ſuch verſes as he did not like he treated as ſpurious. He commented on other poets; Cicero and Horace made uſe of his name to expreſs a very rigid critic.

ARISTIDES, ſurnamed the *Juſt*, flouriſhed at Athens at the ſame time with Themiſtocles, who triumphed over him by his boiſterous eloquence, and got him baniſhed, 483 years before Chriſt *: but Ariſtides being recalled a ſhort time after, would never join with the enemies of Themiſtocles, to get him baniſhed; for nothing could make him deviate from the ſtricteſt rules of moderation and juſtice. Ariſtides brought the Greeks to unite againſt the Perſians; diſtinguiſhed himſelf at the famous battle of Marathon, and that of Salamine and Platea; and eſtabliſhed an annual income of 460 talents for a fund to ſupply the expences of war. This great man died ſo poor, though he had the management of the revenues of Greece, that the ſtate was obliged to pay his funeral expences, to give fortunes to his daughters in marriage, and a maintenance to his ſon Lyſimachus.

ARISTIDES of Miletus, a famous Greek author, often cited by the ancients.

ARISTIDES, a very eloquent Athenian orator, who became a convert to the Chriſtian religion, and about the year 124 preſented to the emperor Adrian an apology for the Chriſtians.

ARISTIDES (Ælius), a celebrated orator, born in Myſia, about 129 years before the Chriſtian æra. The beſt edition of his works is that of Oxford, printed in Greek and Latin, in two volumes quarto.

ARISTIDES, a painter cotemporary with Apelles, flouriſhed at Thebes about the 122d Olympiad. He is ſaid to have been the firſt who attempted to delineate the paſſions of the mind in colours. His Bacchus was ſo excellent a piece, as to become proverbial.

ARISTIPPUS, the founder of the Cyrenaic ſect of philoſophy, was the ſon of Aretades, and born at Cyrene in Libya. He flouriſhed about the 96th Olympiad. The great reputation of Socrates induced him to leave his own country, and remove to Athens, that he might have the ſatisfaction of hearing his diſcourſes. He was chiefly delighted with thoſe diſcourſes of Socrates that related the moſt to pleaſure; which he aſſerted to be the ultimate end in which all happineſs conſiſts. His manner of life was agreeable to his opinion; for he indulged himſelf extremely in all the luxuries of dreſs, wine, and women. Though he had a good eſtate, and three country-ſeats, yet he was the only one of the diſciples of Socrates who took money for teaching; which being obſerved by the philoſopher, he aſked Ariſtippus, How he came to have ſo much? Who in reply aſked him, How he came to have ſo little? Upon his leaving Socrates, he went to Ægina, as Athenæus informs us, where he lived with more freedom and luxury than before. Socrates ſent frequent exhortations to him, in order to reclaim him; but all in vain: and with the ſame view he publiſhed that diſcourſe which we find in Xenophon. Here Ariſtippus became acquainted with Lais, the famous courtezan of Corinth; for whoſe ſake he took a voyage to that city. He continued at Ægina till the death of Socrates, as appears from Plato's *Phædo*, and the epiſtle which he wrote upon that occaſion. He returned at laſt into his own country Cyrene, where he profeſſed philoſophy, and inſtituted a ſect which, as we obſerved above, was called the *Cyrenaic*, from the place, and by ſome writers the *Hedonic* or voluptuous, from its doctrines. During the height of the grandeur of Dionyſius the Sicilian tyrant, a great many philoſophers reſorted to him; and among the reſt Ariſtippus, who was tempted thither by the magnificence of that court. Dionyſius aſking him the reaſon of his coming, he replied, "That it was in order to give what he had, and to receive what he had not:" or, as others repreſent it, "That when he wanted wiſdom, he went to Socrates; but now as he wanted money, he was come to him." He very ſoon inſinuated himſelf into the favour of Dionyſius; for, being a man of a ſoft eaſy temper, he conformed himſelf exactly to every place, time, and perſon, and was a complete maſter of the moſt refined complaiſance.

We have ſeveral remarkable paſſages concerning him during his reſidence at that court mentioned by Diogenes Laertius. Dionyſius, at a feaſt, commanded that all ſhould put on womens purple habits, and dance in them. But Plato refuſed, repeating theſe lines:

> I cannot in this gay effeminate dreſs
> Diſgrace my manhood, or my ſex betray.

But Ariſtippus readily ſubmitted to the command, and made this reply immediately:

> —— At feaſts, where mirth is free,
> A ſober mind can never be corrupted.

At another time, interceding with Dionyſius in behalf of a friend, but not prevailing, he caſt himſelf at his feet: being reproved by one for that exceſs of humility, he replied, "That it was not he who was the cauſe of that ſubmiſſion; but Dionyſius, whoſe ears were in his feet." Dionyſius ſhewed him three beautiful courtezans, and ordered him to take his choice. Upon which, he took them all three away with him, alleging that Paris was puniſhed for preferring one to the other two: but when he had brought them to his door, he diſmiſſed them, in order to ſhew that he could either enjoy or reject with the ſame indifference. Having deſired money of Dionyſius, the latter obſerved to him, that he had aſſured him a wiſe man wanted nothing. "Give me (ſays he) what I aſk, and we will talk of that afterwards." When Dionyſius had given it him, "Now (ſays he), you ſee I do not want." By this complaiſance he gained ſo much upon Dionyſius, that he had a greater regard for him than for all the reſt of the philoſophers, though he ſometimes ſpoke with ſuch freedom to that king, that he incurred his diſpleaſure. When Dionyſius aſked, Why philoſophers haunted the gates

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* See *Oſtraciſm*.

of rich men, but not rich men thoſe of philoſophers? he replied, "Becauſe the latter know what they want, and the others not." Another time, Dionyſius repeating (out of Sophocles, as Plutarch affirms, who aſcribes this to Zeno) theſe verſes,

> He, that with tyrants ſeeks for bare ſupport,
> Enſlaves himſelf, though free he came to court;

he immediately anſwered,

> He is no ſlave, if he be free to come.

Diocles, as Laertius informs us, related this in his *Lives of the Philoſophers;* though others aſcribe this ſaying to Plato. Ariſtippus had a conteſt with Antiſthenes the Cynic philoſopher; notwithſtanding which, he was very ready to employ his intereſt at court for ſome friends of Antiſthenes, to preſerve them from death, as we find by a letter of his to that philoſopher. Diogenes followed the example of his maſter Antiſthenes in ridiculing Ariſtippus, and called him the *court-ſpaniel.*

We have many apophthegms of his preſerved. Suidas obſerves, that he ſurpaſſed all the philoſophers in the the acuteneſs of his apopthegms. Being once railed at, he left the room; and the perſon who abuſed him, following him, and aſking him why he went away, he anſwered, "Becauſe it is in your power to rail, but it is not in my power not to hear you." A perſon obſerving, that the philoſophers frequented the houſes of rich men; "Why (ſays he), the phyſicians frequent the chambers of the ſick, yet that is no reaſon why a man ſhould rather chuſe to lie ſick than be cured." To one who boaſted of his great reading, he ſaid, "That as they who feed and exerciſe moſt are not always more healthy than they who only eat and exerciſe to ſatisfy nature; ſo neither they who read much, but they who read no more than is uſeful, are truly learned." Among other inſtructions which he gave to his daughter Arete, he adviſed her particularly to deſpiſe ſuperfluity. To one who aſked him what his ſon would be the better for being a ſcholar? "If for nothing elſe (ſaid he), yet for this alone, that when he comes into the theatre, one ſtone will not ſit upon another." When a certain perſon recommended his ſon to him, he demanded 500 drachmas; and upon the father's replying, that he could buy a ſlave for that ſum, "Do ſo (ſaid he), and then you'll be maſter of a couple." Being reproached, becauſe, having a ſuit of law depending, he fee'd a lawyer to plead for him, "Juſt ſo (ſaid he), when I have a great ſupper to make, I always hire a cook." Being aſked what was the difference between a wiſe man and a fool, he replied, "Send both of them together naked to thoſe who are acquainted with neither of them, and then you'll know." Being reproved by a certain perſon (who, according to Mr Stanley, was Plato) for his coſtly and voluptuous feaſts, "I warrant you (ſaid he), that you would not have beſtowed three farthings upon ſuch a dinner;" which the other confeſſing, "Why, then (ſaid he) I find myſelf leſs indulgent to my palate, than you are to your covetous humour;" or, as it is otherwiſe repreſented, "I find, that I love my belly, and you love your money." When Simus, treaſurer to Dionyſius, ſhewed him his houſe magnificently furniſhed, and paved with coſtly marble, (for he was a Phrygian, and conſequently profuſe); Ariſtippus ſpit in his face: upon which the other growing angry, "Why, truly (ſaid he), I could not find a fitter place." His ſervant carrying after him a great weight of money, and being ready to ſink upon the road under his burden, he bid him throw away all what was too much for him to carry. Horace mentions this fact in his third ſatire of the ſecond book:

> Quid ſimile iſti
> Græcus Ariſtippus? qui ſervos projicere aurum
> In media juſſit Libya, quia tardius irent
> Propter onus ſegnes.

Being aſked, what things were moſt proper for children to be inſtructed in? he anſwered, "Thoſe which might prove of the greateſt advantage to them when they came to be men." Being reproached for going from Socrates to Dionyſius, he replied, "That he went to Socrates when he wanted ſerious inſtruction, and to Dionyſius for diverſion." Having received money of Dionyſius at the ſame time that Plato accepted a book only, and being reproached for it, "The reaſon is plain (ſays he), I want money, and Plato wants books." Having loſt a conſiderable farm, he ſaid to one who ſeemed exceſſively to compaſſionate his loſs, "You have but one field; I have three left: why ſhould not I rather grieve for you?" Plutarch, who relates this in his book *De Tranquillitate Animi*, obſerves upon it, that it is very abſurd to lament for what is loſt, and not to rejoice for what is left. When a perſon told him, "That the land for his ſake was loſt," he replied, "That it was better ſo, than that he ſhould be loſt for the land." Being caſt by ſhipwreck aſhore on the iſland of Rhodes, and perceiving mathematical ſchemes and diagrams drawn upon the ground, he ſaid, "Courage, friends; for I ſee the footſteps of men."

After he had lived a long time with Dionyſius, his daughter Arete ſent to him, to deſire his preſence at Cyrene, in order to take care of her affairs, ſince ſhe was in danger of being oppreſſed by the magiſtrates. But he fell ſick in his return home, and died at Lipara, an Æolian iſland. With regard to his principal opinions; like Socrates, he rejected the ſciences as they were then taught, and pretended that logic alone was ſufficient to teach truth and fix its bounds. He aſſerted, that pleaſure and pain were the criterions by which we were to be determined; that theſe alone made up all our paſſions; that the firſt produced all the ſoft emotions, and the latter all the violent ones. The aſſemblage of all pleaſure, he aſſerted, made true happineſs, and that the beſt way to attain this was to enjoy the preſent moments. He wrote a great many books: particularly the Hiſtory of Libya, dedicated to Dionyſius; ſeveral Dialogues; and four books Of the Luxury of the Ancients. There are four epiſtles of his extant in the Socratic Collection publiſhed by Leo Allatius.

Beſides Arete his daughter, whom he educated in philoſophy, Ariſtippus had alſo a ſon, whom he diſinherited for his ſtupidity. Arete had a ſon, who was named *Ariſtippus* from his grandfather, and had the ſurname of Μητροδιδακτος from his mother's inſtructing him in philoſophy. Among his auditors, beſides his daughter Arete, we have an account of Æthiops of Ptolemais, and Antipater of Cyrene. Arete communicated the philoſophy, which ſhe received from her father, to her ſon Ariſtippus, who tranſmitted it to Theodorus *the Atheiſt*, who inſtituted the ſect called *Theodorean*. Antipater communicated the philoſophy of Ariſtippus to Epitimedes his diſciple; Epitimedes to Paræbates; Paræbates to Hegeſias and Anniceris; and theſe two laſt, improving it by ſome additions of their own, obtained the honour each of them of giving a name to the *Hegeſiac* and *Anniceriaian* ſect.

Laertius mentions two other perſons of the name of Ariſtippus; one, who wrote the Hiſtory of Arcadia; the other, a philoſopher of the New Academy.

ARISTO, a Stoic philoſopher, the diſciple of Zeno the chief of the Stoics, flouriſhed about 290 years before the Chriſtian æra. He differed but little from his maſter Zeno. He rejected logic as of no uſe, and natural philoſophy as being above the reach of the human underſtanding. It is ſaid, that being bald, the ſun burnt his head; and that this cauſed his death.—There is a ſaying of his recorded, which might render the doctrine of Ariſtippus leſs odious than it ordinarily is; (ſee ARISTIPPUS). He uſed to ſay, "That a philoſopher might do thoſe of his hearers a prejudice who put a wrong interpretation upon good meanings; as for example, that the ſchool of Ariſtippus might ſend out debauchees, and that of Zeno Cynics:" which ſeems to imply, that the doctrine of this philoſopher never produced this effect but when it was miſunderſtood. He ſhould alſo have added, that every teacher is therefore obliged to forbear laying down ambiguous maxims, or to prevent falſe gloſſes being put upon them.

ARISTO (Titus), a Roman lawyer, perfect maſter of the public and civil law, of hiſtory and antiquity. The Pandects mention ſome books of his, as does Aulus Gellius.—He was cotemporary with Pliny the younger, who gives him a noble character, and had a moſt tender friendſhip for him. See *Plinii Epiſt.* lib. i. ep. 22.

ARISTOCRACY, a form of government where the ſupreme power is veſted in the principal perſons of the ſtate. See GOVERNMENT.

ARISTOGITON, a famous Athenian, who, with Armodius, killed Hipparchus, tyrant of Athens, about 513 years before the Chriſtian æra. The Athenians erected a ſtatue to him.

ARISTOLOCHIA, BIRTHWORT; a genus of the hexandria order, belonging to the gynandria claſs of plants.

Species. Of this genus there are 21 different ſpecies; but only the four following merit deſcription. 1. The rotunda, is a native of the ſouth of France, of Spain, and Italy, from whence the roots are brought for medicinal uſe. The roots are roundiſh, grow to the ſize of ſmall turnips, being in ſhape and colour like the roots of cyclamens, which are frequently ſold inſtead of them. This ſort hath three or four weak trailing branches, which lie on the ground when they are not ſupported, and extend two feet in length; the leaves are heart-ſhaped and rounded at their extremity; the flowers come out ſingly at every leaf, toward the upper part of the ſtalk. They are of a purpliſh black colour; and are frequently ſucceeded by oval ſeed-veſſels, having ſix cells, full of flat ſeeds. 2. The longa, is a native of the ſame countries. This ſpecies hath long taproots like carrots; the branches are weak and trailing, extending little more than a foot; the flowers come out from the wings of the leaves like the other, are of a pale purple colour, and are frequently ſucceeded by ſeed-veſſels like the other. 3. The ſerpentaria, is a native of Virginia and Carolina, from whence the *radix ſerpentariæ*, ſo much uſed in medicine, is brought over. The plant riſes out of the ground in one, two, and ſometimes three pliant ſtalks, which at every little diſtance are crooked or undulated. The leaves ſtand alternately, and are about three inches long, in form ſomewhat like the ſmilax aſpera. The leaves grow cloſe to the ground on footſtalks an inch long, of a ſingular ſhape, and of a dark purple colour. A round canulated capſule ſucceeds the flower. It is filled with ſeeds, which are ripe in May. The uſual price of the root when dried is 6 d. per pound, both in Virginia and Carolina, which is money hardly earned; yet the negro ſlaves employ great part of the time allowed them by their maſters in ſearch of it, which is the reaſon that there are ſeldom found any but very ſmall plants of this ſpecies. When they are planted in gardens in thoſe countries where they are natives, the plants increaſe ſo much in two years time, that the hand can ſcarce graſp the ſtalks of a ſingle one. This ſpecies delights in woods, and is uſually found near the roots of great trees. 4. The indica, or contrayerva of Jamaica, is a native of that iſland, where its roots are uſed inſtead of the true contrayerva. It hath long trailing branches, which climb upon the neighbouring plants, and ſometimes riſe to a conſiderable height. The flowers are produced in ſmall cluſters towards the upper part of the ſtalks, which are of a dark purple colour.

Culture. The firſt, ſecond, and third ſorts are propagated from ſeeds, which ſhould be ſown in the autumn, in pots filled with light freſh earth, and placed under a frame to preſerve them from the froſt. If they are plunged into a gentle hot-bed in the month of March, the plants will come up the ſooner. In ſummer, and in autumn when the ſtalks begin to decay, they muſt be watered. In winter they muſt be again ſheltered; and in March, before the roots begin to ſhoot, they muſt be tranſplanted into ſmall ſeparate pots filled with light earth, when they may be removed into the open air, and treated as before. The next ſpring, they may be planted in the open air in a warm border; where, in the autumn, when their ſtalks decay, if the border is covered with old tanners bark to keep out the froſt, the roots will be ſecured; but where this care is not taken, they will frequently be killed by the froſt. The fourth is tender; and therefore muſt be kept in a ſtove during the winter, or it will not live in England.

Medicinal Uſes. The roots of the long and round ſorts, on being firſt chewed, ſcarce diſcover any taſte, but in a little time prove nauſeouſly bitteriſh; the long ſomewhat the leaſt ſo. The other ſort inſtantly fills the mouth with an aromatic bitterneſs, which is not ungrateful. Their medical virtues are, to heat, ſtimulate, attenuate viſcid phlegm, and promote the fluid ſecretions in general; they are principally celebrated in ſuppreſſions of female evacuations. The doſe in ſubſtance is from a ſcruple to two drams. The long ſort is recommended externally for cleanſing and drying wounds and ulcers, and in cutaneous diſeaſes.

The root of the ſerpentaria is ſmall, light, buſhy, and conſiſts of a number of ſtrings or fibres, matted together, iſſuing from one common head; of a browniſh colour on the outſide, and paler or yellowiſh within. It has an aromatic ſmell, like that of valerian, but more agreeable; and a warm, bitteriſh, pungent taſte. This root is a warm diaphoretic and diuretic; it has been greatly celebrated as an alexipharmac, and eſteemed one of the principal remedies in malignant fevers and epidemic diſeaſes. In theſe intentions, it is given in ſubſtance from 10 to 30 grains; and in infuſion, to a dram or two. Both watery and ſpirituous menſtrua extract its virtue by infuſion, and elevate ſome ſhare of its flavour in diſtillation; along with the water a ſmall portion of eſſential oil ariſes.

ARISTOMENES, a general of the Meſſenians, renowned for his valour and virtue *.

ARISTOPHANES, a celebrated comic poet of Athens. He was cotemporary with Plato, Socrates, and Euripides; and moſt of his plays were written during the Peloponneſian war. His imagination was warm and lively, and his genius particularly turned to raillery: he had alſo great ſpirit and reſolution; and was a declared enemy to ſlavery, and to all thoſe who wanted to oppreſs their country. The Athenians ſuffered themſelves in his time to be governed by men who had no other views than to make themſelves maſters of the commonwealth. Ariſtophanes expoſed the deſigns of theſe men, with great wit and ſeverity, upon the ſtage. Cleo was the firſt whom he attacked, in his comedy of the *Equites*; and as there was not one of the comedians who would venture to perſonate a man of his great authority, Ariſtophanes played the character himſelf, and with ſo much ſucceſs, that the Athenians obliged Cleo to pay a fine of five talents, which were given to the poet. He deſcribed the affairs of the Athenians in ſo exact a manner, that his comedies are a faithful hiſtory of that people. For this reaſon, when Dionyſius king of Syracuſe deſired to learn the ſtate and language of Athens, Plato ſent him the comedies of Ariſtophanes, telling him, theſe were the beſt repreſentation thereof. He wrote above 50 comedies; but there are only 11 extant which are perfect: theſe are, Plutus, the Clouds, the Frogs, Equites, the Acharnenſes, the Waſps, Peace, the Birds, the Eccleſiazuſæ or Female Orators, the Theſmophoſiazuſæ or Prieſteſſes of Ceres, and Lyſiſtrata. The *Clouds*, which he wrote in ridicule of Socrates *, is the moſt celebrated of all his comedies: Madam Dacier tells us, ſhe was ſo much charmed with this performance, that after ſhe had tranſlated it, and read it over 200 times, it did not become the leaſt tedious to her, which ſhe could not ſay of any other piece; and that the pleaſure which ſhe received from it was ſo exquiſite, that ſhe forgot all the contempt and indignation which Ariſtophanes deſerved for employing his wit to ruin a man, who was wiſdom itſelf, and the greateſt ornament of the city of Athens. Ariſtophanes, having conceived ſome averſion to the poet Euripides, ſatirizes him in ſeveral of his plays, particularly in his *Frogs* and his *Theſmophoſiazuſæ*. He wrote his *Peace* in the 10th year of the Peloponneſian war, when a treaty for 50 years was concluded between the Athenians and the Lacedæmonians, though it continued but ſeven years. The *Acharnenſes* was written after the death of Pericles, and the loſs of the battle in Sicily, in order to diſſuade the people from intruſting the ſafety of the commonwealth to ſuch imprudent generals as Lamachus. Soon after, he repreſented his *Aves*, or Birds; by which he admoniſhed the Athenians to fortify Decelæa, which he calls by a fictitious name *Nephelococcygia*. The *Veſpæ*, or Waſps, was written after another loſs in Sicily, which the Athenians ſuffered from the miſconduct of Chares. He wrote the *Lyſiſtrata* when all Greece was involved in a war; in which comedy the women are introduced debating upon the affairs of the commonwealth, when they come to a reſolution, not to go to bed with their huſbands till a peace ſhould be concluded. His *Plutus*, and other comedies of that kind, were written after the magiſtrates had given orders that no perſon ſhould be expoſed by name upon the ſtage. He invented a peculiar kind of verſe, which was called by his name, and is mentioned by Cicero in his *Brutus*; and Suidas ſays, that he alſo was the inventor of the tetrameter and octameter verſe.

Ariſtophanes was greatly admired among the ancients, eſpecially for the true Attic elegance of his ſtyle. The time of his death is unknown; but it is certain he was living after the expulſion of the tyrants by Thraſybulus, whom he mentions in his Plutus and other comedies. There have been ſeveral editions and tranſlations of this poet. Nicodemus Friſchin, a German, famous for his claſſical knowledge, in the 16th century, tranſlated Plutus, the Clouds, the Frogs, the Equites, and the Acharnenſes, into Latin verſe. Quintus Septimus Florens rendered into Latin verſe the Waſps, the Peace, and Lyſiſtrata; but his tranſlation is full of obſolete words and phraſes. Madam Dacier publiſhed at Paris, in 1692, a French verſion of Plutus, and the Clouds, with critical notes, and an examination of them according to the rules of the theatre. Mr Lewis Theobald likewiſe tranſlated theſe two comedies into Engliſh, and publiſhed them with remarks. The moſt noble edition of this author is that publiſhed by Ludolphus Kuſter, at Amſterdam, in folio, in 1710, and dedicated to Charles Montague earl of Halifax.

ARISTOTLE, the chief of the Peripatetic philoſophers, born at Stagyra, a ſmall city in Macedon, in the 99th Olympiad, about 384 years before the birth of Chriſt. He was the ſon of Nicomachus, phyſician to Amyntas the grandfather of Alexander the Great. He loſt his parents in his infancy; and Proxenes, a friend of his father's, who had the care of his education, taking but little notice of him, he quitted his ſtudies, and gave himſelf up to the follies of youth. After he had ſpent moſt of his patrimony, he entered into the army: but not ſucceeding in this profeſſion, he went to Delphos to conſult the oracle what courſe of life he ſhould follow; when he was adviſed to go to Athens, and ſtudy philoſophy. He accordingly went thither about 18 years of age, and ſtudied under Plato till he was 37. By this time he had ſpent his whole fortune; and we are told that he got his living by felling powders, and ſome receipts in pharmacy. He followed his ſtudies with moſt extraordinary diligence, ſo that he ſoon ſurpaſſed all in Plato's ſchool. He eat little, and ſlept leſs; and, that he might not over-ſleep himſelf, Diogenes Laertius tells us, that he lay always with one hand out of the bed, having a ball of braſs in it, which, by its falling into a baſon of the ſame metal, awaked him. We are told, that Ariſtotle had ſeveral conferences with a learned Jew at Athens, and that by this means he inſtructed himſelf in the ſciences and religion of the Egyptians, and thereby ſaved

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* See the article Meſſenia.

See the ar- le crates.

Ariſtotle.

himſelf the trouble of travelling into Egypt. When he had ſtudied about 15 years under Plato, he began to form different tenets from thoſe of his maſter, who became highly piqued at his behaviour. Upon the death of Plato, he quitted Athens; and retired to Atarnya, a little city of Myſia, where his old friend Hermias reigned. Here he married Pythias, the ſiſter of this prince, whom he is ſaid to have loved ſo paſſionately, that he offered ſacrifice to her. Some time after, Hermias having been taken priſoner by Meranon the king of Perſia's general, Ariſtotle went to Mitylene the capital of Leſbos, where he remained till Philip king of Macedon, having heard of his great reputation, ſent for him to be tutor to his ſon Alexander, then about 14 years of age: Ariſtotle accepted the offer; and in eight years taught him rhetoric, natural philoſophy, ethics, politics, and a certain ſort of philoſophy, according to Plutarch, which he taught nobody elſe. Philip erected ſtatues in honour of Ariſtotle; and for his ſake rebuilt Stagyra, which had been almoſt ruined by the wars.

Ariſtotle having loſt the favour of Alexander by adhering to Caliſthenes his kinſman, who was accuſed of a conſpiracy againſt Alexander's life, he removed to Athens, where he ſet up his new ſchool. The magiſtrates received him very kindly; and gave him the Lycæum, ſo famous afterwards for the concourſe of his diſciples: here he taught, according to the cuſtom long eſtabliſhed, a public and a ſecret doctrine; and as he gave his lectures walking along among his auditors, his ſect aſſumed the name of *Peripatetic*. Here alſo it was, according to ſome authors, that he compoſed his principal works. Plutarch, however, tells us, that he had already wrote his books of phyſic, morals, metaphyſics, and rhetoric. The ſame author ſays, that Ariſtotle being piqued at Alexander, becauſe of the preſents he had ſent to Xenocrates, was moved with ſo much reſentment, that he entered into Antipator's conſpiracy againſt this prince. The advocates for Ariſtotle, however, maintain this charge to have been without foundation; that at leaſt it made no impreſſion on Alexander, ſince about the ſame time he ordered him to apply himſelf to the ſtudy of animals; and ſent him, in order to defray his expences, eight hundred talents, which amounts to four hundred and eighty thouſand crowns, beſides a great number of fiſhers and huntſmen to bring him all ſorts of animals.—When Ariſtotle was accuſed of impiety by one Eurymedon, a prieſt of Ceres, he wrote a large apology for himſelf, addreſſed to the magiſtrates: but knowing the Athenians to be extremely jealous in regard to their religion, and remembering the fate of Socrates, he was ſo much alarmed, that he retired to Chalcis, a city of Eubœa, where he ended his days. Some ſay he poiſoned himſelf, to avoid falling into the hands of his enemies; others affirm, that he threw himſelf into the Euripus, becauſe he could not comprehend the reaſon of its ebbing and flowing; and there are ſome who tell us he died of a colic, in the 63d year of his age, being the third of the 114th Olympiad, two years after Alexander. The Stagyrites carried away his body, and erected altars to his memory.

Beſides his treatiſes on philoſophy, he wrote alſo on poetry, rhetoric, law, &c. to the number of 400 treatiſes, according to Diogenes Laertius; or more, according to Francis Patricius of Venice. An account of ſuch as are extant, and of thoſe ſaid to be loſt, may be ſeen in Fabricius's *Bibliotheca Græca*. He left his writings with Theophraſtus, his beloved diſciple and ſucceſſor in the Lycæum; and forbad that they ſhould ever be publiſhed. Theophraſtus, at his death, truſted them to Neleus, his good friend and diſciple; whoſe heirs buried them in the ground at Scepſis, a town of Troas, to ſecure them from the king of Pergamus, who made great ſearch every where for books to adorn his library. Here they lay concealed 160 years, until, being almoſt ſpoiled, they were ſold to one Apellicon, a rich citizen of Athens. Sylla found them at this man's houſe, and ordered them to be carried to Rome. They were ſome time after purchaſed by Tyrannion a grammarian: and Andronicus of Rhodes having bought them of his heirs, was in a manner the firſt reſtorer of the works of this great philoſopher; for he not only repaired what had been decayed by time and ill-keeping, but alſo put them in a better order, and got them copied. There were many who followed the doctrine of Ariſtotle in the reigns of the twelve Cæſars, and their numbers increaſed much under Adrian and Antoninus: Alexander Aphrodinus was the firſt profeſſor of the Peripatetic philoſophy at Rome, being appointed by the emperors Marcus Aurelius and Lucius Verus; and in ſucceeding ages the doctrine of Ariſtotle prevailed among almoſt all men of letters, and many commentaries were written upon his works.

Ariſtotle.

The firſt doctors of the church diſapproved of the doctrine of Ariſtotle, as allowing too much to reaſon and ſenſe; but Anatolius biſhop of Loadicea, Didymus of Alexandria, St Jerome, St Auguſtin, and ſeveral others, at length wrote and ſpoke in favour of it. In the ſixth age, Boethius made him known in the weſt, and tranſlated ſome of his pieces into Latin. But from the time of Boethius to the eighth age, Joannes Damaſcenus was the only man who made an abridgement of his philoſophy, or wrote any thing concerning him. The Grecians, who took great pains to reſtore learning in the 11th and following ages, applied much to the works of this philoſopher, and many learned men wrote commentaries on his writings: amongſt theſe were Alfarabius, Algazel, Avicenna, and Averroes. They taught his doctrine in Africa, and afterwards at Cordova in Spain. The Spaniards introduced his doctrine into France, with the commentaries of Averroes and Avicenna; and it was taught in the univerſity of Paris, until Amauri, having ſupported ſome particular tenets on the principles of this philoſopher, was condemned of hereſy, in a council held there in 1210, when all the works of Ariſtotle that could be found were burnt, and the reading of them forbidden under pain of excommunication. This prohibition was confirmed, as to the phyſics and metaphyſics, in 1215, by the Pope's legate; though at the ſame time he gave leave for his logic to be read, inſtead of St Auguſtin's uſed at that time in the univerſity. In the year 1265, Simon, cardinal of St Cecil, and legate from the holy ſee, prohibited the reading of the phyſics and metaphyſics of Ariſtotle. All theſe prohibitions, however, were taken off in 1366; for the cardinals of St Mark and St Martin, who were deputed by Pope Urban V. to reform the univerſity of Paris, permitted the reading of thoſe books, which had been prohibited: and in the

Ariſtotle, Ariſtoxenus.

year 1448, Pope Stephen approved of all his works, and took care to have a new tranſlation of them into Latin.

Paſſing from hand to hand, in the manner abovementioned, the works of Ariſtotle have greatly ſuffered from the ignorance or the inaccuracy of tranſcribers. This has given birth to much obſcurity, and to omiſſions that are now irreparable: it is this which has rendered the ſenſe of Ariſtotle ſo doubtful, and opened ſuch a wide field for the combats of ſcholaſtic philoſophy. Beſides, our philoſopher was not himſelf very much inclined to be perfectly plain and familiar. His ſtyle was difficult and conciſe. He has employed a mathematical manner of communication; often uſes terms which have no determinate meaning; and, with many of his doctrines, he mixes ancient opinions as taken for granted, which are altogether falſe or uncertain. In a word, the Peripatetic philoſophy is very obſcure in itſelf, and commentators have rather contributed to increaſe the obſcurity.

ARISTOXENUS, the moſt ancient muſical writer, of whoſe works any tracts are come down to us. He was born at Tarentum, a city in that part of Italy called *Magna Græcia*, now Calabria. He was the ſon of a muſician, whom ſome call *Mneſias*, others *Spintharus*. He had his firſt education at Mantinæa, a city of Arcadia, under his father, and Lamprus of Erythræ; he next ſtudied under Xenophilus, the Pythagorean; and laſtly under Ariſtotle, in company with Theophraſtus. Suidas, from whom theſe particulars are tranſcribed, adds, that Ariſtoxenus, enraged at Ariſtotle having bequeathed his ſchool to Theophraſtus, traduced him ever after. But Ariſtocles the Peripatetic, in Euſebius, exculpates Ariſtoxenus in this particular, and aſſures us that he always ſpoke with great reſpect of his maſter Ariſtotle. From the preceding account it appears that Ariſtoxenus lived under Alexander the Great and his firſt ſucceſſors. His *Harmonics* in three books, all that are come down to us, together with Ptolemy's Harmonics, were firſt publiſhed by Gogavinus, but not very correctly, at Venice, 1562, in 4to, with a Latin verſion. John Meurſius next tranſlated the three books of Ariſtoxenus into Latin, from the MS. of Joſ. Scaliger; but, according to Meibomius, very negligently. With theſe he printed at Leyden, 1616, 4to, Nicomachus and Alypius, two other Greek writers on muſic. After this, Meibomius collected theſe muſical writers together; to which he added Euclid, Bacchius ſenior, Ariſtides Quintilianus; and publiſhed the whole, with a Latin verſion and notes, from the elegant preſs of Elzevir, Amſt. 1652. The learned editor dedicates theſe ancient muſical treatiſes to Chriſtina queen of Sweden. Ariſtoxenus is ſaid by Suidas to have written 452 different works, among which thoſe on muſic were the moſt eſteemed; yet his writings on other ſubjects are very frequently quoted by ancient authors, notwithſtanding Cicero and ſome others ſay that he was a bad philoſopher, and had nothing in his head but muſic. The titles of ſeveral of the loſt works of Ariſtoxenus, quoted by Athenæus and others, have been collected by Meurſius in his notes upon this author, by Tonſius and Menage, all which Fabricius has digeſted into alphabetical order.

Ariſtoxenus.

ARITHMETIC

IS a ſcience which explains the properties of numbers, and ſhews the method or art of computing by them.

Hiſtory of Arithmetic.

1 nowledge numbers eval with e human ce.

At what time this ſcience was firſt introduced into the world, we can by no means determine. That ſome part of it, however, was coeval with the human race is abſolutely certain. We cannot conceive how any man endowed with reaſon can be without ſome knowledge of numbers. We are indeed told of nations in America who have no word in their language to expreſs a greater number than three; and this they call *poetarrarorincouroac*: but that ſuch nations ſhould have no idea of a greater number than this, is abſolutely incredible. Perhaps they may compute by threes, as we compute by tens; and this may have occaſioned the notion that they have no greater number than three.

But though we cannot ſuppoſe any nation, or indeed any ſingle perſon, ever to have been without ſome knowledge of the difference between greater and ſmaller numbers, it is poſſible that mankind may have ſubſiſted for a conſiderable time without bringing this ſcience to to any perfection, or computing by any regular ſcale, as 10, 60, &c. That this, however, was very early introduced into the world, even before the flood, we may gather from the following expreſſion in Enoch's prophecy, as mentioned by the Apoſtle Jude: "Behold, the Lord cometh with *ten thouſands* of his ſaints." This ſhews, that even at that time men had ideas of numbers as high as we have at this day, and computed them alſo in the ſame manner, namely by tens. The directions alſo given to Noah concerning the dimenſions of the ark, leave us no room to doubt that he had a knowledge of numbers, and of meaſures likewiſe. When Rebekah was ſent away to Iſaac, Abraham's ſon, her relations wiſhed ſhe might be the mother of *thouſands of millions*; and if they were totally unacquainted with the rule of multiplication, it is difficult to ſee how ſuch a wiſh could have been formed.

It is probable, therefore, that the four fundamental rules of Arithmetic have always been known to ſome nation or other. No doubt, as ſome nations, like the Europeans formerly, and the Africans and Americans now, have been immerſed in the moſt abject and deplorable ſtate of ignorance, they might remain for ſome time unacquainted with numbers, except ſuch as they had immediate occaſion for; and, when they came afterwards to improve, either from their own induſtry, or hints given by others, might fancy that they themſelves, or thoſe from whom they got the hints, had invented what was known long before. The Greeks were the firſt European nation among whom arithmetic arrived at any degree of perfection. M. Goguet is of opinion, that they firſt uſed pebbles in their calculations: a proof of which, he imagines, is, that the word ψηφιζω, which comes from ψηφος, a little ſtone or flint, among other things, ſignifies *to calculate*. The ſame, he thinks, is probable of the Romans; and derives the word *calculation* from the uſe of little ſtones (*calculi*) in their firſt arithmetical operations.

2 Grecian method of computation.

If this method, however, was at all made uſe of, it muſt have been but for a ſhort time, ſince we find the Greeks very early made uſe of the letters of the alphabet to repreſent their numbers. The 24 letters of their alphabet, taken according to their order, at firſt denoted the numbers 1, 2, 3, 4, 5, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 100, 200, 300, 400, 500, 600, 700, and 800; to which they added the three, following ϛ, ϟ, ϡ), to repreſent 6, 90, and 900. The difficulty of performing arithmetical operations by ſuch marks as theſe may eaſily be imagined, and is very conſpicuous from Archimedes's treatiſe concerning the dimenſions of a circle.

3 Roman Notation.

The Romans followed a like method; and beſides characters for each rank of claſſes, they introduced others for five, fifty, and five hundred. Their method is ſtill uſed for diſtinguiſhing the chapters of books, and ſome other purpoſes. Their numeral letters and values are the following.

I	V	X	L	C	D	M
One,	five,	ten,	fifty,	one hundred,	five hundred,	one thouſand.

Any number, however great, may be repreſented by repeating and combining theſe according to the following rules.

1st, When the ſame letter is repeated twice, or oftener, its value is repreſented as often. Thus II ſignifies two; XXX thirty, CC two hundred.

2d, When a numeral letter of leſſer value is placed after one of greater, their values are added: thus XI ſignifies eleven, LXV ſixty-five, MDCXXVIII one thouſand ſix hundred and twenty-eight.

3d, When a numeral letter of leſſer value is placed before one of greater, the value of the leſſer is taken from that of the greater: thus IV ſignifies four, XL forty, XC ninety, CD four hundred.

Sometimes IↃ is uſed inſtead of D for 500, and the value is increaſed ten times by annexing Ↄ to the right hand.

Thus	IↃ ſignifies	500.	Alſo CIↃ is uſed for	1000
	IↃↃ	5000	CCIↃↃ for	10000
	IↃↃↃ	50000	CCCIↃↃↃ for	100000

Sometimes thouſands are repreſented by drawing a line over the top of the numeral, $\overline{V}$ being uſed for five thouſand, $\overline{L}$ for fifty thouſand, $\overline{CC}$ two hundred thouſand.

4 Sexageſimal Arithmetic.

About the year of Chriſt 200, a new kind of arithmetic, called *ſexageſimal*, was invented, as is ſuppoſed, by Claudius Ptolomæus. The deſign of it was to remedy the difficulties of the common method, eſpecially with regard to fractions. In this kind of arithmetic, every unit was ſuppoſed to be divided into 60 parts, and each of theſe into 60 others, and ſo on: hence any number of ſuch parts were called *ſexageſimal fractions*; and to make the computation in whole numbers more eaſy, he made the progreſſion in theſe alſo ſexageſimal. Thus from one to 59 were marked in the common way: then 60 was called a *ſexageſima prima*, or firſt ſexageſimal integer, and had one ſingle daſh over it; ſo 60 was expreſſed thus I′; and ſo on to 59 times 60, or 3540, which was thus expreſſed LIX′. He now proceeded to 60 times 60, which he called a *ſexageſima ſecunda*, and was thus expreſſed I″. In like manner, twice 60 times 60, or 7200, was expreſſed by II″; and ſo on till he came to 60 times 3600, which was a third ſexageſimal, and expreſſed thus, I‴. If any number leſs than 60 was joined with theſe ſexageſimals, it was added in its proper characters without any daſh: thus I′XV repreſented 60 and 15, or 75; I′VXXV is four times 60 and 25, or 265; X″II′XV, is 10 times 3600, twice 60 and 15, or 36,135, &c. Sexageſimal fractions were marked by putting the daſh at the foot, or on the left hand of the letter: thus I,, or ′I, denoted $\frac{1}{60}$; I,,, or ″I, $\frac{1}{3600}$ &c.

5 Indian Cha racters whe brought i to uſe.

The moſt perfect method of notation, which we now uſe, came into Europe from the Arabians, by the way of Spain. The Arabs, however, do not pretend to be the inventors of them, but acknowledge that they received them from the Indians. Some there are indeed, who contend that neither the Arabs nor the Indians were the inventors, but that they were found out by the Greeks. But this is by no means probable; as Maximus Planudes, who lived towards the cloſe of the 13th century, is the firſt Greek who makes uſe of them: and he is plainly not the inventor; for Dr Wallis mentions an inſcription on a chimney in the parſonage-houſe of Helendon in Northamptonſhire, where the date is expreſſed by M^{o}133, inſtead of 1133. Mr Luffkin furniſhes a ſtill earlier inſtance of their uſe, in the window of a houſe, part of which is a Roman wall, near the market-place in Colcheſter; where between two carved lions ſtands an eſcutcheon with the figures 1090. Dr Wallis is of opinion that theſe characters muſt have been uſed in England at leaſt as long ago as the year 1050, if not in ordinary affairs, at leaſt in mathematical ones, and in aſtronomical tables. How theſe characters came to be originally invented by the Indians we are entirely ignorant.

The introduction of the Arabian characters in notation did not immediately put an end to the ſexageſimal arithmetic. As this had been uſed in all the aſtronomical tables, it was for their ſakes retained for a conſiderable time. The ſexageſimal integers went firſt out, but the fractions continued till the invention of decimals.

6 Treatiſe Arithme

The oldeſt treatiſes extant upon the theory of arithmetic are the ſeventh, eight, and ninth books of Euclid's elements, where he treats of proportion and of prime and compoſite numbers; both of which have received improvements ſince his time, eſpecially the former. The next of whom we know any thing is Nicomachus the Pythagorean, who wrote a treatiſe of the theory of arithmetic, conſiſting chiefly of the diſtinctions and diviſions of numbers into claſſes, as plain, ſolid, triangular, quadrangular, and the reſt of the figurate numbers as they are called, numbers odd and even, &c. with ſome of the more general properties of the ſeveral kinds. This author is, by ſome, ſaid to have lived before the time of Euclid; by others, not long after. His arithmetic was publiſhed at Paris in 1538. The next remarkable writer on this ſubject is Boethius, who lived at Rome in the time of Theodoric the Goth. He is ſuppoſed to have copied moſt of his work from Nicomachus.

From this time no remarkable writer on arithmetic appeared till about the year 1200, when Jordanus of Namur wrote a treatiſe on this ſubject, which was publiſhed and demonſtrated by Joannes Faber Stapulenſis in the 15th century, ſoon after the invention of printing.

ing. The ſame author alſo wrote upon the new art of computation by the Arabic figures, and called this book *Algoriſmus Demonſtratus*. Dr Wallis ſays this manuſcript is in the Savillian library at Oxford, but it hath never yet been printed. As learning advanced in Europe, ſo did the knowledge of numbers; and the writers on arithmetic ſoon became innumerable. About the year 1464, Regiomentanus, in his triangular tables, divided the Radius into 10,000 parts inſtead of 60,000; and thus tacitly expelled the ſexageſimal arithmetic. Part of it, however, ſtill remains in the diviſion of time, as of an hour into 60 minutes, a minute into 60 ſeconds, &c. Ramus in his arithmetic, written about the year 1550, and publiſhed by Lazarus Schonerus in 1586, uſes decimal periods in carrying on the ſquare and cube roots to fractions. The ſame had been done before by our countrymen Buckley and Record; but the firſt who publiſhed an expreſs treatiſe on decimals was Simon Stevinius, about the year 1582. As to the circulating decimals, Dr Wallis is the firſt who took much notice of them. He is alſo the author of the *arithmetic of infinites*, which has been very uſefully applied to geometry. The greateſt improvement, however, which the art of computation ever received, is the invention of logarithms. The honour of this invention is unqueſtionably due to Lord Napier baron of Merchiſton in Scotland, about the end of the 16th or beginning of the 17th century. By theſe means arithmetic has advanced to a degree of perfection which the ancients could never have imagined poſſible, much leſs hoped to attain; and we believe it may now be reckoned one of thoſe few ſciences which have arrived at their utmoſt height, and which is in its nature capable of little further improvement.

7 Chap. I. NOTATION and NUMERATION.

The firſt elements of arithmetic are acquired during our infancy. The idea of one, though the ſimpleſt of any, and ſuggeſted by every ſingle object, is perhaps rather of the negative kind, and conſiſts partly in the excluſion of plurality, and is not attended to till that of number be acquired. Two is formed by placing one object near another; three, four, and every higher number, by adding one continually to the former collection. As we thus advance from lower numbers to higher, we ſoon perceive that there is no limit to this increaſing operation; and that, whatever number of objects be collected together, more may be added, at leaſt, in imagination; ſo that we can never reach the higheſt poſſible number, nor approach near it. As we are led to underſtand and add numbers by collecting objects, ſo we learn to diminiſh them by removing the objects collected; and, if we remove them one by one, the number decreaſes through all the ſteps by which it advanced, till only one remain, or none at all. When a child gathers as many ſtones together as ſuits his fancy, and then throws them away, he acquires the firſt elements of the two capital operations in arithmetic. The idea of numbers, which is firſt acquired by the obſervation of ſenſible objects, is afterwards extended to meaſures of ſpace and time, affections of the mind, and other immaterial qualities.

Small numbers are moſt eaſily apprehended: a child ſoon knows what two and what three is; but has not any diſtinct notion of ſeventeen. Experience removes this difficulty in ſome degree; as we become accuſtomed to handle larger collections, we apprehend clearly the number of a dozen or a ſcore; but, perhaps could hardly advance to an hundred without the aid of claſſical arrangement, which is the art of forming ſo many units into a claſs, and ſo many of theſe claſſes into one of a higher kind, and thus advancing through as many ranks of claſſes as occaſion requires. If a boy arrange an hundred ſtones in one row, he would be tired before he could reckon them; but if he place them in ten rows of ten ſtones each, he will reckon an hundred with eaſe; and if he collect ten ſuch parcels, he will reckon a thouſand. In this caſe, ten is the loweſt claſs, an hundred is a claſs of the ſecond rank, and a thouſand is a claſs of the third rank.

There does not ſeem to be any number naturally adapted for conſtituting a claſs of the loweſt, or any higher rank, to the excluſion of others. However, as ten has been univerſally uſed for this purpoſe by the Hebrews, Greeks, Romans, and Arabians, and by all nations who have cultivated this ſcience, it is probably the moſt convenient for general uſe. Other ſcales, however, may be aſſumed, perhaps on ſome occaſions, with ſuperior advantage; and the principles of arithmetic will appear in their full extent, if the ſtudent can adapt them to any ſcale whatever: thus, if eight were the ſcale, 6 times 3 would be two claſſes and two units, and the number 18 would then be repreſented by 22. If 12 were the ſcale, 5 times 9 would be three claſſes and nine units, and 45 would be repreſented by 39, &c.

It is proper, whatever number of units conſtitutes a claſs of the lower rank, that the ſame number of each claſs ſhould make one of the next higher. This is obſerved in our arithmetic, ten being the univerſal ſcale: but is not regarded in the various kinds of monies, weights, and the like, which do not advance by any univerſal meaſure; and much of the difficulty in the practice of arithmetic ariſes from that irregularity.

As higher numbers are ſomewhat difficult to apprehend, we naturally fall on contrivances to fix them in our minds, and render them familiar: but notwithſtanding all the expedients we can fall upon, our ideas of high numbers are ſtill imperfect, and generally far ſhort of the reality; and though we can perform any computation with exactneſs, the anſwer we obtain is often incompletely apprehended.

It may not be amiſs to illuſtrate, by a few examples, the extent of numbers which are frequently named without being attended to. If a perſon employed in telling money reckon an hundred pieces in a minnte, and continue at work ten hours each day, he will take ſeventeen days to reckon a million; a thouſand men would take 45 years to reckon a billion. If we ſuppoſe the whole earth to be as well peopled as Britain, and to have been ſo from the creation, and that the whole race of mankind had conſtantly ſpent their time in telling from a heap conſiſting of a quadrillion of pieces, they would hardly have yet reckoned the thouſandth part of that quantity.

All numbers are repreſented by the ten following characters.

1	2	3	4	5	6	7	8	9	0
One,	two,	three,	four,	five,	ſix,	ſeven,	eight,	nine,	cypher.

The nine firſt are called *ſignificant figures*, or *digits*;

and ſometimes repreſent units, ſometimes tens, hundreds, or higher claſſes. When placed ſingly, they denote the ſimple numbers ſubjoined to the characters. When ſeveral are placed together, the firſt or right-hand figure only is to be taken for its ſimple value: the ſecond ſignifies ſo many tens, the third ſo many hundreds, and the others ſo many higher claſſes, according to the order they ſtand in. And as it may ſometimes be required to expreſs a number conſiſting of tens, hundreds, or higher claſſes, without any units or claſſes of a lower rank annexed; and as this can only be done by figures ſtanding in the ſecond, third, or higher place, while there are none to fill up the lower ones; therefore an additional character or cypher (0) is neceſſary, which has no ſignification when placed by itſelf, but ſerves to ſupply the vacant places, and bring the figures to their proper ſtation.

The following table ſhews the names and diviſions of the claſſes.

8.	TRILLIONS
4	Hundred thouſand of billions
3	Ten thouſand of billions
7,	Thouſand billions
9	Hundred billions
8	Ten billions
2.	BILLIONS
5	Hundred thouſand of millions
6	Ten thouſand of millions
4,	Thouſand millions
7	Hundred millions
3	Ten millions
8.	MILLIONS
9	Hundred thouſands
7	Ten thouſands
2,	Thouſands
6	Hundreds
4	Tens
5	Units

The firſt ſix figures from the right hand are called the *unit period*, the next ſix the *million period*, after which the *trillion*, *quadrillion*, *quintillion*, *ſextillion*, *ſeptillion*, *octillion* and *nonillion* periods follow in their order.

It is proper to divide any number, before we reckon it, into periods and half periods, by different marks. We then begin at the left hand, and read the figures in their order, with the names of their places, from the table. In writing any number, we muſt be careful to mark the figures in their proper places, and ſupply the vacant places with cyphers.

As there are no poſſible ways of changing numbers, except by enlarging or diminiſhing them according to ſome given rule, it follows, that the whole art of arithmetic is comprehended in two operations, *Addition* and *Subtraction*. However, as it is frequently required to add ſeveral equal numbers together, or to ſubtract ſeveral equal ones from a greater, till it be exhauſted, proper methods have been invented for facilitating the operation in theſe caſes, and diſtinguiſhed by the names of *Multiplication* and *Diviſion;* and theſe four rules are the foundation of all arithmetical operations whatever.

As the idea of number is acquired by obſerving ſeveral objects collected, ſo is that of fractions by obſerving an object divided into ſeveral parts. As we ſometimes meet with objects broken into two, three, or more parts, we may conſider any or all of theſe diviſions promiſcuouſly, which is done in the doctrine of vulgar fractions, for which a chapter will be allotted. However, ſince the practice of collecting units into parcels of tens has prevailed univerſally, it has been found convenient to follow a like method in the conſideration of fractions, by dividing each unit into ten equal parts, and each of theſe into ten ſmaller parts; and ſo on. Numbers divided in this manner are called *Decimal Fractions*.

CHAP. II. ADDITION.

ADDITION is that operation by which we find the amount of two or more numbers. The method of doing this in ſimple caſes is obvious, as ſoon as the meaning of number is known, and admits of no illuſtration. A young learner will begin at one of the numbers and reckon up as many units ſeparately as there are in the other, and practice will enable him to do it at once. It is impoſſible, ſtrictly ſpeaking, to add more than two numbers at a time. We muſt firſt find the ſum of the firſt and ſecond; then we add the third to that number; and ſo on. However, as the ſeveral ſums obtained are eaſily retained in the memory, it is neither neceſſary nor uſual to mark them down. When the numbers conſiſt of more figures than one, we add the units together, the tens together; and ſo on. But, if the ſum of the units exceed ten, or contain ten ſeveral times, we add the number of tens it contains to the next column, and only ſet down the number of units that are over. In like manner, we carry the tens of every column to the next higher. And the reaſon of this is obvious from the value of the places; ſince an unit, in any higher place, ſignifies the ſame thing as ten in the place immediately lower.

RULE. "Write the numbers diſtinctly, "units under units, tens under tens; and "ſo on. Then reckon the amount of the "right-hand column. If it be under ten, "mark it down. If it exceed ten, mark "the units only, and carry the tens to the "next place. In like manner, carry the "tens of each column to the next, and "mark down the full ſum of the left-hand "column."

Example.

```
 346863
 876734
 123467
 314213
 712316
 438987
 279654
-------
3092234
  24433
```

As it is of great conſequence in buſineſs to perform addition readily and exactly, the learner ought to practiſe it till it become quite familiar. If the learner can readily add any two digits, he will ſoon add a digit to a higher number with equal eaſe. It is only to add the unit place of that number to the digit; and, if it exceed ten, it raiſes the amount accordingly. Thus, becauſe 8 and 6 is 14, 48 and 6 is 54. It will be proper to mark down under the ſums of each column, in a ſmall hand, the figure that is carried to the next column. This prevents the trouble of going over the whole operation again, in caſe of interruption or miſtake. If you want to keep the account clean, mark down the ſum and figure you carry, on a ſeparate paper, and, after reviſing them, tranſcribe the ſum only. After ſome practice, we ought to acquire the habit of adding two or more figures at one glance. This is particularly uſeful when two figures which amount to 10, as 6 and 4, or 7 and 3, ſtand together in the column.

Every operation in arithmetic ought to be reviſed, to prevent miſtakes; and, as one is apt to fall into the ſame miſtake if he reviſe it in the ſame manner he performed it, it is proper either to alter the order, or elſe to trace back the ſteps by which the operation advanced,

ced, which will lead us at laſt to the number we began with. Every method of proving accounts may be referred to one or other of theſe heads.

1ſt, Addition may be proven by any of the following methods: repeat the operation, beginning at the top of the column, if you began at the foot when you wrought it.

2d, Divide the account into ſeveral parts; add theſe ſeparately, and then add the ſums together. If their amount correſpond with the ſum of the account, when added at once, it may be preſumed right. This method is particularly proper when you want to know the ſums of the parts, as well as that of the whole.

3d, Subtract the numbers ſucceſſively from the ſum; if the account be right, you will exhauſt it exactly, and find no remainder.

When the given number conſiſts of articles of different value, as pounds, ſhillings, and pence, or the like, which are called *different denominations*, the operations in arithmetic muſt be regulated by the value of the articles. We ſhall give here a few of the moſt uſeful tables for the learners information.

I. *Sterling Money.*

4 Farthings=1 penny, *marked* d.
12 Pence=1 ſhilling, s.
20 Shillings=1 pound, L.
Alſo, 6s. 8d.=1 noble
10s.=1 angel
13s. 4d. or two thirds of a pound=1 merk.

II. *Averdupois weight.*

16 Drams=1 ounce, oz.
16 Ounces=1 pound, lb.
28 Pound=1 quarter, qr.
4 Quart.=1 hun.wght, C.
20 Hun. weight=1 ton, T.

Scots money is divided in the ſame manner as Sterling, and has one twelfth of its value. A pound Scots is equal to 1s. 8d. Sterling, a ſhilling Scots to a penny Sterling, and a penny Scots to a twelfth part of a penny Sterling; a mark Scots is two thirds of a pound Scots, or 13$\frac{1}{3}$d. Sterling.

III. *Troy Weight.*

20 Mites=1 grain, gr.
24 Grains=1 pen. wt, dwt.
20 Pennywts=1 ounce, oz.
12 Ounces=1 pound, lb.

IV. *Apothecaries Weight.*

20 Grains=1 ſcruple, ℈
3 Scruples=1 dram, ʒ
8 Drams=1 ounce, ℥
12 Ounces=1 pound, ℔

V. *Engliſh Dry Meaſure.*

2 Pints=1 quart
4 Quarts=1 gallon
2 Gallons=1 peck
4 Pecks=1 buſhel
8 Buſhels=1 quarter

VI. *Scots Dry Meaſure.*

4 Lippies=1 peck
4 Pecks=1 firlot
4 Firlots=1 boll
16 Bolls=1 chalder

VII. *Engliſh Land Meaſure.*

30$\frac{1}{4}$ Square yards=1 pole or perch
40 Poles=1 rood
4 Roods=1 acre

VIII. *Scots Land Meaſure.*

36 Square ells=1 fall
40 Falls=1 rood
4 Roods=1 acre

IX. *Long Meaſure.*

12 Inches=1 foot
3 Feet=1 yard
5$\frac{1}{2}$ Yards=1 pole
40 Poles=1 furlong
8 Furlongs=1 mile
3 Miles=1 league.

X. *Time.*

60 Seconds=1 minute
60 Minutes=1 hour
24 Hours=1 day
7 Days=1 week
365 Days=1 year
52 Weeks & 1 day=1 year

RULE *for compound Addition.* "Arrange like "quantities under like, and carry according to the "value of the higher place."

Note 1. When you add a denomination, which contains more columns than one, and from which you carry to the higher by 20, 30, or any even number of tens, firſt add the units of that column, and mark down their ſum, carrying the tens to the next column; then add the tens, and carry to the higher denomination, by the number of tens that it contains of the lower. For example, in adding ſhillings, carry by 10 from the units to the tens, and by 2 from the tens to the pounds.

Note 2. If you do not carry by an even number of tens, firſt find the complete ſum of the lower denomination, then inquire how many of the higher that ſum contains, and carry accordingly, and mark the remainder, if any, under the column. For example, if the ſum of a column of pence be 43, which is three ſhillings and ſeven pence, mark 7 under the pence-column, and carry 3 to that of the ſhillings.

Note 3. Some add the lower denominations after the following method: when they have reckoned as many as amounts to one of the higher denomination, or upwards, they mark a dot, and begin again with the exceſs of the number reckoned above the value of the denomination. The number of dots ſhows how many are carried, and the laſt reckoned number is placed under the column.

Examples in Sterling Money.

L	145	6	8
	215	3	9
	172	18	4
	645	7	7
	737	2	3
	35	3	9
	9	—	7
	1764	12	3
	780	—	—
	99	9	9
	150	10	—
	844	8	7

L	16	9	11$\frac{1}{2}$
	169	16	10
	36	12	9$\frac{3}{4}$
	54	7	6
	30	—	1$\frac{1}{4}$
	7	19	6
	707	19	11
	14	14	4
	84	18	8$\frac{3}{4}$
	125	3	7
	16	16	8$\frac{3}{4}$
	62	5	3

In Averdupois Weight.

T.	*C.*	*qr.*	*lb.*
1	19	3	26
—	14	1	16
2	18	1	16
—	1	2	27
3	9	—	10
—	17	2	24
—	15	3	18
4	6	—	5
—	6	3	9
6	4	—	4
5	5	—	5

T.	*C.*	*qr.*	*lb.*
3	15	2	22
6	3	—	19
5	7	3	26
3	2	2	—
4	3	1	10
—	18	1	12
1	1	1	1
5	3	—	7
6	4	—	9
4	6	—	5
2	1	3	4

When one page will not contain the whole account, we add the articles it contains, and write againſt their ſum, *Carried forward;* and we begin the next page with the ſum of the foregoing, writing againſt it, *Brought forward.*

When the articles fill ſeveral pages, and their whole ſum is known, which is the caſe in tranſcribing accounts, it is beſt to proceed in the following manner: Add the pages, placing the ſums on a ſeparate paper; then add the ſums, and if the amount of the whole be right, it only remains to find what numbers ſhould be placed at the foot and top of the pages. For this purpoſe, repeat the ſum of the firſt page on the ſame line; add the ſums of the firſt and ſecond, placing the amount in a line with the ſecond; to this add the ſum of the third, placing the amount in a line with the third. Proceed in like manner with the others; and if the laſt ſum correſponds with the amount of the pages, it is right. Theſe ſums are tranſcribed at the foot of the reſpective pages, and tops of the following ones.

Examples.

L134	6	8	L			L			L		
42	3	9	170	5	4	70	4	2	15	3	9
175	4	9	66	9	8	18	6	8	12	2	6
42	5	7	73	8	6	12	13	2	7	5	4
163	7	4	45	3	2	15	3	9	8	—	—
148	5	8	78	7	9	17	5	4	—	9	6
73	2	3	12	—	—	18	6	8	—	5	10
L			L			L			L		

1st Page,	L 778	16	—	L 778	16	—
2d,	445	14	5	1224	10	5
3d,	151	19	9	1376	10	2
4rh,	43	6	11	1419	17	1
	L 1419	17	1			

Then we tranſcribe L 778 : 16s. at the foot of the firſt and top of the ſecond pages, L 1224 : 10 : 5 at the foot of the ſecond and top of the third; and ſo on.

Chap. III. SUBTRACTION.

Subtraction is the operation by which we take a leſſer number from a greater, and find their differences. It is exactly oppoſite to addition, and is performed by learners in a like manner, beginning at the greater and reckoning downwards the units of the leſſer. The greater is called the *minuend*, and the leſſer the *ſubtrahend*.

If any figure of the ſubtrahend be greater than the correſponding figure of the minuend, we add ten to that of the minuend; and, having found and marked the difference, we add one to the next place of the ſubtrahend. This is called *borrowing ten*. The reaſon will appear, if we conſider that, when two numbers are equally increaſed by adding the ſame to both, their difference will not be altered. When we proceed as directed above, we add ten to the minuend, and we likewiſe add one to the higher place of the ſubtrahend, which is equal to ten of the lower place.

Rule. "Subtract units from units, tens from tens, "and ſo on. If any figure of the ſubtrahend be greater "than the correſponding one of the minuend, borrow "ten."

Example.	Minuend	173694	738641
	Subtrahend	21453	379235
	Remainder	152241	359406

To prove ſubtraction, add the ſubtrahend and remainder together; if their ſum be equal to the minuend, the account is right.

Or ſubtract the remainder from the minuend. If the difference be equal to the ſubtrahend, the account is right.

Rule *for compound ſubtraction*. "Place like denominations under like, and borrow, when neceſſary, "according to the value of the higher place."

Examples.

			C.	*qr.*	*lb.*	*A.*	*R.*	*F.*	*E.*
L146	3	3	12	3	19	15	2	24	18
58	7	6	4	3	24	12	2	36	7
L 87	15	9	7	3	23	2	3	28	11

Note 1. The reaſon for borrowing is the ſame as in ſimple ſubtraction. Thus, in ſubtracting pence, we add 12 pence when neceſſary to the minuend, and at the next ſtep, we add one ſhilling to the ſubtrahend.

Note 2. When there are two places in the ſame denomination, if the next higher contain exactly ſo many tens, it is beſt to ſubtract the units firſt, borrowing ten when neceſſary; and then ſubtract the tens, borrowing, if there is occaſion, according to the number of tens in the higher denomination.

Note 3. If the value of the higher denomination be not an even number of tens, ſubtract the units and tens at once, borrowing according to the value of the higher denomination.

Note 4. Some chuſe to ſubtract the place in the ſubtrahend, when it exceeds that of the minuend, from the value of the higher denomination, and add the minuend to the difference. This is only a different order of proceeding, and gives the ſame anſwer.

Note 5. As cuſtom has eſtabliſhed the method of placing the ſubtrahend under the minuend, we follow it when there is no reaſon for doing otherwiſe; but the minuend may be placed under the ſubtrahend with equal propriety; and the learner ſhould be able to work it either way, with equal readineſs, as this laſt is ſometimes more convenient; of which inſtances will occur afterwards.

Note 6. The learner ſhould alſo acquire the habit, when two numbers are marked down, of placing ſuch a number under the leſſer, that, when added together, the ſum may be equal to the greater. The operation is the ſame as ſubtraction, though conceived in a different manner, and is uſeful in balancing accounts, and on other occaſions.

It is often neceſſary to place the ſums in different columns, in order to exhibit a clear view of what is required. For inſtance, if the values of ſeveral parcels of goods are to be added, and each parcel conſiſts of ſeveral articles, the particular articles ſhould be placed in an inner column, and the ſum of each parcel extended to the outer column, and the total added there.

If any perſon be owing an account, and has made ſome partial payments, the payments muſt be placed in an inner column, and their ſum extended under that of the account in the outer column, and ſubtracted there.

An example or two will make this plain.

1ts.] 30 yards linen	at 2 s.	L.	3						
45 ditto	at 1 s. 6 d.		3	7	6				
						L.	6	7	6
120 ℔ thread	at 4 s.	L.	24						
40 ditto	at 3 s.		6						
30 ditto	at 2 s. 6 d.		3	15					
							33	15	
						L.	40	2	6

2d.] 1773.
Jan. 15. Lent James Smith L. 50
22. Lent him further 70
L. 120
Feb. 3. Received in part L. 62
5. Received further
In gold L. 10 10
In ſilver 13
23 10
85 10
Balance due me L. 34 10

10

CHAP. IV. MULTIPLICATION.

In Multiplication, two numbers are given, and it is required to find how much the firſt amounts to, when reckoned as many times as there are units in the ſecond. Thus, 8 multiplied by 5, or 5 times 8, is 40. The given numbers (8 and 5) are called *factors;* the firſt (8) the *multiplicand;* the ſecond (5) the *multiplier;* and the amount (40) the *product.*

This operation is nothing elſe than addition of the ſame number ſeveral times repeated. If we mark 8 five times under each other, and add them, the ſum is 40: But, as this kind of addition is of frequent and extenſive uſe, in order to ſhorten the operation, we mark down the number only once, and conceive it to be repeated as often as there are units in the multiplier.

For this purpoſe, the learner muſt be thoroughly acquainted with the following multiplication-table, which is compoſed by adding each digit twelve times.

Twice		Thrice		Four times		Five times		Six times		Seven times	
1 is	2	1 is	3	1 is	4	1 is	5	1 is	6	1 is	7
2	4	2	6	2	8	2	10	2	12	2	14
3	6	3	9	3	12	3	13	3	18	3	21
4	8	4	12	4	16	4	20	4	24	4	28
5	10	5	15	5	20	5	25	5	30	5	35
6	12	6	18	6	24	6	30	6	36	6	42
7	14	7	21	7	28	7	35	7	42	7	49
8	16	8	24	8	32	8	40	8	48	8	56
9	18	9	27	9	36	9	45	9	54	9	63
10	20	10	30	10	40	10	50	10	60	10	70
11	22	11	33	11	44	11	55	11	66	11	77
12	24	12	36	12	48	12	60	12	72	12	84

Eight times		Nine times		Ten times		Eleven times		Twelve times	
1 is	8	1 is	9	1 is	10	1 is	11	1 is	12
2	16	2	18	2	20	2	22	2	24
3	24	3	27	3	30	3	33	3	36
4	32	4	36	4	40	4	44	4	48
5	40	5	45	5	50	5	55	5	60
6	48	6	54	6	60	6	66	6	72
7	56	7	63	7	70	7	77	7	84
8	64	8	72	8	80	8	88	8	96
9	72	9	81	9	90	9	99	9	108
10	80	10	90	10	100	10	110	10	120
11	88	11	99	11	110	11	121	11	132
12	96	12	108	12	120	12	132	12	144

If both factors be under 12, the table exhibits the product at once. If the multiplier only be under 12, we begin at the unit-place, and multiply the figures in their order, carrying the tens to the higher place, as in addition.

Ex. 76859 multiplied by 4, or 76859 added 4 times.

$$\begin{array}{r} 4 \\ \hline 307436 \end{array} \qquad \qquad \begin{array}{r} 76859 \\ 76859 \\ 76859 \\ \hline 307436 \end{array}$$

If the multiplier be 10, we annex a cypher to the multiplicand. If the multiplier be 100, we annex two cyphers; and ſo on. The reaſon is obvious, from the uſe of cyphers in notation.

If the multiplier be any digit, with one or more cyphers on the right hand, we multiply by the figure, and annex an equal number of cyphers to the product. Thus, if it be required to multiply by 50, we firſt multiply by 5, and then annex a cypher. It is the ſame thing as to add the multiplicand fifty times; and this might be done by writing the account at large, dividing the column into 10 parts of 5 lines, finding the ſum of each part, and adding theſe ten ſums together.

If the multiplier conſiſt of ſeveral ſignificant figures, we multiply ſeparately by each, and add the products. It is the ſame as if we divided a long account of addition into parts correſponding to the figures of the multiplier.

Example. To multiply 7329 by 365.

$$\begin{array}{r} 7329 \\ 5 \\ \hline 36645 \end{array} \quad \begin{array}{r} 7329 \\ 60 \\ \hline 439740 \end{array} \quad \begin{array}{r} 7329 \\ 300 \\ \hline 2198700 \end{array} \quad \begin{array}{rcr} 36645 & = & 5 \text{ times.} \\ 439740 & = & 60 \text{ times.} \\ 2198700 & = & 300 \text{ times.} \\ \hline 2675085 & = & 365 \text{ times.} \end{array}$$

It is obvious that 5 times the multiplicand added to 60 times, and to 300 times, the ſame muſt amount to the product required. In practice, we place the products at once under each other; and, as the cyphers ariſing from the higher places of the multiplier are loſt in the addition, we omit them. Hence may be inferred the following

RULE. "Place the multiplier under the multiplicand, and multiply the latter ſucceſſively by the ſignificant figures of the former; placing the right-hand figure of each product under the figure of the multiplier from which it ariſes; then add the product."

Ex.

$$\begin{array}{r} 7329 \\ 365 \\ \hline 36645 \\ 43974 \\ 21987 \\ \hline 2675085 \end{array} \qquad \begin{array}{r} 42785 \\ 91 \\ \hline 42785 \\ 385065 \\ \hline 3893431 \end{array} \qquad \begin{array}{r} 37846 \\ 235 \\ \hline 189230 \\ 113538 \\ 75692 \\ \hline 8893810 \end{array} \qquad \begin{array}{r} 93956 \\ 8704 \\ \hline 375824 \\ 657692 \\ 751648 \\ \hline 817793024 \end{array}$$

A number which cannot be produced by the multiplication of two others is called a *prime number;* as 3, 5, 7, 11, and many others.

A number which may be produced by the multiplication of two or more ſmaller ones, is called a *compoſite number.* For example, 27, which ariſes from the multiplication of 9 by 3; and theſe numbers (9 and 3) are called the *component parts* of 27.

Contractions and Varieties in Multiplication.

Firſt, If the multiplier be a compoſite number, we may multiply ſucceſſively by the component parts.

Ex.

```
Ex. 7638 by 45 or 5 times 9   7638   1st,    5492 by  72
     45                          9   2d,    13759 by  56
  ------                    ------   3d,    56417 by 144
   38190                     68742   4th,   73048 by  84
  30552                          5   5th,  166549 by 125
  ------                    ------   6th,  378914 by  54
  343710                    343710   7th,  520813 by  63
```

Becauſe the ſecond product is equal to five times the firſt, and the firſt is equal to nine times the multiplicand, it is obvious that the ſecond product muſt be five times nine, or forty-five times as great as the multiplicand.

Secondly, If the multiplier be 5, which is the half of 10, we may annex a cypher and divide by 2. If it be 25, which is the fourth part of an 100, we may annex two cyphers, and divide by 4. Other contractions of the like kind will readily occur to the learner.

Thirdly, To multiply by 9, which is one leſs than 10, we may annex a cypher; and ſubtract the multiplicand from the number it compoſes. To multiply by 99, 999, or any number of 9's, annex as many cyphers, and ſubtract the multiplicand. The reaſon is obvious; and a like rule may be found, though the unit place be different from 9.

Fourthly, Sometimes a line of the product is more eaſily obtained from a former line of the ſame than from the multiplicand.

```
Ex. 1st.]  1372          2d.]  1348
             84                  36
          ------               -----
           5488                8088
          10976                4044
          ------               -----
         115248               48528
```

In the firſt example, inſtead of multiplying by 5, we may multiply 5488 by 2: and, in the ſecond, inſtead of multiplying by 3, we may divide 8088 by 2.

Fifthly, Sometimes the product of two or more figures may be obtained at once, from the product of a figure already found.

```
Ex. 1st.]  14356         2d.]   3462321
             648                  96484
          -------             ------------
          114848               13849284
         918784               166191408
         -------             332382816
         9302688             ------------
                              334058579364
```

In the ſecond example, we multiply firſt by 4; then, becauſe 12 times 4 is 48, we multiply the firſt line of the product by 12, inſtead of multiplying ſeparately by 8 and 4; laſtly, becauſe twice 48 is 96, we multiply the ſecond line of the product by 2, inſtead of multiplying ſeparately by 6 and 9.

When we follow this method, we muſt be careful to place the right-hand figure of each product under the right-hand figure of that part of the multiplier which it is derived from.

It would anſwer equally well in all caſes, to begin the work at the higheſt place of the multiplier; and contractions are ſometimes obtained by following that order.

```
Ex. 1st.]  3125   or   7125       2d.]   32452
            642         642               52575
         -------     -------          -----------
          18750       18750            162260
          12500      131250             811300
           6250      -------            2433900
         -------     2006250          -----------
         2006250                       1706163900
```

It is a matter of indifference which of the factors be uſed as the multiplier; for 4 multiplied by 3 gives the ſame product as 3 multiplied by 4; and the like holds univerſally true. To illuſtrate this, we may mark three rows of points, four in each row, placing the rows under each other; and we ſhall alſo have four rows, containing three points each, if we reckon the rows downwards.

```
. . . .
. . . .
. . . .
```

Multiplication is proven by repeating the operation, uſing the multiplier for the multiplicand, and the multiplicand for the multiplier. It may alſo be proven by diviſion, or by caſting out the 9's; of which afterwards; and an account, wrought by any contraction, may be proven by performing the operation at large, or by a different contraction.

Compound Multiplication.

Rule I. "If the multiplier do not exceed 12, the "operation is performed at once, beginning at the "loweſt place, and carrying according to the value of "the higher place."

```
[Examples.]       Cwt. qr. lb.    A. R. P.     lb. oz. dwt.
L.  13  6  7      12   2   8      13  3  18     7   5   9
           9               5              6             12
    --------      ----------      ---------     ----------
L. 119 19  3      62   3  12      83  —  28    89   5   8
```

Rule II. "If the multiplier be a compoſite number, whoſe component parts do not exceed 12, multiply firſt by one of theſe parts, then multiply the "product by the other. Proceed in the ſame manner "if there be more than two."

```
Ex. 1st.] L.   15   3   8 by 32=8×4
                        8
              -----------
          L.  121   9   4 = 8 times
                        4
              -----------
          L.  485  17   4 = 32 times.

     2d.] L.   17   3   8 by 75=5×5×3
                        3
              -----------
          L.   51  11   — = 3 times
                        5
              -----------
          L.  257  15   — = 15 times
                        5
              -----------
          L. 1288  15   — = 75 times
```

Note 1. Although the component parts will anſwer in any order, it is beſt, when it can be done, to take them in ſuch order as may clear off ſome of the lower places at the firſt multiplication, as is done in Ex. 2d.

Note 2. The operation may be proved, by taking the component parts in a different order, or dividing the multiplier in a different manner.

Rule III. "If the multiplier be a prime number, "multiply firſt by the compoſite number next lower, "then by the difference, and add the products."

L. 35 17 9 by 67=64×3
8 64= 8×8
L. 287 2 — = 8 times.
8
L. 2296 16 — = 64 times.
107 13 3 = 3 times.
L. 2404 9 3 = 67 times.

Here, becauſe 8 times 8 is 64, we multiply twice by 8, which gives L. 2296 16s. equal to 64 times the multiplicand; then we find the amount of 3 times the multiplicand, which is L. 107 : 13 : 3; and it is evident that theſe added, amount to 67, the multiplicand.

Rule IV. "If there be a compoſite number a little above the multiplier, we may multiply by that "number, and by the difference, and ſubtract the ſecond product from the firſt."

L. 17 4 5 by 106=108—2
12 108= 9×12
L. 206 13 —
9
L. 1859 17 — = 108 times.
34 8 10 = 2 times.
L. 1825 8 2 = 106 times.

Here we multiply by 12 and 9, the component parts of 108, and obtain a product of L. 1860 : 6s. equal to 108 times the multiplicand; and, as this is twice oftener than was required, we ſubtract the multiplicand doubled, and the remainder is the number ſought.

Example. L. 34 8 $2\frac{1}{2}$ by 3465

Rule V. "If the multiplier be large, multiply by "10, and multiply the product again by 10; by which "means you obtain an hundred times the given number. "If the multiplier exceed 1000, multiply by 10 again; "and continue it farther if the multiplier require it; "then multiply the given number by the unit-place of "the multiplier; the firſt product by the ten-place, the "ſecond product by the hundred-place; and ſo on. "Add the products thus obtained together."

L. 34 8 $2\frac{1}{2}$ by 5 = L. 172 1 $\frac{1}{2}$ = 5 times
10
10 times L. 344 2 1 by 6 = 2064 12 6 = 60 times
10
100 times L. 3441 — 10 by 4 = 13764 3 4 = 400 times
10
1000 times L. 34410 8 4 by 3 = 103231 5 — = 3000 times
L. 119232 1 $10\frac{1}{2}$ = 3465 times

The uſe of multiplication is to compute the amount of any number of equal articles, either in reſpect of meaſure, weight, value, or any other conſideration. The multiplicand expreſſes how much is to be reckoned for each article; and the multiplier expreſſes how many times that is to be reckoned. As the multiplier points out the number of articles to be added, it is always an abſtract number, and has no reference to any value or meaſure whatever. It is therefore quite improper to attempt the multiplication of ſhillings by ſhillings, or to conſider the multiplier as expreſſive of any denomination. The moſt common inſtances in which the practice of this operation is required, are, to find the amount of any number of parcels, to find the value of any number of articles, to find the weight or meaſure of a number of articles, *&c.*

This computation, for changing any ſum of money, weight, or meaſure, into a different kind, is called Reduction. When the given quantity is expreſſed in different denominations, we reduce the higheſt to the next lower, and add thereto the given number of that denomination; and proceed in like manner till we have reduced it to the loweſt denomination.

Example. To reduce L. 46 : 13 : $8\frac{3}{4}$ to farthings.

L. 46
20
920 ſhillings in L. 46
13
933 ſhillings in L. 46 13
12
11196 pence in L. 46 13
8
11204 pence in L. 46 13 8
4
44816 farthings in L. 46 13 8
3
44819 farthings in L. 46 13 $8\frac{3}{4}$

Or thus:

L. 46 13 $8\frac{3}{4}$
20
933
12
11204
4
44819

It is eaſy to take in or add the higher denomination at the ſame time we multiply the lower.

Chap. V. DIVISION.

In diviſion, two numbers are given; and it is required to find how often the former contains the latter. Thus, it may be aſked how often 21 contains 7, and the anſwer is exactly 3 times. The former given number (21) is called the *Dividend*; the latter (7) the *Diviſor;* and the number required (3) the *Quotient*. It frequently happens that the diviſion cannot be completed exactly without fractions. Thus it may be aſked, how often 8 is contained in 19? the anſwer is twice, and a remainder of 3.

This operation conſiſts in ſubtracting the diviſor from the dividend, and again from the remainder, as often as it can be done, and reckoning the number of ſubtractions; as,

21	19
7 firſt ſubtraction	8 firſt ſubtraction
14	11
7 ſecond ſubtraction	8 ſecond ſubtraction
7	3 remainder.
7 third ſubtraction.	
0	

As this operation, performed at large, would be very tedious, when the quotient is a high number, it is proper to ſhorten it by every convenient method; and, for this purpoſe, we may multiply the diviſor by any number whoſe product is not greater than the dividend, and ſo ſubtract it twice or thrice, or oftener, at the ſame time. The beſt way is to multiply it by the greateſt number, that does not raiſe the product too high, and that number is alſo the quotient. For example, to divide 45 by 7, we inquire what is the greateſt multiplier for 7, that does not give a product above 45; and we ſhall find that it is 6; and 6 times 7 is 42, which, ſubtracted from 45, leaves a remainder of 3. Therefore 7 may be ſubtracted 6 times from 45; or, which is the ſame thing, 45, divided by 7, gives a quotient of 6, and a remainder of 3.

If the diviſor do not exceed 12, we readily find the higheſt multiplier that can be uſed from the multiplication table. If it exceed 12, we may try any multiplier that we think will anſwer. If the product be greater than the dividend, the multiplier is too great; and, if the remainder, after the product is ſubtracted from the dividend, be greater than the diviſor, the multiplier is too ſmall. In either of theſe caſes, we muſt try another. But the attentive learner, after ſome practice, will generally hit on the right multiplier at firſt.

If the diviſor be contained oftener than ten times in the dividend, the operation requires as many ſteps as there are figures in the quotient. For inſtance, if the quotient be greater than 100, but leſs than 1000, it requires 3 ſteps. We firſt inquire how many hundred times the diviſor is contained in the dividend, and ſubtract the amount of theſe hundreds. Then we inquire how often it is contained ten times in the remainder, and ſubtract the amount of theſe tens. Laſtly, we inquire how many ſingle times it is contained in the remainder. The method of proceeding will appear from the following example:

```
                  To divide 5936 by 8.
                  From      5936
                  Take      5600 = 700 times 8
                            ----
                  Rem.       336
From which take              320 =  40 times 8
                            ----
                  Rem.        16
From which take               16 =   2 times 8
                            ----    ---
                               0    742 times 8 in all.
```

It is obvious, that as often as 8 is contained in 59, ſo many hundred times it will be contained in 5900, or in 5936; and, as often as it is contained in 33, ſo many ten times it will be contained in 330, or in 336; and thus the higher places of the quotient will be obtained with equal eaſe as the lower. The operation might be performed by ſubtracting 8 continually from the dividend, which will lead to the ſame concluſion by a very tedious proceſs. After 700 ſubtractions, the remainder would be 336; after 40 more, it would be 16; and after 2 more, the dividend would be entirely exhauſted. In practice, we omit the cyphers, and proceed by the following

RULE. 1st, "Aſſume as many figures on the left hand of the multiplier as contain the diviſor once or oftener: find how many times they contain it, and place the anſwer as the higheſt figure of the quotient.

2d, "Multiply the diviſor by the figure you have found, and place the product under the part of the dividend from which it is obtained.

3d, "Subtract the product from the figures above it."

4th, "Bring down the next figure of the dividend to the remainder, and divide the number it makes up, as before."

```
Examples.] 1st. 8)5936(742        2d. 63)30114(478
                  56..                   252..
                  --                     ---
                  33                     491
                  32                     441
                  --                     ---
                   16                     504
                   16                     504
                   --                     ---
                    0                       0
          3d. 365)974932(2671 17/365
                  730...
                  ----
                  2449
                  2190
                  ----
                   2593
                   2555
                   ----
                    382
                    365
                    ---
              Remainder 17
```

The numbers which we divide, as 59, 33, and 16, in the firſt example, are called *dividuals*.

It is uſual to mark a point under the figures of the dividend, as they are brought down, to prevent miſtakes.

If there be a remainder, the diviſion is completed by a vulgar fraction, whoſe numerator is the remainder, and its denominator the diviſor. Thus, in Ex. 3. the quotient is 2671, and remainder 17; and the quotient completed is 2671 $\frac{17}{365}$.

A number which divides another without a remainder is ſaid to meaſure it; and the ſeveral numbers which meaſure another, are called its *aliquot parts*. Thus, 2, 4, 6, 8; and 12, are aliquot parts of 24. As it is often uſeful to diſcover numbers which meaſure others, we may obſerve,

1st, Every number ending with an even figure, that is, with 2, 4, 6, 8, or, 0, is meaſured by 2.

2d, Every number ending with 5, or 0, is meaſured by 5.

3d, Every number, whoſe figures, when added, amount to an even number of 3's or 9's, is meaſured by 3 or 9, reſpectively.

Contractions and Varieties in Diviſion.

Firſt, When the diviſor does not exceed 12, the whole computation may be performed without ſetting down any figures except the quotient.

```
Ex.   7)35868(5124     or     7)35868
                                5124
```

Secondly, When the diviſor is a compoſite number, and one of the component parts alſo meaſures the dividend, we may divide ſucceſſively by the component parts.

Ex. 1st.] 30114 by 63.
9)30114
7) 3346
Quotient 478

2d.] 975 by 105=5×7×3
5)975
3)195
7) 65
Quotient $9\frac{2}{7}$

This method might be alſo uſed, although the component parts of the diviſor do not meaſure the dividend; but the learner will not underſtand how to manage the remainder till he be acquainted with the doctrine of vulgar fractions.

Thirdly, When there are cyphers annexed to the diviſor, cut them off, and cut off an equal number of figures from the dividend; annex theſe figures to the remainder. *Ex.* To divide 378643 by 5200.

52|00)3786|43($72\frac{4243}{5200}$
364
146
104
4243

The reaſon will appear, by performing the operation at large, and comparing the ſteps.

To divide by 10, 100, 1000, or the like. Cut off as many figures on the right hand of the dividend as there are cyphers in the diviſor. The figures which remain on the left hand compoſe the quotient, and the figures cut off compoſe the remainder.

Fourthly, When the diviſor conſiſts of ſeveral figures we may try them ſeparately, by inquiring how often the firſt figure of the diviſor is contained in the firſt figure of the dividend, and then conſidering whether the ſecond and following figures of the diviſor be contained as often in the correſponding ones of the dividend with the remainder (if any) prefixed. If not, we muſt begin again, and make trial of a lower number. When the remainder is nine, or upwards, we may be ſure the diviſion will hold through the lower places; and it is unneceſſary to continue the trial farther.

Fifthly, We may make a table of the products of the diviſor, multiplied by the nine digits, in order to diſcover more readily how often it is contained in each dividual. This is convenient when the dividend is very long, or when it is required to divide frequently by the ſame diviſor.

73 by 2 = 146
3 = 219
4 = 292
5 = 365
6 = 438
7 = 511
8 = 584
9 = 657

73)53872694(737982
511
277
219
582
511
716
657
599
584
154
146
Rem. 8

Sixthly, To divide by 9, 99, 999, or any number of 9's, tranſcribe under the dividend part of the ſame, ſhifting the higheſt figure as many places to the right hand as there are 9's in the diviſor. Tranſcribe it again, with the like change of place, as often as the length of the dividend admits; add theſe together, and cut off as many figures from the right hand of the ſum as there are 9's in the diviſor. The figures which remain on the left hand compoſe the quotient, and thoſe cut off the remainder.

If there be any carriage to the unit-place of the quotient, add the number carried likewiſe to the remainder, as in Ex. 2.; and if the figures cut off be all 9's, add 1 to the quotient, and there is no remainder.

Examples. 1st.] 99)324123
3241
32
3273|96
Quotient 3273 and rem. 96.

2d.] 99)547825
5478
54
5533|57
1
Quotient 5333.58 rem.

3d.] 999)476523
476
476|999
1
Quotient 477

To explain the reaſon of this, we muſt recollect, that whatever number of hundreds any dividend contains, it contains an equal number of 99's, together with an equal number of units. In Ex. 1. the dividend contains 3241 hundreds, and a remainder of 23. It therefore contains 3241 times 99, and alſo 3241 beſides the remainder already mentioned. Again, 3241 contains 32 hundreds, and a remainder of 51: it therefore contains 32 99's, and alſo 32, beſides the remainder of 41. Conſequently the dividend contains 99, altogether, 3241 times, and 32 times, that is 3273 times, and the remainder conſiſts of 23, 41, and 32, added, which makes 96.

As multiplication ſupplies the place of frequent additions, and diviſion of frequent ſubtractions, they are only repetitions and contractions of the ſimple rules, and when compared together, their tendency is exactly oppoſite. As numbers, increaſed by addition, are diminiſhed and brought back to their original quantity by ſubtraction; in like manner, numbers compounded by multiplication are reduced by diviſion to the parts from which they were compounded. The multiplier ſhows how many additions are neceſſary to produce the number; and the quotient ſhows how many ſubtractions are neceſſary to exhauſt it. It follows that the product, divided by the multiplicand, will quote the multiplier; and, becauſe either factor may be aſſumed for the multiplicand, therefore the product, divided by either factor, quotes the other. It follows, alſo, that the dividend is equal to the product of the diviſor and quotient multiplied together; and hence theſe operations mutually prove each other.

To prove multiplication. Divide the product by either factor. If the operation be right, the quotient is the other factor, and there is no remainder.

To prove diviſion. Multiply the diviſor and quotient together; to the product add the remainder, if any; and, if the operation be right, it makes up the dividend. Otherwiſe divide the dividend (after ſubtracting the remainder, if any) by the quotient. If the operation be right, it will quote the diviſor. The reaſon of all theſe rules may be collected from the laſt paragraph.

12 *Compound Diviſion.*

Rule I. "When the dividend only conſiſts of different denominations, divide the higher denomination, and reduce the remainder to the next lower, taking in (p. 659. Rule V.) the given number of that denomination, and continue the diviſion."

Examples.

Divide L. 465 : 12 : 8
by 72.
L. s. d. L. s. d.
72) 465 12 8 (6 9 4
432 · · ·
33
20
72)672
648
24
12
72)296
288
8 Rem.

Or we might divide by the component parts of 72, (as explained under *Thirdly*, p. 661).

Divide 345 cwt. 1 q. 8 lb.
by 22.
Cwt. q. lb. Cwt. q. lb.
22) 345 1 8 (15 2 21
22 · · ·
125
110
15
4
22)61
44
17
28
144
34
22)484
44
44
44
0

Rule II. "When the diviſor is in different denominations, reduce both diviſor and dividend to the loweſt denomination, and proceed as in ſimple diviſion. The quotient is an abſtract number."

To divide L. 38 : 13 s.
by L. 3 : 4 : 5.
L. 3 4 5 L. 38 13
20 20
64 773
12 12
773)9276(12 quote.
773
1546
1546
0

To divide 96 Cwt. 1 q. 20 lb.
by 3 cwt. 2 q. 8 lb.
Cwt. q. lb. Cwt. q. lb.
3 2 8) 96 1 20
4 4
14 385
28 28
120 3100
28 770
4|00) 108|00 (27 quote.

It is beſt not to reduce the terms lower than is neceſſary to render them equal. For inſtance, if each of them conſiſts of an even number of ſixpences, fourpences, or the like, we reduce them to ſixpences, or fourpences, but not to pence.

The uſe of diviſion is to find either of the factors by whoſe multiplication a given number is produced, when the other factor is given; and therefore is of two kinds, ſince either the multiplier or the multiplicand may be given. If the former be given, it diſcovers what that number is which is contained ſo many times in another. If the latter be given, it diſcovers how many times one number is contained in another. Thus, it anſwers the queſtions of an oppoſite kind to thoſe mentioned under Rule IV. p. 659. as, To find the quantity of a ſingle parcel or ſhare; to find the value weight, or meaſure, of a ſingle article; to find how much work is done, proviſions conſumed, intereſt incurred, or the like, in a ſingle day, &c.

The laſt uſe of diviſion is a kind of reduction exactly oppoſite to that deſcribed under Rule V. p. 659. The manner of conducting and arranging it, when there are ſeveral denominations in the queſtion, will appear from the following examples.

1. To reduce 15783 pence
to pounds, ſh. and pence.
20
12) 15783(1315 (65
12 · · · 120 ·
37 115
36 100
18 15
12
63
60
3
Anſwer, L. 65 : 15 : 3.

2. To reduce 174865 grs. to
lbs. oz. and dwt. Troy.
20 12
24) 174865 (7286 (364 (30
168 · · · 60 · · 36 ·
68 128 04
48 120
206 86
192 80
145 6
144
1
Anſwer, 30 lb. 4 oz. 6 dwt. 1 gr.

In the firſt example, we reduce 15783 pence to ſhillings, by dividing by 12, and obtain 1315 ſhillings, and a remainder of 3 pence. Then we reduce 1315 ſhillings to pounds, by dividing by 20, and obtain 65 pounds, and a remainder of 15 ſhillings. The diviſions might have been contracted.

In the practice of arithmetic, queſtions often occur which require both multiplication and diviſion to reſolve. This happens in reduction, when the higher denomination does not contain an exact number of the lower.

Rule *for mixed reduction.* "Reduce the given denomination by multiplication to ſome lower one, which is an aliquot part of both; then reduce that by diviſion to the denomination required."

Ex. Reduce L. 31742 to guineas.

31742
20
21)634840(30230
63 · · · ·
048
42
64
63
10 Anſwer, 30230 guineas and 10 ſhill.

Here we multiply by 20, which reduces the pounds to ſhillings; and divide the product by 21, which reduces the ſhillings to guineas.

As Portugueze money frequently paſſes here in payments, we ſhall give a table of the pieces, and their value.

A moidore	=	L. 1	7	—
A half moidore	=	—	13	6
A quarter moidore	=	—	6	9
A double Joannes	=	3	12	—
A Joannes	=	1	16	—
A half ditto	=	—	18	—
A quarter ditto	=	—	9	—
An eighth ditto	=	—	4	6

Note 1. Guineas may be reduced to pounds, by adding one twentieth part of the number.

2. Pounds may be reduced to merks by adding one half.

3. Merks may be reduced to pounds by ſubtracting one third.

4. Four moidores are equal to three Joannes: wherefore moidores may be reduced to Joannes, by ſubtracting one fourth; and Joannes to moidores, by adding one third.

5. Five Joannes are equal to L. 9. Hence it is eaſy to reduce Portugueze money to Sterling.

Another caſe, which requires both multiplication and diviſion, is, when the value, weight, meaſure, or duration of any quantity is given, and the value, &c. of a different quantity required, we firſt find the value, &c. of a ſingle article by diviſion, and then the value, &c. of the quantity required, by multiplication.

Ex. If 3 yards coſt 15 s. 9 d. what will 7 yards coſt, at the ſame rate?

	s.	d.	
3)	15	9	Price of 3 yards.
	5	3	Price of 1 yard by Rule IV. p. 659.
	7		
L. 1	16	9	Price of 7 yards (by par. 1. p. 662. col. 2.)

Many other inſtances might be adduced, where the operation and the reaſon of it are equally obvious. Theſe are generally, though unneceſſarily, referred to the rule of proportion.

We ſhall now offer a general obſervation on all the operations in arithmetic. When a computation requires ſeveral ſteps, we obtain a juſt anſwer, whatever order we follow. Some arrangements may be preferable to others in point of eaſe, but all of them lead to the ſame concluſion. In addition, or ſubtraction, we may take the articles in any order, as is evident from the idea of number; or, we may collect them into ſeveral ſums, and add or ſubtract theſe, either ſeparately or together. When both the ſimple operations are required to be repeated, we may either complete one of them firſt, or may introduce them promiſcuouſly; and the compound operations admit of the ſame variety. When ſeveral numbers are to be multiplied together, we may take the factors in any order, or we may arrange them into ſeveral claſſes, find the product of each claſs, and then multiply the products together. When a number is to be divided by ſeveral others, we may take the diviſors in any order, or we may multiply them into each other, and divide by the product; or we may multiply them into ſeveral parcels, and divide by the products ſucceſſively. Laſtly, when multiplication and diviſion are both required, we may begin with either; and, when both are repeatedly neceſſary, we may collect the multipliers into one product, and the diviſors into one another; or, we collect them into parcels, or uſe them ſingly, and that in any order. Still, we ſhall obtain the proper anſwer, if none of the terms be neglected.

When both multiplication and diviſion are neceſſary to obtain the anſwer of a queſtion, it is generally beſt to begin with the multiplication, as this order keeps the account as clear as poſſible from fraction. The example laſt given may be wrought accordingly as follows:

	s.	d.
	15	9
		7
3)5	10	3
1	16	9

Some accountants prove the operations of arithmetic by a method which they call caſting out the 9's, depending on the following principles:

Firſt, if ſeveral numbers be divided by any diviſor, (the remainders being always added to the next number), the ſum of the quotients, and the laſt remainder, will be the ſame as thoſe obtained when the ſum of the numbers is divided by the ſame diviſor. Thus, 19, 15, and 23, contain, together, as many 5's, as many 7's, &c. as their ſum 57 does, and the remainders are the ſame; and, in this way, addition may be proven by diviſion. It is from the correſpondence of the remainders, that the proof, by caſting out the 9's, is deduced.

Secondly, If any figure, with cyphers annexed, be divided by 9, the quotient conſiſts entirely of that figure; and the remainder is alſo the ſame. Thus, 40, divided by 9, quotes 4, remainder 4; and 400, divided by 9, quotes 4, remainder 44. The ſame holds with all the digits; and the reaſon will be eaſily underſtood; every digit, with a cypher annexed, contains exactly ſo many ten's; it muſt therefore contain an equal number of 9's, beſides a remainder of an equal number of units.

Thirdly, If any number be divided by 9, the remainder is equal to the ſum of the figures of the number, or to the remainder obtained, when that ſum is divided by 9. For inſtance, 3765, divided by 9, leave a remainder of 3, and the ſum of 3, 7, 6, and 5, is 21; which, divided by 9, leaves a remainder of 3. The reaſon of this will appear from the following illuſtration:

3000 divided by 9	quotes	333;	remainder	3
700	quotes	77;	remainder	7
60	quotes	6;	remainder	6
5	quotes	0;	remainder	5
3765		416	Sum of rem.	21
Again; 21 divided by 9	quotes	2;	remainder	3

Wherefore, 3765 divid. by 9 quotes 418; remainder 3; for the reaſon given. Hence we may collect the following rules for practice:

To caſt the 9's out of any number, or to find what remainder will be left when any number is divided by 9: Add the figures; and, when the ſum exceeds 9, add the figures which would expreſs it. Paſs by the 9's; and, when the ſum comes exactly to 9, neglect it, and begin anew. For example, if it be required to caſt the 9's out of 3573294, we reckon thus: 3 and

5 is 8, and 7 is 15; 1 and 5 is 6, and 3 is 9, which we neglect; 2 and (paſſing by 9), 4 is 6; which is the remainder or Result. If the article out of which the 9's are to be caſt contains more denominations than one, we caſt the 9's out of the higher, and multiply the reſult by the value of the lower, and carry on the product (caſting out the 9's, if neceſſary), to the lower.

To prove addition, caſt the 9's out of the ſeveral articles, carrying the reſults to the following articles; caſt them alſo out of the ſum. If the operation be right, the reſults will agree.

To prove ſubtraction, caſt the 9's out of the minuend; caſt them alſo out of the ſubtrahend and remainder together; and if you obtain the ſame reſult, the operation is preſumed right.

To prove multiplication, caſt the 9's out of the multiplicand, and alſo out of the multiplier, if above 9. Multiply the reſults together, and caſt the 9's, if neceſſary, out of their product. Then caſt the 9's out of the product, and obſerve if this reſult correſpond with the former.

Ex. 1st.] 9276 reſ. 6×8=48 reſ. 3.
8
74208 reſ. 3.

2d.] 7898 reſ. 5×3=15 reſ. 6.
48 reſ. 3
63184
31592
379104 reſ. 6.

The reaſon of this will be evident, if we conſider multiplication under the view of repeated addition. In the firſt example it is obviouſly the ſame. In the ſecond, we may ſuppoſe the multiplicand repeated 48 times. If this be done, and the 9's caſt out, the reſult, at the end of the 9th line, will be 0; for any number, repeated 9 times, and divided by 9, leaves no remainder. The ſame muſt happen at the end of the 18th, 27th, 36th, and 45th lines; and the laſt reſult will be the ſame as if the multiplicand had only been repeated 3 times. This is the reaſon for caſting out the 9's from the multiplier as well as the multiplicand.

To prove diviſion, caſt the 9's out of the diviſor, and alſo out of the quotient; multiply the reſults, and caſt the 9's out of the product. If there be any remainder, add to it the reſult, caſting out the 9's, if neceſſary. If the account be right, the laſt reſult will agree with that obtained from the dividend.

Ex. 42) 2490 (59 reſ. 5×6=30 reſ. 3.
reſ. 6 210
390
378
Rem. 12 - - reſ. 3.

And the reſult of the dividend is 6

This depends on the ſame reaſon as the laſt; for the dividend is equal to the product of the diviſor and quotient added to the remainder.

We cannot recommend this method, as it lies under the following diſadvantages:

Firſt, If an error of 9, or any of its multiples, be committed, the reſults will nevertheleſs agree; and ſo the error will remain undiſcovered. And this will always be the caſe, when a figure is placed or reckoned in a wrong column; which is one of the moſt frequent cauſes of error.

Secondly, When it appears by the diſagreement of the reſults, that an error has been committed, the particular figure or figures in which the error lies are not pointed out; and, conſequently, it is not eaſily corrected.

Chap. VI. RULE of PROPORTION.

Sect. i. Simple Proportion. 13

Quantities are reckoned proportional to each other, when they are connected in ſuch a manner, that, if one of them be increaſed or diminiſhed, the other increaſes or diminiſhes at the ſame time; and the degree of the alteration on each is a like part of its original meaſure; thus four numbers are in the ſume proportion, the firſt to the ſecond as the third to the fourth, when the firſt contains the ſecond, or any part of it, as often as the third contains the fourth, or the like part of it. In either of theſe caſes, the quotient of the firſt, divided by the ſecond, is equal to that of the third divided by the fourth; and this quotient may be called the *meaſure of the proportion*.

Proportionals are marked down in the following manner:
6 : 3 :: 8 : 4
12 : 36 :: 9 : 27
9 : 6 :: 24 : 18
16 : 24 :: 10 : 15

The rule of proportion directs us, when three numbers are given, how to find a fourth, to which the third may have the ſame proportion that the firſt has to the ſecond. It is ſometimes called the *Rule of Three*, from the three numbers given; and ſometimes the *Golden Rule*, from its various and extenſive utility.

Rule. "Multiply the ſecond and third terms together, and divide the product by the firſt."

Ex. To find a fourth proportional to 18, 27, and 34.
18 : 27 :: 34 : 51
34
108
81
18)918(51
90
18
18
0

To explain the reaſon of this, we muſt obſerve, that, if two or more numbers be multiplied or divided alike, the products or quotients will have the ſame proportion.
18 : 27
Multiplied by 34, 612 : 918
Divided by 18, 34 : 51

The products 612, 918, and the quotients 34, 51, have therefore the ſame proportion to each other that 18 has to 27. In the courſe of this operation, the products of the firſt and third term is divided by the firſt; therefore the quotient is equal to the third.

The firſt and ſecond terms muſt always be of the ſame kind; that is, either both monies, weights, meaſures, both abſtract numbers, or the like. The fourth, or number ſought, is of the ſame kind as the third.

When any of the terms is in more denominations than one, we may reduce them all to the loweſt. But this is not always neceſſary. The firſt and ſecond ſhould not be reduced lower than directed p. 662. col. 1. par. *ult.*; and, when either the ſecond or third is a ſimple number, the other, though in different denominations, may be multiplied without reduction.

L. *s.* *d.*

Ex. 5 : 7 :: 25 11 3

7

——— *L.* *s.* *d.*

5)178 18 9(35 19 9

The accountant muſt conſider the nature of every queſtion, and obſerve the circumſtance which the proportion depends on; and common ſenſe will direct him to this, if the terms of the queſtion be underſtood. It is evident that the value, weight, and meaſure of any commodity is proportioned to its quantity; that the amount of work or conſumption is proportioned to the time; that gain, loſs, or intereſt, when the rate and time are fixed, is proportioned to the capital ſum from which it ariſes; and that the effect produced by any cauſe is proportioned to the extent of the cauſe. In theſe, and many other caſes, the proportion is direct, and the number ſought increaſes or diminiſhes along with the term from which it is derived.

In ſome queſtions, the number ſought becomes leſs, when the circumſtances from which it is derived become greater. Thus, when the price of goods increaſes, the quantity which may be bought for a given ſum is ſmaller. When the number of men employed at work is increaſed, the time in which they may complete it becomes ſhorter; and, when the activity of any cauſe is increaſed, the quantity neceſſary to produce a given effect is diminiſhed. In theſe, and the like, the proportion is ſaid to be inverſe.

General Rule *for ſtating all queſtions, whether direct or inverſe.* "Place that number for the third "term which ſignifies the ſame kind of thing with "what is ſought, and conſider whether the number "ſought will be greater or leſs. If greater, place the "leaſt of the other terms for the firſt; but, if leſs, "place the greateſt for the firſt."

Ex. 1ſt.] If 30 horſes plough 12 acres, how many will 42 plough in the ſame time?

H. H. A.

30 : 42 :: 12

Here, becauſe the thing ſought is a number of acres, we place 12, the given number of acres, for the third term; and, becauſe 42 horſes will plough more than 12, we make the leſſer number 30, the firſt term, and the greater number, 42, the ſecond term.

2d.] If 40 horſes be maintained for a certain ſum on hay, at 5 d. per ſtone, how many will be maintained on the ſame ſum when the price of hay riſes to 8 d.

d. d. H.

8 : 5 :: 40

Here, becauſe a number of horſes is ſought, we make the given number of horſes, 40, the third term; and, becauſe fewer will be maintained for the ſame money, when the price of hay is dearer, we make the greater price, 8 d. the firſt term; and the leſſer price, 5 d. the ſecond term.

The firſt of theſe examples is direct, the ſecond inverſe. Every queſtion conſiſts of a ſuppoſition and demand. In the firſt, the ſuppoſition is, that 30 *horſes plough 12 acres*, and the demand, *how many 42 will plough?* and the firſt term of the proportion, 30, is found in the ſuppoſition, in this, and every other direct queſtion. In the ſecond, the ſuppoſition is, *that 40 horſes are maintained on hay at 5 d.* and the demand, *how many will be maintained on hay at 8 d?* and the firſt term of the proportion, 8, is found in the demand, in this and every other inverſe queſtion.

When an account is ſtated, if the firſt and ſecond term, or firſt and third, be meaſured by the ſame number, we may divide them by that meaſure, and uſe the quotients in their ſtead.

Ex. If 36 yards coſt 42 ſhillings, what will 27 coſt?

Y. Y. ſh.

36 : 27 :: 42

4 : 3 :: 42

3

—— s. d.

4)126(31 6

Here 36 and 27 are both meaſured by 9, and we work with the quotients 4 and 3.

Sect. ii. Compound Proportion. 14

Sometimes the proportion depends upon ſeveral circumſtances. Thus, it may be aſked, if 18 men conſume 6 bolls corn in 40 days, how much will 24 men conſume in 56 days? Here the quantity required depends partly on the number of men, partly on the time, and the queſtion may be reſolved into the two following ones:

1ſt, If 18 men conſume 6 bolls in a certain time, how many will 24 men conſume in the ſame time?

M. M. B. B.

18 : 24 :: 6 : 8

6

——

18)144(8

Anſwer. 24 men will conſume 8 bolls in the ſame time.

2d, If a certain number of men conſume 8 bolls in 28 days, how many will they conſume in 56 days?

D. D. B. B.

28 : 56 :: 8 : 16

8

——

28)448(16

Anſ. The ſame number of men will conſume 16 bolls in 56 days?

In the courſe of this operation, the original number of bolls, 6, is firſt multiplied into 24, then divided by 18, then multiplied into 8, then divided by 28. It would anſwer the ſame purpoſe to collect the multipliers into one product, and the diviſors into another; and then to multiply the given number of bolls by the former, and divide the product by the latter. p. 663. col. 1. par. *ult.*

The above queſtion may therefore be ſtated and wrought as follows:

Men 18 : 24 :: 6 bolls
Days 28 : 56
144 144
36 120
504 1344
6
504)3064(16

Here we multiply 18 into 40 for a divisor, and 6 into the product of 24 by 56, for a dividend.

"In general, ſtate the ſeveral particulars on which "the queſtion depends, as ſo many ſimple proportions, "attending to the ſenſe of the queſtion to diſcover "whether the proportions ſhould be ſtated directly or "inverſely; then multiply all the terms in the firſt rank "together, and all thoſe in the ſecond rank together; "and work with the products as directed in the ſimple "rule (Sect. i. p. 664.)"

Example. If 100 men make 3 miles of road in 27 days, in how many days will 150 men make 5 miles?

Men 150 : 100 :: 27 days
Miles 3 5
450 500
27
450)13500(30 days anſwer.

Here the firſt ſtating is inverſe, becauſe more men will do it in fewer days; but the ſecond is direct, becauſe more miles will require more days.

The following contraction is often uſeful. After ſtating the proportion, if the ſame number occurs in both ranks, daſh it out from both; or, if any term in the firſt rank, and another in the ſecond rank, are meaſured by the ſame numbers, daſh out the original terms, and uſe the quotients in their ſtead.

Ex. If 18 men conſume L. 30 value of corn in 9 months, when the price is 16s. per boll, how many will conſume L. 54 value in 6 months, when the price is 12s. per boll? In this queſtion, the proportion depends upon three particulars, the value of corn, the time, and the price. The firſt of which is direct, becauſe the more the value of proviſions is, the more time is required to conſume them; but the ſecond and third are inverſe, for the greater the time and price is, fewer men will conſume an equal value.

Value $\cancel{30}$: $\cancel{54}$ :: 18 men
Months $\cancel{6}$: $\cancel{9}$
Price $\cancel{12}$: $\cancel{16}$
10 9
$\cancel{3}$ $\cancel{3}$
4
36
18
288
36
10)648(64$\frac{8}{10}$.

Here we obſerve that 6 in the firſt rank meaſures 54 in the ſecond: ſo we daſh them out, and place the quotient 9 in the ſecond rank. Next, becauſe 30 and 9 are both meaſured by 3, we daſh them out, and place down the quotients 10 and 3; then, becauſe 12 and 16 are both meaſured by 4, we daſh them out, and place down the quotients 3 and 4. Laſtly, becauſe there is now 3 in both columns, we daſh them out, and work with the remaining terms, according to the rule.

The monies, weights, and meaſures, of different countries, may be reduced from the proportion which they bear to each other.

Ex. If 112 lb. averdupois make 104 lb. of Holland, and 100 lb. of Holland make 89 of Geneva, and 110 of Geneva make 117 of Seville, how many lbs. of Seville will make 100 lb. averdupois.

112 : 104 :: 100
100 : 89
110 : 117

If it be required, how many lb. averdupois will make 100 of Seville, the terms would have been placed in the different columns thus:

104 : 112 :: 100
89 : 100
117 : 110

Sect. iii. Distributive Proportion. 15

If it be required to divide a number into parts, which have the ſame proportion to each other that ſeveral other given numbers have, we add theſe numbers together, and ſtate the following proportion: As the ſum is to the particular numbers, ſo is the number required to be divided to the ſeveral parts ſought.

Ex. 1st.] Four partners engage to trade in company; A's ſtock is L.150, B's L.320, C's L.350, D's L.500, and they gain L.730; Required how much belongs to each, if the gain be divided among them in proportion to their ſtocks?

						Rem.
A's ſtock	L.150	1320 : 150 :: 730 :	L. 82	19	1	— 120
B's	320	1320 : 320 :: 730 :	176	19	4	— 960
C's	350	1320 : 350 :: 730 :	193	11	2	— 720
D's	500	1320 : 500 :: 730 :	276	10	3	— 840
Whole ſtock	1320	Proof	L.730			

This account is proved by adding the gains of the partners; the ſum of which will be equal to the whole gain, if the operation be right; but, if there be remainders, they muſt be added, their ſum divided by the common diviſor, and the quotient carried to the loweſt place.

Ex. 2^{d}.] A bankrupt owes A L.146, B L.170, C L.45, D L.480, and E L.72; his whole effects are only L.342 : 7 : 6. How much ſhould each have?

A's debt	L.146	913 : 146 :: L.342 7 6 :	L. 54	15		A's ſhare.
B's	170	913 : 170 :: 342 7 6	63	15		B's
C's	45	913 : 45 :: 342 7 6	16	17	6	C's
D's	480	913 : 480 :: 342 7 6	180			D's
E's	72	913 : 72 :: 342 7 6	27			E's
	913		L. 342	7	6	

This might alſo be calculated, by finding what compoſition the bankrupt was able to pay per pound; which is obtained by dividing the amount of his effects by the amount of his debts; and comes to 7s. 6d. and then finding by the rules of practice, how much each debt came to at that rate.

Chap. VII. RULES for PRACTICE. 16

The operations explained in the foregoing chapters comprehend the whole ſyſtem of arithmetic, and are ſufficient for every computation. In many caſes, however, the work may be contracted, by adverting to the particular circumſtances of the queſtion. We ſhall explain, in this chapter, the moſt uſeful methods which practice has ſuggeſted for rendering mercantile computations eaſy; in which, the four elementary rules of arithmetic are ſometimes jointly, ſometimes ſeparately employed.

Sect. i. Computation of Prices. 17

The value of any number of articles, at a pound, a ſhilling, Practice.

ſhilling, or a penny, is an equal number of pounds, ſhillings, or pence; and theſe two laſt are eaſily reduced to pounds. The value, at any other rate, may be calculated by eaſy methods, depending on ſome contraction already explained, or on one or more of the following principles.

1st, If the rate be an aliquot part of a pound, a ſhilling, or a penny, then an exact number of articles may be bought for a pound, a ſhilling, or a penny; and the value is found by dividing the given number accordingly. Thus, to find the price of ſo many yards at 2 s. 6 d. which is the eighth part of a pound, we divide the quantity by eight, becauſe every eight yards coſt L. 1.

2d, If the rate be equal to the ſum of two other rates which are eaſily calculated, the value may be found by computing theſe ſeparately, and adding the ſums obtained. Thus, the price of ſo many yards, at 9d. is found, by adding their prices, at 6d. and 3d. together.

3d, If the rate be equal to the difference of two eaſy rates, they may be calculated ſeparately, and the leſſer ſubtracted from the greater. Thus, the value of ſo many articles at 11d. is found, by ſubtracting their value at a penny from their value at a ſhilling. We may ſuppoſe that a ſhilling was paid for each article, and then a penny returned on each.

4th, If the rate be a compoſite number, the value may be found by calculating what it comes to at one of the component parts, and multiplying the ſame by the other.

CASE I. "When the rate is an aliquot part of a "pound, divide the quantity by the number which "may be bought for a pound."

Table of the aliquot parts of L. 1.

10 ſhillings	= $\frac{1}{2}$ of L. 1.	1 ſhilling 4d.	= $\frac{1}{15}$ of L. 1.
6 s. 8 d.	= $\frac{1}{3}$	1 s. 3 d.	= $\frac{1}{16}$
5 s.	= $\frac{1}{4}$	1 s.	= $\frac{1}{20}$
4 s.	= $\frac{1}{5}$	8 d.	= $\frac{1}{30}$
3 s. 4d.	= $\frac{1}{6}$	6 d.	= $\frac{1}{40}$
2 s. 6 d.	= $\frac{1}{8}$	4 d.	= $\frac{1}{60}$
2 s.	= $\frac{1}{10}$	3 d.	= $\frac{1}{80}$
1 s. 8 d.	= $\frac{1}{12}$	2 d.	= $\frac{1}{120}$

Ex. 1st.] What is the value of 7463 yards, at 4 s?

5)7463

L. 1492 12 s.

2d.] What is the value of 1773 yards at 3 d.

8|0)177|3

L. 22 3 3

In the firſt example we divide by 5, becauſe 4 s. is $\frac{1}{5}$ of a pound; the quotient 1492 ſhows how many pounds they amount to; beſides which there remains three yards at 4 s. and theſe come to 12 s. In the ſecond example, we divide by 80, as directed, and the quotient gives L. 22, and the remainder 13 yards, which at 3d. comes to 3 s. and 3d.

This method can only be uſed in calculating for the particular prices ſpecified in the table. The following 6 caſes comprehend all poſſible rates, and will therefore exhibit different methods of ſolving the foregoing queſtions.

CASE II. "When the rate conſiſts of ſhillings only, "multiply the quantity by the number of ſhillings, "and divide the product by 20: Or, if the number "of ſhillings be even, multiply by half the number, "and divide the product by 10.

Ex. 1st.] 4573 at 13 s.

```
      4573
        13
     -----
     13719
     4573
     -----
  20)59449
  L. 2972  9 s.
```

2d.] 7543 at 14 s.

```
      7543
         7
     -----
  10)52801
  L. 5280 2 s.
```

The learner will eaſily perceive, that the method in which the ſecond example is wrought, muſt give the ſame anſwer as if the quantity had been multiplied by 14, and divided by 20; and, as the diviſion by 10 doubles the laſt figure for ſhillings, and continues all the reſt unchanged for pounds, we may obtain the anſwer at once, by doubling the right-hand figure of the product before we ſet it down.

If the rate be the ſum of two or more aliquot parts of a pound, we may calculate theſe as directed in Caſe I. and add them. If it be any odd number of ſhillings, we may calculate for the even number next lower, and add thereto the value at a ſhilling. If it be 19 s. we may ſubtract the value at a ſhilling, from the value at pound.

CASE III. "When the rate conſiſts of pence only."

Method 1. If the rate be an aliquot part of a ſhilling, divide the quantity accordingly, which gives the anſwer in ſhillings; if not, it may be divided into two or more aliquot parts: calculate theſe ſeparately, and add the values; reduce the anſwer to pounds.

1 penny is $\frac{1}{12}$ of a ſhilling.
2 d. $\frac{1}{6}$ of ditto.
3 d. $\frac{1}{4}$ of ditto.
4 d. $\frac{1}{3}$ of ditto.
6 d. $\frac{1}{2}$ of ditto.
5 d. is the ſum of 4 d. and 1 d. or of 2 d. and 3 d.
7 d. is the ſum of 4 d. and 3 d. or of 6 d. and 1 d.
8 d. is the ſum of 6 d. and 2 d. or the double of 4d.
9 d. is the ſum of 6 d. and 3 d.
10 d. is the ſum of 6 d. and 4 d.
11 d. is the ſum of 6 d. 3 d. and 2 d.

Ex. 1st.] 7423 at 4 d.

```
     3)7423
    20)2474  4
    L. 123 14  4
```

Here, becauſe 4 d. is one third of a ſhilling, we divide by 3, which gives the price in ſhills. and reduce theſe by diviſion to pounds.

2d.] 9786 at 9 d.

```
At 6d.=½ of 1 s.  4893
At 3d.=½ of 6d.   2446  6
  —               ----------
At 9d.            7339  6
               L. 366  19  6
```

Here we ſuppoſe, that firſt 6 d. and then 3 d. is paid for each article; half the quantity is the number of ſhillings which they would coſt at 6 d. each. Half of that is the coſt at 3d. and theſe added and reduced give the anſwer.

3d.] 4856 at 11 d.

```
At 6d.=½ of 1 s.  2428
At 3d.=½ of 6d.   1214
At 2d.=⅓ of 6d.    809  4
  —               ----------
  11d.            4451  4
               L. 222  11  4
```

Here we calculate what the articles would coſt at 6d. at 3d. and at 2d. and add the values.

It is ſometimes eaſier to calculate at two rates, whoſe difference is the rate required, and ſubtract the leſſer value from the greater. Thus, the laſt example may be wrought by ſubtracting the value at a penny from the value at a ſhilling. The remainder muſt be the value at 11d.

At 1 s. 4856 s.
At 1 d.=$\frac{1}{12}$ 404 8
At 11d. 4451 4
L. 222 11 4

10 d. may be wrought as the difference of 1 s. and 2 d.; and ſeveral other rates in like manner.

Meth. 2. *Multiply the quantity by the number of pence, the product is the anſwer in pence. Reduce it to pounds.*

Method 3. *Find the value at a penny by diviſion, and multiply the ſame by the number of pence.*

CASE IV. " When the rate conſiſts of farthings on-" ly, find the value in pence, and reduce it by divi-" ſion to pounds."

Ex. 1st. 37843 at 1 farthing.
4)37843 farth.
12) 9460$\frac{3}{4}$ pence
788 4$\frac{3}{4}$
L. 39 8 4$\frac{3}{4}$

2d. 23754 at $\frac{1}{2}$d.
2)23754 halfpence
12)11877 pence
989 9
L. 49 9 9

3d. 72564 at $\frac{3}{4}$ d.
3
4)217692 farth.
1) 54423 pence
4535 3
L. 226 15 3

Or, 72564
At $\frac{1}{2}$ d. 3682 d.
At $\frac{1}{4}$ d. 18141 d.
12)54423 d.
4535 3
L. 220 15 3

We may alſo find the amount in twopences, threepences, fourpences, or ſixpences, by one diviſion, and reduce theſe as directed in Caſe I.

CASE V. " When the rate conſiſts of pence and " farthings, find the value of the pence, as directed " in Caſe III. and that of the farthings from the pro-" portion which they bear to the pounds. Add theſe " together, and reduce."

Ex. 1st.] 3287 at 5$\frac{1}{4}$ d.
At 4 d.=$\frac{1}{3}$ of 1 s. 1095 8
At 1 d.=$\frac{1}{4}$ of 4 d. 273 11
At 1 f.=$\frac{1}{4}$ of 1 d. 68 5$\frac{3}{4}$
At 5$\frac{1}{4}$ 1438 $\frac{3}{4}$
L. 71 18 $\frac{3}{4}$

2d.] 4573 at 2$\frac{3}{4}$d.
At 2 d.=$\frac{1}{6}$ of 1 s. 762 2
At $\frac{1}{2}$ d.=$\frac{1}{4}$ of 2 d. 190 6$\frac{1}{2}$
At $\frac{1}{4}$ d.=$\frac{1}{2}$ of $\frac{1}{2}$ d. 85 3$\frac{1}{4}$
At 2$\frac{3}{4}$ 1037 11$\frac{3}{4}$
L. 51 17 11$\frac{3}{4}$

3d.] 2842 at 3$\frac{3}{4}$d.
At 3d.=$\frac{1}{4}$ of 1 s. 710 6
At 3f.=$\frac{1}{4}$ of 3 d. 177 7$\frac{1}{2}$
At 3$\frac{3}{4}$d. 887 1$\frac{1}{2}$
L. 44 8 1$\frac{1}{2}$

4th.] 3572 at 7$\frac{1}{2}$d.
At 6 d. =$\frac{1}{2}$ of 1s. 1386
At 1$\frac{1}{2}$d.=$\frac{1}{4}$ of 6d. 346 6
At 7$\frac{1}{2}$d. 1732 6
L. 87 12 6

It is ſometimes beſt to join ſome of the pence with the farthings in the calculation. Thus, in Ex. 4. we reckon the value at 6d. and at 3 halfpence which makes 7$\frac{1}{2}$d.

If the rate be 1$\frac{1}{2}$d. which is an eighth part of a ſhilling, the value is found in ſhillings, by dividing the quantity by 8.

Caſe VI. " When the rate conſiſts of ſhillings and " lower denominations."

Method 1. *Multiply the quantity by the ſhillings, and find the value of the pence and farthings, if any, from the proportion which they bear to the ſhillings. Add and reduce.*

Ex. 1st.] 4258 at 17 s. 3d.
17
29806
4258
17 s. 72386
3d.=$\frac{1}{4}$ of 1 s. 1064 6
17 s. 3 d. 73450 6
L. 3672 10 6

2d.] 5482 at 12 s. 4$\frac{1}{2}$ d.
12
12 s. 65784
3 d.=$\frac{1}{4}$ of 1 s. 1370 6
1$\frac{1}{2}$ d.=$\frac{1}{2}$ of 3d. 685 3
12 s. 4$\frac{1}{2}$ d. 67839 9
L. 3391 19 9

Method 2. *Divide the rate into aliquot parts of a pound; calculate the values correſponding to theſe, as directed in* Caſe 1. *and add them.*

s. d.
Ex. 1st.] 38[illegible]4 at 17 6
10s. =$\frac{1}{2}$ L. 1947
5 =$\frac{1}{4}$ 973 10
2 6d.=$\frac{1}{8}$ 486 15
17s. 6d. L. 3407 5

s. d.
2d.] 1765 at 9 2
6s. 8d.=$\frac{1}{3}$ L. 588 6 8
2 6 =$\frac{1}{8}$ 220 12 6
9 s. 2 d. 808 19 2

Sometimes part of the value is more readily obtained from a part already found; and ſometimes it is eaſieſt to calculate at a higher rate, and ſubtract the value at the difference.

s. d.
3d.] 63790 at 5 4
4 s =$\frac{1}{5}$ L. 12758
1s. 4d.=$\frac{1}{3}$ of 4s. 4252 13 4
5s. 4d. L. 17010 13 4

s. d.
4th.] 3664 at 14 9
10s. =$\frac{1}{2}$L. 1832
5s. =$\frac{1}{2}$of 10s. 916
15s. 2748
3d.=$\frac{1}{20}$of 5s. 45 16
14s. 9d. L. 2702 4

Method 3. *If the price contain a compoſite number of pence, we may multiply the value at a penny by the component parts.*

Ex. 5628 at 2 s. 11 d. or 35d.
12)5628
20) 469
L. 23 9
5
L. 117 5
7
L. 820 15

Case VII. "When the rate conſiſts of pounds and "lower denominations,"

Method 1. *Multiply by the pounds, and find the value of the other denominations from the proportion which they bear to the pounds.*

Ex. 1st.] 3592 at L. 3 : 12 : 8.
3
L. 3 — 10776
12 s = $\frac{1}{5}$ of L. 3 — 2155 4
8 d = $\frac{1}{18}$ of 12 s. — 119 14 8
L. 3 12 8 — L. 13050 18 8

2d.] 543 at L. 2 : 5 : 10½.
2
L. 2 — 1086
5 s = $\frac{1}{4}$ of L. 1. — 135 15
10 d = $\frac{1}{6}$ of 5 s. — 22 12 6
½ d = $\frac{1}{20}$ of 10 d. — 1 2 7½
L. 1245 10 1½

Method 2. *Reduce the pounds to ſhillings, and proceed as in* Caſe VI.

Ex. 1st.] 3592 at L. 3 : 12 : 8
72 20
7184 72
25144
258624
4 d. = $\frac{1}{3}$ s. 1197 4
4 d. = $\frac{1}{3}$ s. 1197 4
8 d. 261018 8
L. 13050 18 8

2d.] 3683 at L. 2 : 4 : 11
45
18415
14732
At 45 s. 165735
At 1 d. = $\frac{1}{12}$ s. 307 11
44 s. 11 d. 165427 1
L. 8271 7 1

The learner ſhould at firſt try every calculation more ways than one; which will not only ſerve the purpoſe of proving the operation, but will render him expert at diſcovering the beſt method for ſolving each queſtion, and will lead him to invent other methods; for we have not exhauſted the ſubject.

Thus, if the number of articles be 20, each ſhilling of the rate makes a pound of the amount. If it be 12, each penny of the rate makes a ſhilling of the amount. If 240, each penny of the rate makes a pound of the amount. If 480, each half-penny makes a pound. If 960, each farthing makes a pound. If the number of articles be a multiple, or an aliquot part of any of theſe, the amount is eaſily calculated. And if it be near to any ſuch number, we may calculate for that number, and add or ſubtract for the difference.

We have hitherto explained the various methods of computation, when the quantity is a whole number, and in one denomination. It remains to give the proper directions when the quantity contains a fraction, or is expreſſed in ſeveral denominations.

When the quantity contains a fraction, work for the integers by the preceding rules, and for the fraction take proportional parts.

When the quantity is expreſſed in ſeveral denominations and the rate given for the higher; calculate the higher, conſider the lower ones as fractions, and work by the laſt rule.

When the rate is given for the lower denomination, reduce the higher denomination to the lower, and calculate accordingly.

Note 1st. 7 lb. 14 lb. and 21 lb. are aliquot parts of 1 qr.: and 16 lb. is $\frac{1}{7}$ of 1 cwt.; and are therefore eaſily calculated.

2d. If the price of a dozen be ſo many ſhillings, that of an article is as many pence; and if the price of a groſs be ſo many ſhillings, that of a dozen is as many pence.

3d. If the price of a ton or ſcore be ſo many pounds, that of 1 cwt. or a ſingle article, is as many ſhillings.

4th. Though a fraction leſs than a farthing is of no conſequence, and may be rejected, the learner muſt be careful leſt he loſe more than a farthing, by rejecting ſeveral remainders in the ſame calculation.

Sect. ii. Deductions *on* Weights, &c. 18

The full weight of any merchandiſe, together with that of the caſk, box, or other package, in which it is contained, is called the *groſs weight*. From this we muſt make proper deductions, in order to diſcover the quantity, for which price or duty ſhould be charged, which is called the *nett weight*.

Tare is the allowance for the weight of the package; and this ſhould be aſcertained by weighing it before the goods are packed. Sometimes, however, particularly in payment of duty, it is cuſtomary to allow ſo much per C. or ſo much per 100 lb. in place of tare.

Tret is an allowance of 4 lb. on 104 granted on currants, and other goods on which there is waſte, in order that the weight may anſwer when the goods are retailed.

Cloff, or Draught, is a further allowance granted on ſome goods in London, of 2 lb. on every 3 C. to turn the ſcale in favour of the purchaſer. The method of calculating theſe and the like will appear from the following examples.

Ex. 1st. What is the nett weight of 17 C. 2 q. 14 lb. tare 18 lb. per cwt.

C. q. lb.
17 2 14 groſs.
16 lb. = $\frac{1}{7}$ C. — 2 2 2
2 lb. = $\frac{1}{8}$ of 16 lb. — 1 7
18 lb. — 2 3 $9\frac{1}{4}$ tare.
14 3 $4\frac{3}{4}$ nett.

C. q. lb.
or, 17 2 14
6
105 3 —
3
317 1
28) $317\frac{1}{4}$ lb. C. q. lb.
4) 11 $9\frac{1}{4}$ (2 3 $9\frac{1}{4}$ tare

In the firſt method, we add the tare at 16 lb. which is $\frac{1}{7}$ of the groſs weight to the tare, at 2 lb. which is $\frac{1}{8}$ of the former. In the ſecond, we multiply the groſs weight by 18; the tare is 1 lb. for each cwt. of the product, and is reduced by diviſion to higher denominations.

2d.] What is Tret of 158 C. 2 q. 24 lb.?

C. q. lb. C. q. lb.
26) 158 2 26 (6 — 11 Tret.
156
2
4
10
28
286
280
0

Becauſe tret is always 4 lb. in 104, or 1 lb. in 26, it is obtained by dividing by 26.

3d.] What is the cloff on 28 C. 2 q.?

C. q.
28 2
2
3) 57 (19 lb.

This allowance being 2 lb. on every 3 C. might be found by taking $\frac{1}{3}$ of the number of Cs and multiplying it by 2. It is better to begin with multiplication, for the reaſon given p. 663. col. 2 par. 1.

19 Sect iii. COMMISSION, &c.

It is frequently required to calculate allowances on ſums of money, at the rate of ſo many per L. 100. Of this kind is COMMISSION, or the allowance due to a factor for buying or ſelling goods, or tranſacting any other buſineſs; PREMIUM of INSURANCE, or allowance given for engaging to repay one's loſſes at ſea, or otherwiſe; EXCHANGE, or the allowance neceſſary to be added or ſubtracted for reducing the money of one place to that of another; PREMIUMS on STOCKS, or the allowance given for any ſhare of a public ſtock above the original value. All theſe and others of a like kind are calculated by the following

RULE. "Multiply the ſum by the rate, and divide "the product by 100. If the rate contain a fraction, "take proportional parts.

Ex. What is the commiſſion on L. 728, at $2\frac{3}{4}$ per cent.

728
2
2 per cent. 1456
$\frac{1}{2}$ 364
$\frac{1}{4}$ 182
1|00)20|02
20
40
12
4|80
4 Anſw. L. 20——$4\frac{3}{4}$
3|20

When the rate is given in guineas, which is common in caſes of inſurance, you may add a twentieth part to the ſum before you calculate. Or you may calculate at an equal number of pounds, and add a twentieth part to the anſwer.

When the given ſum is an exact number of 10 pounds, the calculation may be done without ſetting down any figures. Every L. 10, at $\frac{1}{2}$ per cent. is a ſhilling; and at other rates in proportion. Thus, L. 170, at $\frac{1}{2}$ per cent. is 17 s.; and, at $\frac{1}{4}$ per cent. 8 s. 6 d.

20 Sect. iv. INTEREST.

Intereſt is the allowance given for the uſe of money by the borrower to the lender. This is computed at ſo many pounds for each hundred lent for a year, and a like proportion for a greater or a leſs time. The higheſt rate is limited by our laws to 5 per cent. which is called the *legal intereſt;* and is due on all debts conſtituted by bond or bill, which are not paid at the proper term, and is always underſtood when no other rate is mentioned.

The intereſt of any ſum for a year, at any rate, is found by the method explained in the laſt ſection.

The intereſt of any number of pounds for a year, at 5 per cent. is one twentieth part, or an equal number of ſhillings. Thus, the intereſt of L. 34675 for a year is 34675 ſhillings.

The intereſt for a day is obtained by dividing the intereſt for a year, by the number of days in a year. Thus, the intereſt of L. 34675 for a day is found by dividing 34675 ſhillings by 365, and comes to 95 ſhillings.

The intereſt for any number of days is obtained by multiplying the daily intereſt by the number of days. Thus, the intereſt of L. 34675 for 17 days, is 17 times 95 ſhillings, or 1615 ſhillings; and this divided by 20, in order to reduce it, comes to L. 80 : 15 s.

It would have ſerved the ſame purpoſe, and been eaſier to multiply at firſt by 17, the number of days; and, inſtead of dividing ſeparately by 365, and by 20, to divide at once by 7300, the product of 365 multiplied by 320; and this diviſion may be facilitated by the table inſerted p. 661. col. 1.

The following practical rules may be inferred from the foregoing obſervations.

I. *To calculate intereſt at 5 per cent.* "Multiply "the principal by the number of days, and divide the "product by 7300."

II. *To calculate intereſt at any other rate.* "Find "what it comes to at 5 per cent. and take a proper "proportion of the ſame for the rate required."

Ex. 1st. Intereſt on L. 34675 for 17 days, at 5 per cent.

34675
17
242725
34675
L. s.
73|00(5894|75(80 15.
584
5475
20
1095|00
73
365
365
0

Ex. 2d. Intereſt on 304 : 3 : 4 for 8 days, at 4 per cent.

L. 304 3 4
8
s. d.
73|00)2433 6 8 (6 8
20
486|66
438
4866
12
584|00
584
0

Int. at 5 per cent.	L. —	6	8
Deduce $\frac{1}{5}$	—	1	4
Int. at 4 per cent.	L —	5	4

When partial payments are made, we proceed in the following manner: Let us ſuppoſe a bill of L. 170 was due 12th Auguſt, that L. 54 was paid on the 18th September, L. 56 on the 17th October, and the balance on the 14th November; and let it be required to find how much intereſt is due.

		Days.		
Aug. 12.	L. 170	37	1190	
Sept. 18. pd.	54		510	
				6290
	116	29	1044	
Oct. 17. pd.	56		232	
				3364
	60	28	1680	
Nov. 14. pd.	60			
	—		7300) 11334 (L. 1 : 11 : $\frac{1}{2}$.	
	0			

Here we ſubtract the ſeveral payments from the original ſum in their order, placing the dates in the margin; and from this it appears that there is intereſt due on L. 170 from 12th Auguſt to 18th September, or L. 110 from 18th September to 17th October, and on L. 60 from 17th October to 14th November. We next compute the number of days in each of theſe periods, and mark it againſt the reſpective ſum. Then we multiply each ſum by the number of days; reſerving a column, when neceſſary, for the products of the ſeveral figures in the multiplier. Laſtly, we add theſe products, and divide their ſum by 7300.

Intereſt on current accounts is calculated nearly in the ſame manner. For example, let the intereſt due on the following account be required to 31st July, at 4 per cent?

Dr. Mr A. Baird, his account current with W. Neil, Cr.

1775.					1775.			
Jan. 15.	To caſh	L. 160			Mar. 22.	By caſh	L. 50	
Mar. 12.	To ditto	36			May 16.	By ditto	37	
June 23.	To ditto	13	4	6	June 15.	By ditto	25	12 6
July 19.	To ditto	26	13	4	28.	By ditto	32	5 4

1775.		L.	s.	d.	Days			
Jan. 15.	Dr.	160			56	960		
Mar. 12	Dr.	36				800		
							8960	Jan. 16
	Dr.	196			10		1960	Feb. 28
22.	Cr.	50						Mar. 31
								Apr. 30
	Dr.	146			55	730		May 31
May 16.	Cr.	37				730		June 30
							8030	July 31
	Dr.	109			30		3270	—
June 15.	Cr.	25	12	6				Days 197
	Dr.	83	7	6	8		667	
23.	Dr.	13	4	6				
	Dr.	96	12		5		483	
28.	Cr.	32	5	4				
	Dr.	64	6	8	21	64		
July 19.	Dr.	26	13	4		1287		
							1351	
31.		91			12		1092	
					197	7300	25813 (L. 3 10 $8\frac{1}{2}$ at	

Deduce $\frac{1}{5}$ part 14 $1\frac{1}{2}$

Intereſt at 4 per cent. L. 2 16 7

Here the ſums on either ſide of the account are introduced according to the order of the dates. Thoſe on the Dr ſide are added to the former balance, and thoſe on the Cr ſide ſubtracted. Before we calculate the days, we try if the laſt ſum L. 91, be equal to the balance of the account, which proves the additions and ſubtractions; and, before multiplying, we try if the ſum of the column of days be equal to the number of days, from 15th January to 31st of July.

In the 5th and 6th multiplications, we begin at the pence-column, and take in the carriage. In the 7th, inſtead of multiplying the 6 s. 8 d. by 21, we add the third part 21 to the product, becauſe 6 s. 8 d. is the third of a pound. This is done by marking down the ſecond line 1287, inſtead of 1280. As the computation on the odd ſhillings and pence is troubleſome, and makes a very ſmall increaſe of the intereſt, ſome neglect them altogether; others add one to the pound, when the ſhillings exceed 10, and neglect them when below it.

2d.] Required intereſt on the following account to 31st December, allowing 5 per cent, when the balance is due to J. T. and 4 per cent. when due to N. W.

Dr Mr J. T. his account current with N. W. Cr.

Dec. 31.	To balance	L. 150	April 9.	By caſh.	L. 70
Mar. 12.	To caſh	120	May 12.	By caſh	300
June 17.	To caſh	165	June 3.	By caſh	240
Sept. 24.	To caſh	242	Aug. 2.	By caſh	10
Oct. 9.	To caſh	178			

1775.			Days			
Dec. 31.	Dr.	L150	71	150		
1776.				1050		
Mar. 12.	Dr.	120			10650	
				2160		
	Dr.	270	28	540		
April. 9.	Cr.	70			7560	
	Dr.	200	33		6600	
May 12.	Cr.	300				
	Cr.	100	22			2200
June 3.	Cr.	240				
	Cr.	340	14	1360		4760
17.	Dr.	165		340		
	Cr.	175	46	1050		8050
Aug. 2.	Cr.	10		700		
	Cr.	185	53	555		9805
Sept. 24.	Dr.	242		925		
	Dr.	57	15	285		
Oct. 9.	Dr.	178		57	855	
Dec. 31.	Dr.	235	83	705		
				1880		
			365		19505	
				7300	45170	24815

Intereſt due to N. W. at 5 per cent.	L.	6	8	9
Deduce $\frac{1}{5}$ - -		1	5	5
Due to N. W. at 4 per cent.	L.	5	3	4
Due to J. T. at 5 per cent.		3	7	$11\frac{1}{4}$
Balance due to N. W.	L.	1	15	$4\frac{1}{4}$

In this account, the balance is ſometimes due to the one party, ſometimes to the other. At the beginning, there is a balance due to N. W.; and, on the 9th of April, there is L. 200 due him. On the 12th of May, J. T. pays him L. 300, which diſcharges what he owed, and leaves a balance of L. 100 due him. The balance continues in J. T.'s favour till the 24th of September, when N. W. pays L. 242. Theſe changes are diſtinguiſhed by the marks D^r. and C^r. The products are extended in different columns, and divided ſeparately.

When payments are made on conſtituted debts, at conſiderable diſtances of time, it is uſual to calculate the intereſt to the date of each payment, and add it to the principal, and then ſubtract the payment from the amount.

Ex. A bond for L. 540 was due the 18th Aug. 1772; and there was paid 19th March 1773 L. 50; and 19th December 1773 L. 25; and 23d September 1774 L. 25; and 18th Auguſt 1775 L. 110. Required the intereſt and balance due on the 11th November 1775?

A bond due 13th Auguſt 1772				L. 540		
Intereſt to 19th March 1773, 218 days	L. 16	2	6	16	2	6
				L. 566	2	6
Paid 19th March 1773				50		
Balance due 19th March 1773				L. 506	2	6
Intereſt to 19th December 1773, 275 days	19	1	2	19	1	2
				L. 525	3	8
Paid 19th December 1773				25		
Balance due 19th December 1773				L. 500	3	8
Intereſt to 23d September 1774, 278 days	19		9	19		9
				L. 519	4	5
Paid 23d September 1774				25		
Balance due 23d September 1774				L. 494	4	5
Intereſt to 18th Auguſt 1775, 329 days	22	5	3	22	5	3
				L. 516	9	8
Paid 18th Auguſt 1775				110		
Balance due 18th Auguſt 1775				L. 406	9	8
Intereſt to 11th November 1775, 85 days	4	14	6	4	14	6
Balance due 11th November 1775				L. 411	4	2
Amount of the intereſt	L. 81	4	2			

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Chap. VIII. VULGAR FRACTIONS.

In order to underſtand the nature of vulgar fractions, we muſt ſuppoſe unity (or the number 1) divided into ſeveral equal parts. One or more of theſe parts is called a *fraction*, and is repreſented by placing one number in a ſmall character above a line, and another under it: For example, two fifth parts is written thus, $\frac{2}{5}$. The number under the line (5) ſhows how many parts unity is divided into, and is called the *denominator*. The number above the line (2) ſhows how many of theſe parts are repreſented, and is called the *numerator*.

It follows from the manner of repreſenting fractions, that, when the numerator is increaſed, the value of the fraction becomes greater; but, when the denominator is increaſed, the value becomes leſs. Hence we may infer, that, if the numerator and denominator be both increaſed, or both diminiſhed, in the ſame proportion, the value is not altered; and therefore, if we multiply both by any number whatever, or divide them by any number which meaſures both, we ſhall obtain other fractions of equal value. Thus, every fraction may be expreſſed in a variety of forms, which have all the ſame ſignification.

A fraction annexed to an integer, or whole number, makes a mixed number. For example, five and two third-parts, or $5\frac{2}{3}$. A fraction whoſe numerator is greater than its denominator is called an *improper fraction*. For example, ſeventeen third-parts, or $\frac{17}{3}$. Fractions of this kind are greater than unity. Mixed numbers may be repreſented in the form of improper fractions, and improper fractions may be reduced to mixed numbers, and ſometimes to integers. As fractions, whether proper or improper, may be repreſented in different forms, we muſt explain the method of reducing them from one form to another, before we conſider the other operations.

Problem I. "To reduce mixed numbers to improper fractions; Multiply the integer by the denominator of the fraction, and to the product add the numerator. The ſum is the numerator of the improper fraction ſought, and is placed above the given denominator. *Ex.* $5\frac{2}{3}=\frac{17}{3}$

5 integer.
3 denominator.
—
15 product.
2 numerator given.
—
17 numerator ſought.

Becauſe one is equal to two halves, or 3 third parts, or 4 quarters, and every integer is equal to twice as many halves, or four times as many quarters, and ſo on; therefore, every integer may be expreſſed in the form of an improper fraction, having any aſſigned denominator: The numerator is obtained by multiplying the integer into the denominator. Hence the reaſon of the foregoing rule is evident. 5, reduced to an improper fraction, whoſe denominator is 3, makes $\frac{15}{3}$, and this added to $\frac{2}{3}$, amounts to $\frac{17}{3}$.

Problem II. "To reduce improper fractions to whole or mixed numbers: Divide the numerator by the denominator."

Ex. $\frac{112}{17}=6\frac{10}{17}$

$17)112(6\frac{10}{17}$
102
—
10

1. $\frac{3248}{10}$
2. $\frac{342}{12}$
3. $\frac{7536}{27}$
4. $\frac{15764}{328}$
5. $\frac{365}{15}$
6. $\frac{7394}{35}$
7. $\frac{8642}{93}$
8. $\frac{4362}{218}$

This problem is the converſe of the former, and the reaſon may be illuſtrated in the ſame manner.

Problem III. "To reduce fractions to lower terms. Divide both numerator and denominator by any number which meaſures both, and place the quotients in the form of a fraction."

Example. $\frac{135}{360} = \frac{27}{72} = \frac{3}{8}$

Here we obſerve that 135 and 360 are both meaſured by 5, and the quotients form $\frac{27}{72}$, which is a fraction of the ſame value as $\frac{135}{360}$ in lower terms. Again, 27 and 72 are both meaſured by 9, and the quotients form $\frac{3}{8}$, which is ſtill of equal value, and in lower terms

It is generally ſufficient, in practice, to divide by ſuch meaſures as are found to anſwer on inſpection, or by the rules given p. 659. col. 2. But, if it be required to reduce a fraction to the loweſt poſſible terms, we muſt divide

vide the nominator and denominator by the greateſt number which meaſures both. What number this is may not be obvious, but will always be found by the following rule.

To find the greateſt common meaſure of two numbers, divide the greater by the leſſer, and the diviſor by the remainder continually, till nothing remain; the laſt diviſor is the greateſt common meaſure.

Example. Required the greateſt number which meaſures 475 and 589?

$$\begin{array}{l} 475)589(1 \\ \quad 475 \\ \quad \overline{} \\ \quad 114)475(4 \\ \qquad 456 \\ \qquad \overline{} \\ \qquad 19)114(6 \\ \qquad\quad 114 \\ \qquad\quad \overline{} \\ \qquad\quad 0 \end{array}$$

Here we divide 589 by 475, and the remainder is 114; then we divide 475 by 114, and the remainder is 19; then we divide 114 by 19, and there is no remainder: from which we infer, that 19, the laſt diviſor, is the greateſt common meaſure.

To explain the reaſon of this, we muſt obſerve, that any number which meaſures two others, will alſo meaſure their ſum, and their difference, and will meaſure any multiple of either. In the foregoing example, any number which meaſures 589, and 475, will meaſure their difference 114, and will meaſure 456, which is a multiple of 114; and any number which meaſures 475, and 456, will alſo meaſure their difference 19. Conſequently, no number greater than 19 can meaſure 589 and 475. Again, 19 will meaſure them both, for it meaſures 114, and therefore meaſures 456, which is a multiple of 114, and 475, which is juſt 19 more than 456; and, becauſe it meaſures 475 and 114, it will meaſure their ſum 589. To reduce $\frac{475}{589}$ to the loweſt poſſible terms, we divide both by numbers 19, and it comes to $\frac{25}{31}$.

If there be no common meaſure greater than 1, the fraction is already in the loweſt terms.

If the greateſt common meaſure of 3 numbers be required, we find the greateſt meaſure of the two firſt, and then the greateſt meaſure of that number, and the third. If there be more numbers, we proceed in the ſame manner.

PROBLEM IV. "To reduce fractions to others of "equal value that have the ſame denominator: 1st, "Multiply the numerator of each fraction by all the "denominators except its own. The products are nu"merators to the reſpective fractions ſought." 2d, "Multiply all the denominators into each other; the "product is the common denominator."

Ex. $\frac{4}{5}$ and $\frac{7}{9}$ and $\frac{3}{8} = \frac{288}{360}$ and $\frac{280}{360}$ and $\frac{135}{360}$.

$4 \times 9 \times 8 = 288$ firſt numerator.

$7 \times 5 \times 8 = 280$ ſecond numerator.

$3 \times 5 \times 9 = 135$ third numerator.

$5 \times 9 \times 8 = 360$ common denominator.

Here we multiply 4, the numerator of the firſt fraction, by 9 and 3 the denominators of the two others; and the product 288 is the numerator of the fraction ſought, equivalent to the firſt. The other numerators are found in like manner, and the common denominator 360, is obtained by multiplying the given denominators 5, 9, 8, into each other. In the courſe of the whole operation, the numerators and denominators of each fraction are multiplied by the ſame number, and therefore their value is not altered.

The fractions thus obtained may be reduced to lower terms, if the ſeveral numerators and denominators have a common meaſure greater than unity. Or, after arranging the number for multiplication, as is done above, if the ſame number occur in each rank, we may daſh them out and neglect them; and, if numbers which have a common meaſure occur in each, we may daſh them out and uſe the quotients in their ſtead; or any number, which is a multiple of all the given denominators, may be uſed as a common denominator. Sometimes a number of this kind will occur on inſpection, and the new numerators are found by multiplying the given ones by the common denominator, and dividing the products by the reſpective given denominators.

If the articles given for any operation be mixed numbers, they are reduced to improper fractions by problem I. If the anſwer obtained be an improper fraction, it is reduced to a mixed number by problem II. And, it is convenient to reduce fractions to lower terms, when it can be done, by problem III. which makes their value better apprehended, and facilitates any following operation. The reduction of fractions to the ſame denominator by problem IV. is neceſſary to prepare them for addition or ſubtraction, but not for multiplication or diviſion.

1. ADDITION *of* VULGAR FRACTIONS. 22

RULE. "Reduce them, if neceſſary, to a common "denominator; add the numerators, and place the "ſum above the denominator."

Ex. 1st.] $\frac{3}{5} + \frac{2}{9} = \frac{27}{45} + \frac{10}{45}$ by problem IV. $= \frac{37}{45}$

2d.] $\frac{5}{7} + \frac{8}{9} + \frac{9}{10} = \frac{450}{630} + \frac{560}{630} + \frac{567}{630} = \frac{1577}{630}$ $\quad \begin{array}{r} 450 \\ 560 \\ 567 \\ \hline 1577 \end{array}$

by problem II. $= 3\frac{317}{630}$

The numerators of fractions that have the ſame denominator ſignify like parts; and the reaſon for adding them is equally obvious, as that for adding ſhillings or any other inferior denomination.

Mixed numbers may be added, by annexing the ſum of the fractions to the ſum of the integers. If the former be a mixed number, its integer is added to the other integers.

2. SUBTRACTION *of* VULGAR FRACTIONS. 23

RULE. "Reduce the fractions to a common deno"minator; ſubtract the numerator of the ſubtrahend "from the numerator of the minuend, and place the "remainder above the denominator."

Ex. Subtract $\frac{2}{7}$ from $\frac{5}{12}$ remainder $\frac{11}{84}$

$$\left.\begin{array}{r} \frac{5}{12} = \frac{35}{84} \\ \frac{2}{7} = \frac{24}{84} \end{array}\right\} \text{by Prob. IV.} \qquad \begin{array}{rr} \text{from} & 35 \\ \text{take} & 24 \\ \hline \text{rem.} & 11 \end{array}$$

To ſubtract a fraction from an integer: ſubtract the numerator from the denominator, and place the remainder above the denominator; prefix to this the integer diminiſhed by unity.

Ex. Subtract $\frac{3}{5}$ from 12 remainder $11\frac{2}{5}$

To ſubtract mixed numbers, proceed with the fractions by the foregoing rule, and with the integers in the common method. If the numerator of the fraction in the ſubtrahend exceed that in the minuend, borrow the value of the denominator, and repay it by adding 1 to the unit-place of the ſubtrahend.

Ex. Subtract $145\frac{7}{9}$ from $248\frac{3}{5}$

$$\left.\begin{array}{l}\frac{3}{5}=\frac{27}{45}\\ \frac{7}{9}=\frac{35}{45}\end{array}\right\}\text{ by Prob. IV.}\qquad \begin{array}{r}248\frac{27}{45}\\ 145\frac{35}{45}\\ \hline 102\frac{37}{45}\end{array}\qquad \begin{array}{r}27\\ \underline{45}\\ 72\\ \underline{35}\\ 37\end{array}$$

Here, becauſe 27 the numerator of the fraction in the minuend is leſs than 35, the numerator of the ſubtrahend, we borrow 45 the denominator; 27 and 45 make 72, from which we ſubtract 35, and obtain 37 for the numerator of the fraction in the remainder, and we repay what was borrowed, by adding 1 to 5 in the unit-place of the ſubtrahend.

The reaſon of the operations in adding or ſubtracting fractions will be fully underſtood, if we place the numerators of the fractions in a column like a lower denomination, and add or ſubtract them as integers, carrying or borrowing according to the value of the higher denomination.

24 3. MULTIPLICATION *of* VULGAR FRACTIONS.

RULE. "Multiply the numerators of the factors together for the numerator of the product, and the denominators together for the denominator of the product."

Ex. 1st.] $\frac{2}{3}\times\frac{5}{7}=\frac{10}{21}$

$2\times5=10$ num.

$3\times7=21$ den.

2d.] $8\frac{2}{5}\times7\frac{3}{4}=\frac{1302}{20}=65\frac{2}{20}$

$8\frac{2}{5}=\frac{42}{5}$ by prob. I.

$7\frac{3}{4}=\frac{31}{4}$ by ditto

$42\times31=1302$

$5\times4=20$

To multiply $\frac{5}{7}$ by $\frac{2}{3}$ is the ſame, as to find what two third parts of $\frac{5}{7}$ comes to; if one third part only had been required, it would have been obtained by multiplying the denominator 7 by 3, becauſe the value of fractions is leſſened when their denominators are increaſed; and this comes to $\frac{5}{21}$; and, becauſe two thirds were required, we muſt double that fraction, which is done by multiplying the numerator by 2, and comes to $\frac{10}{21}$. Hence we infer, that fractions of fractions, or compound fractions, ſuch as $\frac{2}{3}$ of $\frac{5}{7}$ are reduced to ſimple ones by multiplication. The ſame method is followed when the compound fraction is expreſſed in three parts or more.

If a number be multiplied by any integer, its value is increaſed: if it be multiplied by 1, or taken one time, it undergoes no alteration. If it be multiplied by a proper fraction, or taken for one half, two thirds, or the like, its value is diminiſhed, and the product is leſs than the number multiplied.

The foregoing rule extends to every caſe, when there are fractions in either factor. For mixed numbers may be reduced to improper fractions, as is done in Ex. 2d.; and integers may be written, or underſtood to be written, in the form of fractions whoſe numerator is 1. It will be convenient, however, to give ſome further directions for proceeding, when one of the factors is an integer, or when one or both are mixed numbers.

1st. To multiply an integer by a fraction, multiply it by the numerator, and divide the product by the denominator. *Ex.* $3756\times\frac{3}{5}=2253\frac{3}{5}$

$$\begin{array}{r}3\\ \hline 5)11268(2253\frac{3}{5}\end{array}$$

2d. To multiply an integer by a mixed number, we multiply it firſt by the integer, and then by the fraction, and add the products.

Ex. $138\times5\frac{3}{4}=793\frac{1}{2}$

$$\begin{array}{lr}138\times5=&690\\ 138\times\frac{3}{4}&\\ \phantom{138\times{}}3&\\ \cline{1-1} 4)414(&103\frac{1}{2}\\ \cline{2-2} &793\frac{1}{2}\end{array}$$

3d. To multiply a mixed number by a fraction, we may multiply the integer by the fraction, and the two fractions together, and add the products.

Ex. $15\frac{3}{8}\times\frac{2}{9}=3\frac{5}{12}$

$$\begin{array}{rcl}15\phantom{\frac{3}{8}}\times\frac{2}{9}=3\frac{3}{9}&=&3\frac{4}{12}\\ \frac{3}{8}\times\frac{2}{9}=\frac{6}{72}&=&\frac{1}{12}\\ \cline{3-3} &&3\frac{5}{12}\end{array}$$

4th. When both factors are mixed numbers, we may multiply each part of the multiplicand firſt by the integer of the multiplier, and then by the fraction, and add the four products.

Ex. $8\frac{2}{5}$ by $7\frac{3}{4}$

$$\begin{array}{lr}8\times7= & 56\\ 8\times\frac{3}{4}=\frac{24}{4}= & 6\text{ by prob. II.}\\ \frac{2}{5}\times7=\frac{14}{5}=2\frac{4}{5}= & 2\frac{16}{20}\\ \frac{2}{5}\times\frac{3}{4}= & \frac{6}{20}\\ \hline & \text{product }65\frac{2}{20}\text{ as before.}\end{array}$$

4. DIVISION *of* VULGAR FRACTIONS. 25

RULE I. "Multiply the numerator of the dividend by the denominator of the diviſor. The product is the numerator of the quotient."

II. "Multiply the denominator of the dividend by the numerator of the diviſor. The product is the denominator of the quotient."

Ex. Divide $\frac{2}{5}$ by $\frac{7}{9}$ Quotient $\frac{18}{35}$

$2\times9=18$

$5\times7=35$

To explain the reaſon of this operation, let us ſuppoſe it required to divide $\frac{5}{7}$ by 7, or to take one ſeventh part of that fraction. This is obtained by multiplying the denominator by 7; for the value of fractions is diminiſhed by increaſing their denominators, and comes to $\frac{2}{35}$. Again, becauſe $\frac{7}{9}$ is nine times leſs than 7, the quotient of any number divided by $\frac{7}{9}$ will be nine times greater than the quotient of the ſame number divided by 7. Therefore we multiply $\frac{2}{35}$ by 9, and obtain $\frac{18}{35}$.

If the diviſor and dividend have the ſame denominator, it is ſufficient to divide the numerators.

Ex. $\frac{12}{17}$ divided by $\frac{3}{17}$ quotes 4.

The quotient of any number divided by a proper fraction is greater than the dividend. It is obvious, that any integer contains more halves, more third parts, and the like, than it contains units; and, if an integer and fraction be divided alike, the quotients will have the ſame proportion to the numbers divided; but the value of an integer is increaſed when the diviſor is a proper fraction; therefore, the value of a fraction in the like caſe is increaſed alſo.

The foregoing rule may be extended to every caſe, by reducing integers and mixed numbers to the form of improper fractions. We ſhall add ſome directions for ſhortening the operation when integers and mixed numbers are concerned.

1st. When the dividend is an integer, multiply it by the denominator of the diviſor, and divide the product by the numerator.

Ex. Divide 368 by $\frac{5}{7}$

$$\begin{array}{r} 7 \\ \hline 5)\ 2576\ (515\tfrac{1}{5} \text{ quotient.} \end{array}$$

2^{d}. When the diviſor is an integer, and the dividend a fraction, multiply the denominator by the diviſor, and place the product under the numerator.

Ex. Divide $\frac{3}{8}$ by 5 quotient $\frac{3}{40}$

$8 \times 5 = 40$

3^{d}. When the diviſor is an integer, and the dividend a mixed number, divide the integer, and annex the fraction to the remainder; then reduce the mixed number, thus formed, to an improper fraction, and multiply its denominator by the diviſor.

Ex. To divide $576\frac{4}{11}$ by 7 quotient $82\frac{26}{77}$

$$\begin{array}{l} 7)\ 576\ (82 \\ 56 \\ \hline 16 \\ 14 \\ \hline 2\tfrac{4}{11} = \tfrac{26}{11} \\ 11 \times 7 = 77 \end{array}$$

Here we divide 576 by 7, the quotient is 82, and the remainder 2, to which we annex the fraction $\frac{4}{11}$; and reduce $2\frac{4}{11}$ to an improper fraction $\frac{26}{11}$, and multiply its denominator by 7, which gives $\frac{26}{77}$.

Hitherto we have conſidered the fractions as abſtract numbers, and laid down the neceſſary rules accordingly. We now proceed to apply theſe to practice. Shillings and pence may be conſidered as fractions of pounds, and lower denominations of any kind as fractions of higher; and any operation, where different denominations occur, may be wrought by expreſſing the lower ones in the form of vulgar fractions, and proceeding by the foregoing rules. For this purpoſe, the two following problems are neceſſary.

Problem V. "To reduce lower denominations to "fractions of higher, place the given number for the "numerator, and the value of the higher for the de-"nominator." *Examples.*

1. Reduce 7 d. to the fraction of a ſhilling. Anſ. $\frac{7}{12}$
2. Reduce 7 d. to a fraction of a pound. Anſ. $\frac{7}{240}$
3. Reduce 15 s. 7 d. to a fraction of a pound. Anſ. $\frac{187}{240}$.

Problem VI. "To value fractions of higher deno-"minations, multiply the numerator by the value of "the given denomination, and divide the product by "the denominator; if there be a remainder, multi-"ply it by the value of the next denomination, and "continue the diviſion."

Ex. 1st.] Required the value of $\frac{17}{60}$ of L. 1.

$$\begin{array}{rll} 17 & & \\ 20 & & \\ \hline & \text{s.} & \text{d.} \\ 60)340(& 5 & 8 \\ 300 & & \\ \hline 40 & & \\ 12 & & \\ \hline 60)480 & & \\ 480 & & \\ \hline 0 & & \end{array}$$

2^{d}.] Required the value of $\frac{8}{9}$ of 1 Cwt.

$$\begin{array}{rll} 8 & & \\ 4 & & \\ \hline & \text{qrs.} & \text{lb.} \\ 9)32(& 3 & 15\tfrac{5}{9} \\ 27 & & \\ \hline 5 & & \\ 28 & & \\ \hline 9)140 & & \\ 9 & & \\ \hline 50 & & \\ 45 & & \\ \hline 5 & & \end{array}$$

In the firſt example, we multiply the numerator 17 by 20, the number of ſhillings in a pound, and divide the product 340 by 60, the denominator of the fraction, and obtain a quotient of 5 ſhillings; then we multiply the remainder 40 by 12, the number of pence in a ſhilling, which produces 480, which divided by 60 quotes 8 d. without a remainder. In the ſecond example we proceed in the ſame manner; but as there is a remainder, the quotient is completed by a fraction.

Sometimes the value of the fraction does not amount to a unit of the loweſt denomination; but it may be reduced to a fraction of that or any other denomination, by multiplying the numerator according to the value of the places. Thus $\frac{1}{1289}$ of a pound is equal to $\frac{12}{1289}$ of a ſhilling, or $\frac{240}{1289}$ of a penny, $\frac{960}{1289}$ of a farthing.

Chap. IX. DECIMAL FRACTIONS.

Sect. i. Notation *and* Reduction. 26

The arithmetic of vulgar fractions is tedious, and even intricate to beginners. The difficulty ariſes chiefly from the variety of denominators; for when numbers are divided into different kinds of parts, they cannot be eaſily compared. This conſideration gave riſe to the invention of decimal fractions, where the units are divided into like parts, and the diviſions and ſubdiviſions are regulated by the ſame ſcale which is uſed in the Arithmetic of Integers. The firſt figure of a decimal fraction ſignifies tenth parts, the next hundredth parts, the next thouſandth parts, and ſo on: and the columns may be titled accordingly. Decimals are diſtinguiſhed by a point, which ſeparates them from integers, if any be prefixed.

The uſe of cyphers in decimals, as well as in integers, is to bring the ſignificant figures to their proper places, on which their value depends. As cyphers, when placed on the left hand of an integer, have no ſignification, but when placed on the right hand, increaſe the value ten times each; ſo cyphers, when placed on the right hand of a decimal, have no ſignification; but when placed on the left hand, diminiſh the value ten times each.

The notation and numeration of decimals will be obvious from the following examples:

4.7 ſignifies	Four, and ſeven tenth-parts.
.47	Four tenth-parts, and ſeven hundredth-parts, or 47 hundredth-parts.
.047	Four hundredth-parts, and ſeven thouſandth-parts, or 47 thouſandth-parts.
.407	Four tenth-parts, and ſeven thouſandth-parts, or 407 thouſandth-parts.
4.07	Four, and ſeven hundredth-parts.
4.007	Four, and ſeven thouſandth-parts.

The column next the decimal point is ſometimes called *decimal primes*, the next *decimal ſeconds;* and ſo on.

To reduce vulgar fractions to decimal ones: "Annex "a cypher to the numerator, and divide it by the de-"nominator, annexing a cypher continually to the re-"mainder."

Ex. 1st.] $\frac{12}{75}$=.16   2d.] $\frac{5}{64}$=.078125   3d.] $\frac{2}{3}$=.666.

```
 75)120(16     64)500(078125    3)20(666
    75             448             18
   ----            ----           ----
    450             520          * 20
    450             512            18
   ----            ----           ----
      0              80            20
                     64            18
                     --           ----
                    160            20
                    128
                    ---
                     320
                     320
                     ---
```

4th.] $\frac{5}{6}$=.833   5th.] $\frac{7}{27}$=.259   6th.] $\frac{7}{22}$=.3,18,18,

```
 6)50(83       27)70(259       22)70(31818
   48             54              66
  ----           ----            ----
 * 20             160           * 40
   18             135             22
  ----           ----            ----
    20            250             180
    18            243             170
  ----           ----            ----
     20          * 70            * 40
                                   22
                                  ----
                                   180
```

The reaſon of this operation will be evident, if we conſider that the numerator of a vulgar fraction is underſtood to be divided by the denominator; and this diviſion is actually performed when it is reduced to a decimal.

In like manner, when there is a remainder left in diviſion, we may extend the quotient to a decimal, inſtead of completing it by a vulgar fraction, as in the following example.

25)646(25$\frac{21}{25}$ or 25.84.

```
      50
      ---
      146
      125
      ---
Rem.  21.0
      200
      ---
      100
      100
      ---
       0
```

From the foregoing examples, we may diſtinguiſh the ſeveral kinds of decimals. Some vulgar fractions may be reduced exactly to decimals, as Ex. 1st. and 2d, and are called *terminate* or *finite decimals*. Others cannot be exactly reduced, becauſe the diviſion always leaves a remainder; but, by continuing the diviſion, we will perceive how the decimal may be extended to any length whatever. Theſe are called *infinite decimals*. If the ſame figure continually returns, as in Ex. 3d. and 4th. they are called *repeaters*. If two or more figures return in their order, they are called *circulates*. If this regular ſucceſſion go on from the beginning, they are called *pure repeaters*, or *circulates*, as Ex. 3d. and 5th. If otherwiſe, as Ex. 4th and 6th, they are mixed repeaters or circulates, and the figures prefixed to thoſe in regular ſucceſſion are called the *finite part*. Repeating figures are generally diſtinguiſhed by a daſh, and circulates by a comma, or other mark, at the beginning and end of the circle; and the beginning of a repeater or circulate is pointed out in the diviſion by an aſteriſk.

Lower denominations may be conſidered as fractions of higher ones, and reduced to decimals accordingly. We may proceed by the following rule, which is the ſame, in effect, as the former.

To reduce lower denominations to decimals of higher: "Annex a cypher to the lower denomination, and divide it by the value of the higher. When there are "ſeveral denominations, begin at the loweſt, and reduce them in their order."

Ex. To reduce 5 cwt. 2 qr. 21 lb. to a decimal of a ton?

```
28)210(.75     4)2.75).6875      20)5.6874(.284375
   196            24                 40
   ---            ---                ---
    140            35                168
    140            32                160
    ---            ---               ---
     0              30                87
                    28                80
                    ---               ---
                     20                75
                     20                60
                     --                ---
                     0                 150
                                       140
                                       ---
                                        100
                                        100
                                        ---
                                         0
```

Here, in order to reduce 21 lb. to a decimal of 1 qr. we annex a cypher, and divide by 28, the value of 1 qr. This gives .75. Then we reduce 2.75 qrs. to a decimal of 1 cwt. by dividing by 4, the value of 1 cwt. and it comes to .6875. Laſtly, 5.6875 cwt. is reduced to a decimal of a ton by dividing by 20, and comes to .284375.

To value a decimal fraction: "Multiply it by the "value of the denomination, and cut off as many de- "cimal places from the product as there are in the "multiplicand. The reſt are integers of the lower de- "nomination."

Example. What is the value of .425 of L. 1.

```
     .425
       20
    -----
ſh. 8.500
        6
    -----
d.  3.000
```

Sect. ii. ARITHMETIC *of* TERMINATE DECIMALS. 27

THE value of decimal places decreaſe like that of integers, ten of the lower place in either being equal to one of the next higher; and the ſame holds in paſſing from decimals to integers. Therefore, all the operations are performed in the ſame way with decimals, whether

Decimal Fractions.

whether placed by themſelves, or annexed to integers, as with pure integers. The only peculiarity lies in the arrangement and pointing of the decimals.

In addition and ſubtraction, " Arrange units under " units, tenth-parts under tenth-parts, and proceed as " in integers."

32.035	from 13.348	and 12.248
116.374	take 9.2993	10.6752
160.63		
12.3645	4.0487	1.5728
321.4035		

In multiplication, " Allow as many decimal places " in the product as there are in both factors. If the " product has not ſo many places, ſupply them by " prefixing cyphers on the left hand."

Ex. 1st.] 1.37	2d.] 43.75	3d.] .1572
1.8	.48	.12
1096	35000	.01864
137	17500	
2.466	21.0000	

The reaſon of this rule may be explained, by obſerving, that the value of the product depends on the value of the factors; and ſince each decimal place in either factor diminiſhes its value ten times, it muſt equally diminiſh the value of the product.

To multiply decimals by 10, move the decimal point one place to the right; to multiply by 100, 1000, or the like, move it as many places to the right as there are cyphers in the multiplier.

In diviſion, " Point the quotient ſo, that there may " be an equal number of decimal places in the divi- " dend as in the diviſor and quotient together."

Therefore, if there be the ſame of decimal places in the diviſor and dividend, there will be as many in the quotient.

If there be more in the dividend, the quotient will have as many as the dividend has more than the diviſor.

If there be more in the diviſor, we muſt annex (or ſuppoſe annexed) as many cyphers to the dividend, as may complete the number in the diviſor, and all the figures of the quotient are integers.

If the diviſion leave a remainder, the quotient may be extended to more decimal places; but theſe are not regarded in fixing the decimal point.

The reaſon for fixing the decimal point, as directed, may be inferred from the rule followed in multiplication. The quotient multiplied by the diviſor produces the dividend; and therefore the number of decimal places in the dividend is equal to thoſe in the diviſor and quotient together.

The firſt figure of the quotient is always at the ſame diſtance from the decimal point, and on the ſame ſide as the figure of the dividend, which ſtands above the unit place of the firſt product. This alſo takes place in integers; and the reaſon is the ſame in both.

It was formerly obſerved, that numbers were diminiſhed when multiplied by proper fractions, and increaſed when divided by the ſame. Thus, multiplication by fractions correſponds with diviſion by integers; and diviſion by fractions with multiplication by integers; when we multiply by $\frac{1}{2}$ or .5, we obtain the ſame anſwer as when we divide by 2, and every integer has a correſpondent decimal, which may be called its *reciprocal*. Multiplication by that decimal ſupplies the place of diviſion by the integer, and diviſion ſupplies the place of multiplication.

Decimal Fractions.

To find the reciprocal of any number, divide 1 with cyphers annexed by that number.

Ex. Required the reciprocal of 625.

625)1.000(.0016
625
3750
3750
0

The product of any number multiplied by .0016 is the ſame as the quotient divided by 625. *Example.*

625)9375(15
625
3125
3125
0

9375
.0016
56250
9375
15.0000

Becauſe .0016 is $\frac{1}{625}$ of unity, any number multiplied by that fraction will be diminiſhed 625 times. For a like reaſon, the quotient of any number divided by 0016, will be equal to the product of the ſame multiplied by 625. *Example.*

.0016)516.0000(322500
48 ....
36
32
40
32
80
80
0

516
625
2580
1032
3096
322500

Sect. iii. APPROXIMATE DECIMALS. 25

IT has been ſhown, that ſome decimals, though extended to any length, are never complete: and others, which terminate at laſt, ſometimes conſiſt of ſo many places, that it would be difficult in practice to extend them fully. In theſe caſes, we may extend the decimal to three, four, or more places, according to the nature of the articles, and the degree of accuracy required, and reject the reſt of it as inconſiderable. In this manner we may perform any operation with eaſe by the common rules, and the anſwers we obtain are ſufficiently exact for any purpoſe in buſineſs. Decimals thus reſtricted are called *approximates*.

Shillings, pence, and farthings, may be eaſily reduced to decimals of three places, by the following rule. Take half the ſhillings for the firſt decimal place, and the number of farthings increaſed by 1, if it amount to 24, or upwards; by two, if it amount to 48 or upwards; and by three, if it amount to 72, or upwards, for the two next places.

The reaſon of this is, that 20 ſhillings make a pound, two ſhillings is the tenth part of a pound; and therefore half the number of ſhillings makes the firſt decimal place. If there were 50 farthings in a ſhilling, or 1000 in a pound, the units of the farthings in the remainder would be thouſandth-parts, and the tens would be hundredth-parts, and ſo would give the two next decimal places; but becauſe there are only 48 farthings in a ſhilling, or 960 in a pound, every farthing is a little more than the thouſandth-part of a pound; and and ſince 24 farthings make 25 thouſandth-parts, allowance is made for that exceſs by adding 1 for every 24 farthings, as directed.

If the number of farthings be 24, 48, or 72, and conſequently the ſecond and third decimal places 25, 50, and 75, they are exactly right; otherwiſe they are not quite complete, ſince there ſhould be an allowance of $\frac{1}{24}$ not only for 24, 48, and 72 farthings, but for every other ſingle farthing. They may be completed by the following rule: Multiply the ſecond and third decimal places, or their exceſs above 25, 50, 75, by 4. If the product amount to 24 or upwards, add 1; if 48, add 2; if 72, add 35. By this operation we obtain two decimal places more; and by continuing the ſame operation, we may extend the decimal till it terminate in 25, 50, 75, or in a repeater.

Decimals of ſterling money of three places may eaſily be reduced to ſhillings, pence, and farthings, by the following rule. Double the firſt decimal place, and if the ſecond be 5 or upwards, add 1 thereto for ſhillings. Then divide the ſecond and third decimal places, or their exceſs above 50, by 4, firſt deducing 1, if it amount to 25, or upwards; the quotient is pence, and the remainder farthings.

As this rule is the converſe of the former one, the reaſon of the one may be inferred from that of the other. The value obtained by it, unleſs the decimal terminate in 25, 50, or 75, is a little more than the true value; for there ſhould be a deduction not only of 1 for 25, but a like deduction of $\frac{1}{25}$ on the remaining figures of theſe places.

We proceed to give ſome examples of the arithmetic of approximates, and ſubjoin any neceſſary obſervations.

ADDITION.

Cwt.	*qrs.*	*lb.*	
3	2	14	= 3.625
2	3	22	= 2.94642
3	3	19	= 3.91964
4	1	25	= 4.47321
14	3	24	14.96427

SUBTRACTION.

Cwt.	*qrs.*	*lb.*	
3	2	2	= 3.51785
1	1	19	= 1.41964
2	—	9	2.09821

If we value the ſum of the approximates, it will fall a little ſhort of the ſum of the articles, becauſe the decimals are not complete.

Some add 1 to the laſt decimal place of the approximate, when the following figure would have been 5, or upwards. Thus the full decimal of 3 qrs. 22lb. is .946,428571, and therefore .94643 is nearer to it than .94642. Approximates, thus regulated, will in general give exacter anſwers, and ſometimes above the true one, ſometimes below it.

The mark + ſignifies that the approximate is leſs than the exact decimal, or requires ſomething to be added. The mark — ſignifies that it is greater, or requires ſomething to be ſubtracted.

MULTIPLICATION.

```
    8278+    Meth. 2d.] 8278    Meth. 3d.] 8278
    2153+               2153               3512
   ------             ------              ------
   24834             16556|               16556
  41390                827|8                827
  8278                 413|90               413
 16556                  24|834               24
---------          ----------             ------
 1782|2534          1782|2534              1782
```

Here the four laſt places are quite uncertain. The right-hand figure of each particular product is obtained by multiplying 8 into the figures of the multiplier; but if the multiplicand had been extended, the carriage from the right-hand place would have been taken in; conſequently the right-hand place of each particular product, and the four places of the total product, which depend on theſe, are quite uncertain. Since part of the operation, therefore, is uſeleſs, we may omit it; and, for this purpoſe, it will be convenient to begin (as in p. 658. col. 1. *fifth* variety) at the higheſt place of the multiplier. We may perceive that all the figures on the right hand of the line in Method 2. ſerve no purpoſe, and may be left out, if we only multiply the figures of the multiplicand, whoſe products are placed on the right-hand of the line. This is readily done by inverting the multiplier in Method 3. and beginning each product with the multiplication of that figure which ſtands above the figure of the multiplier that produces it, and including the carriage from the right-hand place.

If both factors be approximates, there are as many uncertain places, at leaſt in the product, as in the longeſt factor. If only one be an approximate, there are as many uncertain places as there are figures in that factor, and ſometimes a place or two more, which might be affected by the carriage. Hence we may infer, how far it is neceſſary to extend the approximates, in order to obtain the requiſite number of certain places in the product.

DIVISION.

$.3724-)798|64327+(2144$ or $3\cancel{7}\cancel{2}\cancel{4})79864327(2144$

```
    744|8              7448
   -------            ------
     53|84              538
     37|24              372
   --------           ------
     16|602             166
     14|896             148
   --------           ------
      1|7063             18
      1|4892             14
     ------             ----
      2171                4
```

Here all the figures on the right hand of the line are uncertain; for the right-hand figure of the firſt product 7448 might be altered by the carriage, if the diviſor were extended; and all the remainders and dividuals that follow are thereby rendered uncertain. We may omit theſe uſeleſs figures; for which purpoſe, we daſh a figure on the right hand of the diviſor at each ſtep, and neglect it when we multiply by the figure of the quotient next obtained: but we include the carriage. The operation, and the reaſon of it, will appear clear, by comparing the operation at large, and contracted, in the above example.

Chap. X. INTERMINATE DECIMALS.

29 Sect. i. Reduction of Interminate Decimals.

As the arithmetic of interminate decimals, otherwiſe called the *arithmetic of infinites*, is facilitated by comparing them with vulgar fractions, it will be proper to inquire what vulgar fractions produce the ſeveral kinds of decimals, terminate or interminate, repeaters or circulates, pure or mixed. And, firſt, we may obſerve, that vulgar fractions, which have the ſame denominator, produce decimals of the ſame kind. If the decimals correſponding to the numerator 1 be known, all others are obtained by multiplying theſe into any given numerator, and always retain the ſame form, providing the vulgar fraction be in its loweſt terms.

Thus, the decimal equal to $\frac{1}{7}$ is .142857,
which multiplied by 3

produces the decimal equal to $\frac{3}{7}$. .428571,

Secondly, If there be cyphers annexed to the ſignificant figures of the denominator, there will be an equal number of additional cyphers prefixed to the decimal. The reaſon of this will be evident, if we reduce theſe vulgar fractions to decimals, or if we conſider that each cypher annexed to the denominator diminiſhes the value of the vulgar fraction ten times, and each cypher prefixed has a like effect on the value of the decimal.

Thus, $\frac{1}{7}=.142857$, $\frac{7}{25}=.28$ $\frac{1}{22}=.0,45$,
$\frac{1}{70}=.0,142857$, $\frac{7}{2500}=.0028$ $\frac{1}{2200}=.000,45$,

We may therefore confine our attention to vulgar fractions, whoſe numerator is 1, and which have no cyphers annexed to the ſignificant figures of the denominator.

Thirdly, Vulgar fractions, whoſe denominators are 2 or 5, or any of their powers, produce terminate decimals; for, if any power of 2 be multiplied by the ſame power of 5, the product is an equal power of 10, as appears from the following table:

$2 \times 5 = 10$
2^2 or 4×5^2 or $25 = 100$ or 10^2
2^3 or 8×5^3 or $125 = 1000$ or 10^3
2^4 or 16×5^4 or $625 = 10000$ or 10^4
2^5 or 32×5^5 or $3125 = 100000$ or 10^5

And the reaſon is eaſily pointed out; for $2^3 \times 5^3 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$; or, becauſe the factors may be taken in any order, $= 2 \times 5 \times 2 \times 5 \times 2 \times 5$; and this, if we multiply the factors by pairs, becomes $10 \times 10 \times 10$, or 10^3. The like may be ſhown of any other power. And we may infer, that, if any power of 10 be divided by a like power of 2 or 5, the quotient will be an equal power of 5 or 2 reſpectively, and will come out exact, without a remainder; and, ſince the vulgar fractions above mentioned are reduced to decimals by ſome ſuch diviſion, it follows that the equivalent decimals are terminate.

The number of places in the decimal is pointed out by the exponent of the power; for the dividend muſt be a like power of 10, or muſt have an equal number of cyphers annexed to 1, and each cypher of the dividend gives a place of the quotient.

Ex. $\frac{1}{32}=.03125$, a decimal of 5 places, and $32=2^5$.

```
32)1.00000(.03125
    96...
    ---
     40
     32
     ---
      80
      64
      ---
      160
      160
```

Again, no denominators except 2, 5, or their powers, produce terminate decimals. It is obvious from p. 661. col. 2. par. 4. that, if any denominator which produces a terminate decimal be multiplied thereby, the product will conſiſt of 1, with cyphers annexed; and conſequently the loweſt places of the factors, multiplied into each other, muſt amount to 10, 20, or the like, in order to ſupply a cypher for the loweſt place of the product; but none of the digits give a product of this kind, except 5 multiplied by the even numbers: therefore one of the factors muſt terminate in 5, and the other in an even number. The former is meaſured by 5, and the latter by 2, as was obſerved p. 660. col. 2. par. 7. Let them be divided accordingly, and let the quotients be multiplied. This laſt product will be exactly one tenth-part of the former; and therefore will conſiſt of 1, with cyphers annexed, and the factors which produce it are meaſured by 5 and 2, as was ſhewn before. This operation may be repeated; and one of the factors may be divided by 5, and the other by 2, till they be exhauſted; conſequently they are powers of 5 and 2.

Fourthly, Vulgar fractions, whoſe denominators are 3 or 9, produce pure repeating decimals.

Thus, $\frac{1}{9}=.11\acute{1}$ $\frac{5}{9}=.55\acute{5}$
$\frac{2}{9}=.22\acute{2}$ $\frac{2}{3}$ or $\frac{6}{9}=.06\acute{6}$
$\frac{1}{3}$ or $\frac{3}{9}=.33\acute{3}$ $\frac{7}{9}=.77\acute{7}$
$\frac{4}{9}=.444$ $\frac{8}{9}=.888$

The repeating figure is always the ſame as the numerator. Hence we infer, that repeating figures ſignify ninth-parts; a repeating 3 ſignifies $\frac{1}{3}$; a repeating 6 ſignifies $\frac{2}{3}$; and a repeating 9 ſignifies $\frac{5}{9}$, or 1.

The value of repeating decimals may alſo be illuſtrated by collecting the values of the different places: for example, let the value of $11\acute{1}$ be required; the firſt decimal place ſignifies $\frac{1}{10}$, the next $\frac{1}{100}$, the next $\frac{1}{1000}$. The ſum of the two firſt places is $\frac{11}{100}$, of the three places $\frac{111}{1000}$; and ſo on. If we ſubtract theſe values ſucceſſively from $\frac{1}{9}$, the firſt remainder is $\frac{1}{90}$, the ſecond $\frac{1}{900}$, the third $\frac{1}{9000}$. Thus, when the value of the ſucceſſive figures is reckoned, the amount of them approaches nearer and nearer to $\frac{1}{9}$, and the difference becomes 10 times leſs for each figure aſſumed; and, ſince the decimal may be extended to any length, the difference will at laſt become ſo ſmall, that it need not be regarded. This may give a notion of a decreaſing ſeries, whoſe ſum may be exactly aſcertained, though the number of terms be unlimited.

Fifthly, Vulgar fractions, whoſe denominators are a product of 3 or 9 multiplied by 2, 5, or any of their powers, produce mixed repeaters. The reaſon of this will be evident, if, in forming the decimal, we divide the numerator ſucceſſively by the component parts of the denominator, as directed p. 660. col. 1. par. *ult.* &c.

Interminate Decimals.

&c. The firſt diviſor is 2, 5, or ſome of their powers, and conſequently gives a finite quotient by p. 679. col. 1. par. 3. &c. The ſecond diviſor is 3 or 9; and therefore, when the figures of the dividend are exhauſted, and figures annexed to the remainder, the quotient will repeat, by p. 679. col. 2. par. 2.

Ex. $\frac{1}{144}$ $144 = 16 \times 9$.

$$\begin{array}{lcl}
 & & \qquad\quad 9 \\
144)1.000(.0069\dot{4} & \text{or} & 16)1.00(.0625 \\
\quad\ 864 & & \qquad 96.0069\dot{4} \\
\quad \overline{1360} & & \qquad \overline{40} \\
\quad\ 1296 & & \qquad\ 32 \\
\quad \overline{{}^{*}\ 640} & & \qquad \overline{80} \\
\quad\ \ 576 & & \qquad\ 80 \\
\quad\ \ \overline{640} & & \qquad \overline{0}
\end{array}$$

In order to illuſtrate this ſubject further, we ſhall explain the operation of caſting out the threes, which reſembles that for caſting out the nines, formerly laid down, p. 663. col. 2. par. 4.—p. 664. col. 2. par. 3. and depends on the ſame principles, being a method of finding the remainder of a number divided by 3. If the ſame number be divided by 3 and by 9, the remainders will either agree, or the ſecond remainder will exceed the firſt by 3 or by 6. The reaſon of this will be obvious, if we ſuppoſe a collection of articles aſſorted into parcels of 3, and afterwards into parcels of 9, by joining three of the former together. If the leſſer parcels be all taken up in compoſing the greater ones, the remainder will be the ſame at the end of the ſecond aſſortment as before; but, if one of theſe leſſer parcels be left over, the remainder will be more, and if two of them be left over, the remainder will be 6 more. Therefore, when the nines are caſt out from any number, and the reſult divided by 3, the remainder is the ſame as when the number is divided by 3: Thus, the reſults on caſting out the 3's may be derived from thoſe obtained by caſting out the 9's; and the ſame correſpondence which was pointed out with reſpect to the latter, for proving the operations of arithmetic, applies alſo to the former.

To caſt out the 3's from any number, add the figures, neglecting 3, 6, and 9; and when the ſum amounts to 3, 6, or 9, reject them, and carry on the computation with the exceſs only. For example, take 286754: in caſting out the 3's, we compute thus, 2 and 8 is 10, which is three times 3, and 1 over; 1 and (paſſing by 6) 7 is 8, which is twice 3, and 2 over; 2 and 5 is 7, which is twice 3, and 1 over; *laſtly*, 1 and 4 is 5, which contains 3 once, and 2 over, ſo the reſult is 2.

If the 3's be caſt out from 2^2 or 4, the reſult is 1; from 2^3 or 8, the reſult is 2; from 2^4 or 16, the reſult is 1; and univerſally the odd powers of 2 give a reſult of 2, and the even powers give a reſult of 1. As every higher power is produced by multiplying the next lower by 2, the reſult of the product may be found by multiplying the reſult of the lower power by 2, and caſting out the 3's, if neceſſary. Therefore, if the reſult of any power be 1, that of the next higher is 2, and that of the next higher (4 with the 3's caſt out or) 1. Thus the reſults of the powers of 2 are 1 and 2 by turns; alſo, becauſe the reſult of 5, when the 3's are caſt out, is 2, its powers will have the ſame reſults as the correſponding powers of 2.

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If the denominator be a product of an even power of 2 or 5, multiplied by 3, the repeating figure of the correſponding decimal is 3; but, if it be the product of an odd power, the repeating figure is 6. For, in forming the decimal, we may divide by the component parts of the denominator, and the firſt diviſor is a power of 2 or 5; therefore the firſt quotient is a like power of 4 or 2, (p. 679. col. 1. par. 3. &c). and this power is again divided by 3. If it be an even power, the remainder or reſult is 1, as was demonſtrated above; and if cyphers be annexed to the remainder, and the diviſion continued, it quotes a repeating 3; but if it be an odd power, the remainder is 2, and the quotient continued by annexing cyphers is a repeating 6.

If the denominator be 9, multiplied by 2, or any of its powers, the repeating figure may be found by caſting out the 9's from the correſponding power of 5; and, if it be multiplied by 5 or any of its powers, by caſting out the 9's from the correſponding power of 2. For if the decimal be formed by two diviſions, the firſt quotes the correſponding power; and the ſecond, becauſe the diviſor is 9, repeats the reſulting figure after the dividend is exhauſted.

If any mixed repeater be multiplied by 9, the product is a terminate decimal, and may be reduced (p. 679. col. 1. par. 3. &c). to a vulgar fraction, whoſe denominator is 2, 5, or ſome of their powers; therefore all mixed repeaters are derived from vulgar fractions, whoſe denominators are products of 2, 5, or their powers, multiplied by 3 or 9.

Sixthly, All denominators, except 2, 5, 3, 9, the powers of 2 and 5, and the products of theſe powers, multiplied by 3 or 9, produce circulating decimals. We have already ſhewn, that all terminate decimals are derived from 2, 5, or their powers; all pure repeaters, from 3 or 9; and all mixed repeaters, from the products of the former multiplied by the latter. The number of places in the circle is never greater than the denominator diminiſhed by unity. Thus $\frac{1}{7}$ produces .142857, a decimal of 6 places; and $\frac{1}{17}$ produces .0588235294117647, a decimal of 16 places. The reaſon of this limit may be inferred from the diviſion; for whenever a remainder which has recurred before returns again, the decimal muſt circulate, and the greateſt number of poſſible remainders is one leſs than the diviſor: But frequently the circle is much ſhorter. Thus $\frac{1}{11}$ = .09, a circle of 2 places.

When a vulgar fraction, whoſe numerator is 1, produces a pure circulate, the product of the circle multiplied by the denominator will conſiſt of as many 9's as there are places in the circle. Thus $\frac{1}{7}$ = .142857, which multiplied by 7 produces 999999. The like holds in every decimal of the ſame kind; for they are formed by dividing 10, or 100, or 1000, or ſome like number, by the denominator, and the remainder is 1, when the decimal begins to circulate; for the diviſion muſt be then exactly in the ſame ſtate as at the beginning: Therefore if the dividend had been leſs by 1, or had conſiſted entirely of 9's, the diviſion would have come out without a remainder; and, ſince the quotient, multiplied by the diviſor, produces the dividend, as was ſhown p. 661. col. 2. par. 3. it follows, that the circulating figures, multiplied by the denominator, produce an equal number of 9's.

Every vulgar fraction, which produces a pure circulate,

Interminate Decimals.

late, is equal to one whoſe numerator is the circulating figures, and its denominator a like number of 9's. If the numerator be 1, the vulgar fraction is reduced to that form by multiplying both terms into the circle of the decimal; and, if the numerator be more than 1, the equivalent decimal is found by multiplying that which correſponds to the numerator 1 into any other numerator.

Thus $\frac{1}{7}=.142857,=\frac{142857}{999999}$ and $\frac{1}{37}=.027.=\frac{27}{999}$
$\frac{2}{7}=.285714,=\frac{285714}{999999}$ $\frac{2}{37}=.054=\frac{54}{999}$
$\frac{3}{7}=.428571,=\frac{428571}{999999}$ $\frac{8}{37}=.216=\frac{216}{999}$

Hence we may infer, that pure circulates are equal in value to vulgar fractions whoſe numerators conſiſt of the circulating figures, and denominators of as many 9's as there are places in the circle. To place this in another point of view, we ſhall reduce a vulgar fraction, whoſe numerator conſiſts entirely of 9's, to a decimal.

```
375/999      999)375000(.375,
                 2997..
                 ----
                  7530
                  6993
                  ----
                   5370
                   4995
                   ----
                 *  375
```

The remainder is now the ſame as the dividend, and therefore the quotient muſt circulate; and, in general, ſince any number with 3 cyphers annexed, may be divided by 1000, without a remainder, and quotes the ſignificant figures; therefore, when divided by 999, it muſt quote the ſame figures, and leave an equal remainder. This alſo applies to every diviſor which conſiſts entirely of 9's. Circles of two places, therefore, ſignify ninety ninth-parts; circles of 3 places ſignify nine hundred and ninety ninth-parts; and ſo on.

The value of circulating decimals may alſo be illuſtrated by adding the values of the places. Thus, if two figures circulate, the firſt circle ſignifieth hundredth-parts, and every following circle ſignifies one hundred times leſs than the preceding; and their values added, as in p. 679. col. 2. par. 3. will approach nearer to ninety ninth-parts than any aſſigned difference, but will never exactly complete it.

All denominators which are powers of 3, except 9, produce pure circulates; and the number of places in the circle is equal to the quotient of the denominator divided by 9.

Thus, $\frac{1}{27}=.037$, a circle of 3 places, and 27 divided by 9=3.

$\frac{1}{81}=.012345679$, a circle of 9 places, and 81 divided by 9=9.

Theſe decimals may be formed, by dividing the numerator by the component parts of the denominator. In the firſt example, the component parts of the numerator are 9 and 3. The diviſion by 9 quotes a pure circulate, and the circulating figure is not 3, 6, or 9, if the vulgar fraction be in its loweſt terms. And any other repeating figure divided by 3, quotes a pure circulate of 3 places; for the firſt dividual muſt leave a remainder of 1 or 2. If the firſt remainder be 1, the ſecond remainder is 2, (becauſe, if 1 be prefixed to the repeating figure, and the 3's be caſt out, the reſult is 2); and, for a like reaſon, the third dividual clears off without a remainder. If the firſt remainder be 2, the ſecond is (twice 2 or 4, with the 3's caſt out, or) 1, and the third 0; ſo the circle is always complete at 3 places, and the diviſion begins anew. The ſum of ſuch a circle cannot be a multiple of 3; for, ſince the repeating figure is not 3, nor any of its multiples, the ſum of 3 places is not a multiple of 9, and therefore cannot be divided by 9, nor twice by 3, without a remainder.

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Again, if the decimal equal to $\frac{1}{27}$ be divided by 3, we ſhall obtain the decimal equal to $\frac{1}{81}$. The dividend, as we have ſhewn already, is a pure circulate of 3 places, whoſe ſum is not a multiple of 3. Therefore, when dvided by 3, the firſt circle leaves a remainder of 1 or 2, which being prefixed to the ſecond, and the diviſion continued, the remainder, at the end of the ſecond circle, is 2 or 1, and, at the end of the third circle, there is no remainder; all which may be illuſtrated by caſting out the 3's. The diviſion being completed at 9 places, finiſhes the circle; and it may be ſhown, as before, that the ſum of theſe places is not a multiple of 3. The learner will apprehend all this if he reduce theſe, or the like vulgar fractions, to decimals, by ſucceſſive diviſions.

27 = 9 × 3, and 9)1.0(.11$\cancel{1}$, and 3)11$\cancel{1}$(.037,
81 =27 × 3, and 3)037,037,037(.012345679.

For the ſame reaſon, if any circulating decimal, not a multiple of 3, be divided by 3, the quotient will circulate thrice as many places as the dividend; and, if any circulate obtained by ſuch diviſion be multiplied by 3, the circle of the product will be reſtricted to one third of the places in the multiplicand.

All vulgar fractions, whoſe denominators are multiples of 2, 5, or their powers, except thoſe already conſidered, produce mixed circulates; for they may be reduced by dividing by the component parts of the denominator. The firſt diviſor is 2, 5, or ſome of their powers, and therefore gives a finite quotient. The ſecond diviſor is none of the numbers enumerated p. 680. col. 2. par. 2. and therefore gives a circulating quotient when the ſignificant figures of the dividend are exhauſted, and cyphers annexed to the remainder.

```
     Ex. 1/216                     216=27×8,
216)1.000(.004,629,           or   8)1.000
     864                          27) .125(.004,629,
     ----                              108
   * 1360                              ---
     1296                            * 170
     ----                              162
      640                              ---
      432                               80
      ----                              54
      2080                             ---
      1944                             260
      ----                             243
   *  1360                             ---
                                        17
```

All mixed circulates are derived from vulgar fractions

tions of this kind, whoſe denominators are multiples of 2, 5, or their powers; and therefore all other denominators, except 3 and 9, produce pure circulates. The reader will eaſily perceive, that, when a decimal is formed from a vulgar fraction, whoſe numerator is 1, when the remainder 1 occurs in the diviſion, the decimal is a pure circulate; but, if any other remainder occurs twice, the decimal is a mixed circulate. We are to ſhow that this laſt will never happen, unleſs the diviſor be a multiple of 2, 5, or their powers. If two numbers be prime to each other, their product will be prime to both; and, if two numbers be propoſed, whereof the firſt does not meaſure the ſecond, it will not meaſure any product of the ſecond, if the multiplier be prime to the firſt. Thus, becauſe 7 does not meaſure 12 it will not meaſure any product of 12 by a multiplier prime to 7. For inſtance, it will not meaſure 12×3, or 36. Otherwiſe, the quotient of 12 divided by 7, or 1 $\frac{5}{7}$ multiplied by 3, would be a whole number, and 5 × 3 would be meaſured by 7, which it cannot be, ſince 5 and 3 are both prime to 7.

Now, if we inſpect the foregoing operation, we ſhall perceive that the product of 136, the remainder, where the decimal begins to circulate, multiplied by 999, is meaſured by the denominator 216. But 999 is not meaſured by the denominator, otherwiſe the decimal would have been a pure circulate; therefore 126, and 136, are not prime to each other, but have a common meaſure, and that meaſure muſt apply to 864, a multiple of 126, and to 1000, the ſum of 136 and 864; ſee p. 672. col. 2. par. *ult.* &c. But it was proven, p. 679. col. 1. par. 1. that no numbers, except the powers of 5 and 2, meaſure a number conſiſting of 1 with cyphers annexed; conſequently the denominator muſt be meaſured by a power of 2 or 5. The reader will perceive, that the exponent of the power muſt be the ſame as the number of cyphers annexed to 1, or as the number of figures in the finite part of the decimal.

We ſhall now recapitulate the ſubſtance of what has been ſaid with reſpect to the formation of decimals. 2, 5, and their powers, produce finite decimals, by p. 679. col. 1. par. 3. &c. and the number of places is meaſured by the exponent of the power. 3 and 9 produce pure repeaters (p. 679. col. 2. par. 2.) The products of 2, 5, and their powers, by 3 or 9, produce mixed repeaters by p. 679. col. 2. par. *ult.*; their products by other multipliers, produce mixed circulates by p. 679. col. 2. par. *ult.*; and all numbers of which 2 and 5 are not aliquot parts, except 3 and 9, produce pure circulates. To find the form of a decimal correſponding to any denominator, divide by 2, 5, and 10, as often as can be done without a remainder; the number of diviſions ſhows how many finite places there are in the decimal, by p. 681. col. 2. par. 3. If the dividend be not exhauſted by theſe diviſions, divide a competent number of 9's by the laſt quotient, till the diviſion be completed without a remainder: the number of 9's required ſhows how many places there are in the circle, and the reaſon may be inferred from p. 680. col. 2. par. 5.

We ſhall conclude this ſubject by marking down the decimals produced by vulgar fractions, whoſe numerator is 1, and denominators 30; and under that the reader may obſerve their connection with the denominators.

$\frac{1}{2}$=.5
$\frac{1}{3}$=.333
$\frac{1}{4}$=.25
$\frac{1}{5}$=.2
$\frac{1}{6}$=.1666
$\frac{1}{7}$=.142857,
$\frac{1}{8}$=.125
$\frac{1}{9}$=.111
$\frac{1}{10}$=.1
$\frac{1}{11}$=.09,09,
$\frac{1}{12}$=.08333
$\frac{1}{13}$=.079623,
$\frac{1}{14}$=.0,714285,
$\frac{1}{15}$=.0666
$\frac{1}{16}$=.0625
$\frac{1}{17}$=.0588235294117647,
$\frac{1}{18}$=.0555
$\frac{1}{19}$=.052631578947368421,
$\frac{1}{20}$=.05
$\frac{1}{21}$=.047619,
$\frac{1}{22}$=.0,45,45,
$\frac{1}{23}$=.0434782608695652173913,
$\frac{1}{24}$=.041666
$\frac{1}{25}$=.04
$\frac{1}{26}$=.0,384615,
$\frac{1}{27}$=.037,
$\frac{1}{28}$=.03,571428,
$\frac{1}{29}$=.0344827586206896551724137931,
$\frac{1}{30}$=.0333

Rules *for reducing interminate decimals to vulgar fractions.*

I. "If the decimal be a pure repeater, place the "repeating figure for the numerator, and 9 for the "denominator."

II. "If the decimal be a pure circulate, place the "circulating figures for the numerator, and as many 9's "as there are places in the circle for the denominator."

III. "If there be cyphers prefixed to the repeating "or circulating figures, annex a like number to the "9's in the denominator."

IV. "If the decimal be mixed, ſubtract the finite "part from the whole decimal. The remainder is the "numerator; and the denominator conſiſts of as many "9's as there are places in the circle, together with "as many cyphers as there are finite places before "the circle.

Thus, 235,62, = $\frac{23327}{99000}$

From the whole decimal	23562
we ſubtract the finite part	235
and the remainder	23327 is the numerator.

The reaſon may be illuſtrated by dividing the decimal into two parts, whereof one is finite, and the other a pure repeater or circulate, with cyphers prefixed. The ſum of the vulgar fractions correſponding to theſe will be the value of the decimal ſought.

.235,62, may be divided into .235 = $\frac{235}{1000}$ by rule I.
and .000,62 = $\frac{62}{99000}$ by rules II. III

In order to add theſe vulgar fractions, we reduce them to a common denominator; and, for that purpoſe, we multiply both terms of the former by 99, which gives $\frac{23265}{99000}$; then we add the numerators.

235 or by method explained p. 658. col. 1. par. 3.
99

		Sum of numerators.		
2115	23500	23265	or	23562
2115	235	62		235
23265	23265	23327		23327

The value of circulating decimals is not altered, though one or more places be ſeparated from the circle, and conſidered as a finite part, providing the circle be completed. For example, .27 may be written .2,72, which is reduced by the laſt of the foregoing rules to $\frac{270}{990}$, or $\frac{27}{99}$, which is alſo the value of .27. And, if two or more circles be joined, the value of the decimal is ſtill the ſame. Thus, 2727, = $\frac{2727}{9999}$, which is reduced by dividing the terms by 101 to $\frac{27}{99}$.

All circulating decimals may be reduced to a ſimilar form, having a like number both of finite and circulating places. For this purpoſe, we extend the finite part of each as far as the longeſt, and then extend all the circles to ſo many places as may be a multiple of the number of places in each.

Ex. .34,725, extended .34,725725725725,
1,4562, 14,562456245624,

Here the finite part of both is extended to two places, and the circle to 12 places, which is the leaſt multiple for circles of 3 and 4 places.

30 Sect. ii. Addition *and* Subtraction *of* Interminate Decimals.

To add repeating decimals, "Extend the repeating "figures one place beyond the longeſt finite ones, and, "when you add the right-hand column, carry to the "next by 9."

Ex. .3752$\dot{4}$	or 3752$\dot{4}$	.2$\dot{8}$	.29$\dot{6}$	$\frac{7}{30}$
.8	8888$\dot{8}$	.32$\dot{8}$	.42	$\frac{11}{45}$
.643	643	.469$\dot{7}$	.7548	$\frac{11}{72}$
.7$\dot{3}$	7333$\dot{3}$	.3$\dot{6}$	.3$\dot{1}$	$\frac{2}{75}$
	264046			

To ſubtract repeating decimals, "Extend them as "directed for addition, and borrow at the right-hand "place, if neceſſary, by 9.

.9356$\dot{6}$	.646	.735$\dot{8}$	.738$\dot{2}$	.469
.8473$\dot{8}$	.5342$\dot{7}$	.6256$\dot{3}$	.6$\dot{8}$	.3$\dot{8}$
.0872$\dot{7}$	.1117$\dot{2}$			

The reaſon of theſe rules will be obvious, if we recollect that repeating figures ſignify ninth-parts. If the right-hand figure of the ſum or remainder be 0, the decimal obtained is finite; otherwiſe it is a repeater.

To add circulating decimals, "Extend them till they "become ſimilar (p. 682. col. 1. par. *ult.* &c.); and, "when you add the right-hand column, include the figure which would have been carried if the circle had "been extended further.

Ex. 1st.	*Extended.*	*Ex.* 2d.	*Extended.*
.574,	.574,574,	.874,	.874,874874,
.2,698,	.266,869,	.146$\dot{3}$	.146,333333,
.428	.428	.1,58,	.158,585858,
.37,983,	.379,839,	.32,	.323,232323,
	1.652,284,		1.503,026390,

Note 1. Repeaters mixed with circulates are extended and added as circulates.

Note 2. Sometimes it is neceſſary to inſpect two or more columns for aſcertaining the carriage; becauſe the carriage from a lower column will ſometimes raiſe the ſum of the higher, ſo as to alter the carriage from it to a new circle. This occurs in Ex. 2.

Note 3. The ſum of the circles muſt be conſidered as a ſimilar circle. If it conſiſt entirely of cyphers, the amount is terminate. If all the figures be the ſame, the amount is a repeater. If they can be divided into parts exactly alike, the amount is a circle of fewer places; but, for the moſt part, the circle of the ſum is ſimilar to the extended circles.

.3,868,	.0842,	$\frac{2}{7}$	.368	.003094,	$\frac{5}{81}$
.4,375,	.08,42	$\frac{3}{5}$	.57,	.765,	$\frac{7}{48}$
.853492,	.0,842	$\frac{8}{11}$	.895	.76,	$\frac{2}{11}$
.62,	.084$\dot{2}$	$\frac{16}{27}$	.742	.765	$\frac{3}{22}$

To ſubtract circulating decimals, "Extend them till "they become ſimilar; and, when you ſubtract the "right-hand figure, conſider whether 1 would have "been borrowed if the circles had been extended further, and make allowance accordingly.

.5,72,	.974,	or .974974,	.8,135,	or .8,135135,
.4,86,	.86,	.868686,	.452907	or .4,529074,
.0,85,		.106288,		.3,606060,
				or 3,60,

31 Sect. iii. Multiplication *of* Interminate Decimals.

Csse I. "When the multiplier is finite, and the "multiplicand repeats, carry by 9 when you multiply "the repeating figure: The right-hand figure of each "line of the product is a repeater; and they muſt be "extended and added accordingly."

Ex. .1349$\dot{4}$
.367

9446$\dot{1}$
80966$\dot{6}$
4048333

.049524$\dot{6}\dot{1}$

If the ſum of the right-hand column be an even number of 9's, the product is finite; otherwiſe, it is a repeater.

Case II. "When the multiplier is finite, and the "multiplicand circulates, add to each product of the "right-hand figure the carriage which would have "been brought to it if the circle had been extended. "Each line of the product is a circle ſimilar to the "multiplicand, and therefore they muſt be extended "and added accordingly."

The product is commonly a circulate ſimilar to the multiplicand; ſometimes it circulates fewer places, repeats, or becomes finite; it never circulates more places.

Ex. .37,46,×.235	1. .674, ×.78
235	2. .37, ×.86
	3. .625, ×.42
187,32,	4. .4793,×4.8
1123,93,	5. .3,75, ×1.24
7492,92,	6. .2,963,×.36
.08804,19,	

Case III. "When the multiplier repeats or circulates, find the product as in finite multipliers, and "place under it the products which would have ariſen "from the repeating or circulating figures, if extended."

Ex. 1st.		2d.]	
.958×.8		.784×.36,	
8		36	
7664		4704	
766	4	2352	
76	64	28224	
7	664	282	24
	7664	2	8224
.851$\dot{8}$		.284,09,	

3d.]

Interminate Decimals.

```
3d.]      .714285,×54,
                  54
          ------------
           2859142
          35714285
       ---------------
      38,571428|571428|571428,
        385714|285714|285714,
          3857|142857|142857,
               |------|------
             38|571428|571428,
               |385714|285714,
               |  3857|142875,
               |      |------
               |    38|571428
               |      |385714
               |      |  3857
               |      |    38
      ------------------------
      38.961038,961038,961038,
```

It is evident, that, if a repeating multiplier be extended to any length, the product ariſing from each figure will be the ſame as the firſt, and each will ſtand one place to the right hand of the former. In like manner, if a circulating multiplier be extended, the product ariſing from each circle will be alike, and will ſtand as many places to the right hand of the former as there are figures in the circle. In the foregoing examples, there are as many of theſe products repeated as is neceſſary for finding the total product. If we place down more, or extend them further, it will only give a continuation of the repeaters or circulates.

This is obvious in Ex. 1st and 2d. As the learner may not apprehend it ſo readily in Ex. 3d, when the multiplicand is a circulate, and conſequently each line of the product is alſo a circulate, we have divided it into columns, whoſe ſums exhibit the ſucceſſive circles. The ſum of the firſt column is 28,961037, and there is a carriage of 1 from the right-hand column, which completes 38,961038. This one is ſupplied from the three firſt lines of the ſecond column, the ſum of which is 999999, and being increaſed by 1, in conſequence of the carriage from the third column, amounts to 1,000000, and therefore carries 1 to the firſt column, and does not affect the ſum of the remaining lines, which are the ſame as thoſe of the firſt column. The third column contains two ſets of theſe lines, which amount to 999999, beſides the lines which compoſe the circle. Each of theſe ſets would be completed into 1,000000 by the carriage from the 4th column, if extended, and each would carry 1 to the ſecond column. One of theſe would complete the ſum of the three firſt lines, and the other would complete the ſum of the circle. In like manner, if the circles be extended ever ſo far, the increaſing carriages will exactly anſwer for the increaſing deficiencies, and the ſum will be always a continuation of the circle: but the product could not circulate, unleſs the ſum of the lines marked off in the ſecond column had conſiſted entirely of 9's, or had been ſome multiple of a number of 9's; and the circles muſt be extended till this take place, in order to find the complete product.

The multiplication of interminate decimals may be often facilitated, by reducing the multiplier to a vulgar fraction, and proceeding as directed p. 674. col. 1. par. 6.

Thus,

4th.] .3824×$\dot{7}$.=$\frac{7}{9}$
7
9)2.6768
.974$\dot{2}$

5th.] .384×.2$\dot{5}$=$\frac{23}{90}$
23   2
1152   23
768
90)8.832
.0981$\dot{3}$

Therefore, in order to multiply by $\dot{3}$, we take one third-part of the multiplier; and, to multiply by $\dot{6}$, we take two thirds of the ſame. Thus,

6th.] .784=.$\dot{3}$×$\frac{1}{3}$
3).784
.261$\dot{3}$

7th.] .8761×.$\dot{6}$=$\frac{2}{3}$
2
3)1.7522
.5840$\dot{6}$

As the denominator of the vulgar fractions always conſiſts of 9's, or of 9's with cyphers annexed, we may uſe the contraction explained p. 661. col. 1. par. *ult.* &c.; and this will lead us exactly to the ſame operation which was explained p. 683. col. 2. par. *ult.* &c. on the principles of decimal arithmetic.

8th.] .735×.3,26,=$\frac{323}{990}$
323   3
2205   323
1470
2205
99|0)237405
2374,05
23,74
,23
.239803,

9th.] .278×365,=$\frac{365}{999}$
365
1390
1668
834
999)101470,
101,
.101,571,

When the multiplier is a mixed repeater or circulate, we may proceed as in Ex. 5th and 8th; or we may divide the multiplier into two parts, of which the firſt is finite, and the ſecond a pure repeater or circulate, with cyphers prefixed, and multiply ſeparately by theſe, and add the products.

Thus, .384×.2$\dot{5}$ or by .2 = .0768 or thus, .384
and by .05 = .0213$\dot{3}$ .2$\dot{5}$
.09813   9)1920
213$\dot{3}$
768
0981$\dot{3}$

In the following examples, the multiplicand is a repeater; and therefore the multiplication by the numerator of the vulgar fraction is performed as directed p. 683. col. 2. par. 2.

10th.] .68$\cancel{3}$×.$\cancel{5}$=$\frac{5}{9}$
5

9)3.41$\cancel{6}$(.37,962,
27

71
63

* 86
81

56
54

26
18

* 86

11th.] .6$\cancel{3}$×.2,39,=$\frac{237}{990}$
.237 2

44$\cancel{3}$ 237
189$\cancel{0}$
1266$\cancel{6}$

99)15010(.15,16,
99

511
495

* 160
99

610
594

* 16

In the following examples the multiplicand is a circulate, and therefore the multiplication by the numerator is performed as directed p. 683. col. 2. par. 4.

12th.] .3,81,×5$\cancel{3}$=$\frac{48}{90}$
48 5

3054 48
15272

9|0)183,27,(.203,63,
18

* 032
27

57
54

* 32

13th.] .12,×03,=$\frac{3}{99}$
3

99)36,36(.036730945821854912764,
666
723
306
936
453
576
813
216
183
846
543
486
903
126
273
756
633
396
* 036

In Ex. 13th. we have omitted the products of the diviſor, and only marked down the remainders. Theſe are found, by adding the left-hand figure of the dividual to the remaining figures of the ſame. Thus, 363 is the firſt dividual, and 3, the left-hand figure, added to 63, the remaining figures, gives 66 for the firſt remainder; and the ſecond dividual, 666, is completed by annexing the circulating figure 6. The reaſon of which may be explained as follows. The higheſt place of each dividual ſhows, in this example, how many hundreds it contains; and, as it muſt contain an equal number of ninety-nines, and alſo an equal number of units, it follows, that theſe units, added to the lower places, muſt ſhow how far the dividual exceeds that number of ninety-nines. The figure of the quotient is generally the ſame as the firſt place of the dividual, ſometimes one more. This happens in the laſt ſtep of the foregoing example, and is diſcovered when the remainder found, as here directed, would amount to 99, or upwards; and the exceſs, above 99 only, muſt in that caſe be taken to complete the next dividual.

14th.].01, × .01, =$\frac{1}{99}$
1

99).01,(000102030405060708091011121314151617181920
(2122232425262728293031323334353637383940
(4142434445464748495051525354555657585960
(6162636465666768697071727374757677787980
(818283848586878889909192939495969799,

The number of places in the circle of the product is ſometimes very great, though there be few places in the factors: but it never exceeds the product of the denominator of the multiplier, multiplied by the number of places in the circle of the multiplicand. Therefore, if the multiplier be 3 or 6, the product may circulate three times as many places as the multiplicand; if the multiplier be any other repeater, nine times as many; if the multiplier be a circulate of two places, ninety-nine times as many: thus, in the laſt example, .01, a circulate of two places, multiplied by .01, a circulate of two places, produces a circulate of twice 99, or 198 places. And the reaſon of this limit may be inferred from the nature of the operation; for the greateſt poſſible number of remainders, including 0, is equal to the diviſor 99; and each remainder may afford two dividuals, if both the circulating figures, 3 and 6, occur to be annexed to it. If the multiplier circulate three places, the circle of the product, for a like reaſon, may extend nine hundred and ninety-nine times as far as that of the multiplicand. But the number of places is often much leſs.

The multiplication of interminate decimals may be proven, by altering the order of the factors, (p. 658. col. 2. par. 2.) or by reducing them both to vulgar fractions in their loweſt terms, multiplying theſe as directed p. 673. col. 2. par. 3. and reducing the product to a decimal.

Sect. iv. Division *of* Interminate Decimals.

Case I. "When the dividend only is interminate, "proceed as in common arithmetic; but, when the figures of the dividend are exhauſted, annex the repeating figure, or the circulating figures in their order, inſtead of cyphers, to the remainder."

Intermediate Decimals.

Ex. 1st.] Divide .5376 by 7.

$7).537\dot{6}(.76,095238,$
49
42
42
* 066
63
36
35
16
14
26
21
56
56
* 066

2d.] Divide $.84\dot{3}$ by 5.

$.5)84\dot{3}(.168\dot{6}$
5
34
30
43
40
* 33
30
33

3d.] Divide $.6532\dot{8}$ by 8.

$8).6532\dot{8}(.08166\dot{1}.$

In theſe accounts the quotient is never finite. It may repeat, if the dividend repeats; or, if the dividend circulate, it may circulate an equal number of places, often more, and never fewer. The greateſt poſſible extent of the circle is found by multiplying the diviſor into the number of places in the circle of the dividend. Thus, a circulate of 3 places, divided by 3, quotes a circulate of 3 times 3, or 9 places.

Case II. "When the diviſor is interminate, the "multiplications and ſubtractions muſt be performed, "according to the directions given for repeating and "circulating decimals."

Ex. 1st.] Divide .37845 by $\dot{8}$

$\dot{8}).37845(.68121$
$33333\dot{3}$
$4511\dot{6}$
$4444\dot{4}$
$67\dot{2}$
$55\dot{8}$
$11\dot{3}$
111
$\dot{8}$
$\dot{8}$
0

2d. Divide .245892 by 2,18

.2,18,).245892(1.127005
218181,81,
27710,18,
21818,18,
5892,00,
4363,63,
1528,36,
1527,27,
1090,90
1090,90
0

The foregoing method is the only one which properly depends on the principles of decimal arithmetic; but it is generally ſhorter to proceed by the following rule.

"Reduce the diviſor to a vulgar fraction, multiply "the dividend by the denominator, and divide the pro- "duct by the numerator."

Ex. 1st.] Divide .37845 by $\dot{8}=\frac{5}{9}$

9

$5)3.40605(.68121$

2d.] Divide $.3784\dot{8}$ by $\dot{6}=\frac{2}{3}$

3

$2)1.1353\dot{6}(.567683$

Note 1. Diviſion by $\dot{3}$ triples the dividend, and diviſion by $\dot{6}$ increaſes the dividend one half.

Note 2. When the diviſor circulates, the denominator of the vulgar fraction conſiſts of 9's, and the multiplication is ſooner performed by the contraction explained p. 658. col. 1. par. 3. It may be wrought in the ſame way, when the diviſor repeats, and the denominator, of conſequence, is 9.

Note 3. If a repeating dividend be divided by a repeating or circulating diviſor; or, if a circulating dividend be divided by a ſimilar circulating dividend; or, if the number of places in the circle of the diviſor be a multiple of the number in the dividend; then the product of the dividend multiplied by the denominator of the diviſor will be terminate, ſince like figures are ſubtracted from like in the contracted multiplication, and conſequently no remainder left. The form of the quotient depends on the diviſor, as explained at large, p. 679. col. 1. par. 1.—p. 681. col. 2. par. 3.

Note 4, In other caſes, the original and multiplied dividend are ſimilar, and the form of the quotient is the ſame as in the caſe of a finite diviſor. See p. 685. col. 2. par. *ult.* &c.

Note 5. If the terms be ſimilar, or extended till they become ſo, the quotient is the ſame as if they were finite, and the operation may be conducted accordingly; for the quotient of vulgar fractions that have the ſame denominator is equal to the quotient of their numerators.

CHAP. XI. OF THE EXTRACTION OF ROOTS.

Extraction of Roots.

33

THE origin of powers by involution has already been explained under the article ALGEBRA, n° 8 and 9. There now remains therefore only to give the moſt expeditious methods of extracting the ſquare and cube roots; the reaſons of which will readily appear from what is ſaid under that article. As for all powers above the cube, unleſs ſuch as are multiples of either the ſquare and cube, the extraction of their roots admits of no deviation from the algebraic canon which muſt be always conſtructed on purpoſe for them.

If the root of any power not exceeding the ſeventh power, be a ſingle digit, it may be obtained by inſpection, from the following TABLE of powers.

1st

1st power or root.	2d power or ſquare.	3d power or cube.	4th power or biquadrate.	5th power or furſolid.	6th power or cube ſquared.	7th power.
1	1	1	1	1	1	1
2	4	8	16	32	64	128
3	9	27	81	243	729	2187
4	16	64	256	1024	4096	16384
5	25	125	625	3125	15625	78125
6	36	216	1296	7776	46656	279936
7	49	343	2401	16807	117649	823543
8	64	512	4096	32768	262144	2097152
9	81	729	6561	59049	531441	4782969

Sect. i. EXTRACTION *of the* SQUARE ROOT. 34

RULE I. " Divide the given number into periods " of two figures, beginning at the right hand in integers, and pointing toward the left. But in decimals, begin at the place of hundreds, and point toward the right. Every period will give one figure " in the root."

II. " Find by the table of powers, or by trial, " the neareſt leſſer root of the left-hand period, place " the figure ſo found in the quot, ſubtract its ſquare " from the ſaid period, and to the remainder bring " down the next period for a dividual or reſolvend."

III. " Double the quot for the firſt part of the " diviſor; inquire how often this firſt part is contained in the whole reſolvend, excluding the units place; " and place the figure denoting the anſwer both in the " quot and on the right of the firſt part; and you have " the diviſor complete."

IV. " Multiply the diviſor thus completed by the " figure put in the quot, ſubtract the product from " the reſolvend, and to the remainder bring down the " following period for a new reſolvend, and then proceed as before."

Note 1. If the firſt part of the diviſor, with unity ſuppoſed to be annexed to it, happen to be greater than the reſolvend, in this caſe place 0 in the quot, and alſo on the right of the partial diviſor; to the reſolvend bring down another period; and proceed to divide as before.

33 Note 2. If the product of the quotient-figure into the diviſor happen to be greater than the reſolvend, you muſt go back, and give a leſſer figure to the quot.

Note 3. If, after every period of the given number is brought down, there happen at laſt to be a remainder, you may continue the operation, by annexing periods or pairs of cyphers, till there be no remainder, or till the decimal part of the quot repeat or circulate, or till you think proper to limit it.

Ex. 1st. Required the ſquare root of 133225.

```
                 .  .  .
Square number  133225(365 root           365
                9                        365
               ———                      ————
   1 div. 66)  432 reſolvend.           1825
               396 product.            2190
               ———                    1095
   2 div. 725) 3625 reſolvend.        ——————
               3625 product.          133225 proof.
```

2d.] Required the ſquare root of 72, to eight decimal places.

```
  .  .  .  .  .
 72.00000000(8.48528137 root.
 64
 ———
164)800
    656
    ————
1688)14400
     13504
     —————
 16965)89600
       84825
       ——————
169702)477500
       339404
       ——————
169704)138096
  .... 135763
       ——————
         2333
         1697
         ————
          636
          509
          ———
          127
          118
          ———
          (9)
```

After getting half of the decimal places, work by contracted diviſion for the other half; and obtain them with the ſame accuracy as if the work had been at large.

3d.] Required the ſquare root of .2916.

```
        .  .
       .2916(.54 root
        25
        ———
  104) 416
       416
       ———
```

If the ſquare root of a vulgar fraction be required, find the root of the given numerator for a new numerator, and find the root of the given denominator for a new denominator. Thus, the ſquare root of $\frac{4}{9}$ is $\frac{2}{3}$, and the root of $\frac{16}{25}$ is $\frac{4}{5}$; and thus the root of $\frac{25}{4}$ ($=6\frac{1}{4}$) is $\frac{5}{2}=2\frac{1}{2}$.

But if the root of either the numerator or denominator cannot be extracted without a remainder, reduce the vulgar fraction to a decimal, and then extract the root, as in Ex. 3d. above.

Sect. ii. EXTRACTION *of the* CUBE ROOT. 35

RULE I. " Divide the given number into periods " of three figures, beginning at the right hand in integers, and pointing toward the left. But in decimals, begin at the place of thouſands, and point toward the right. The number of periods ſhews the " number of figures in the root."

II. " Find by the table of powers, or by trial, the " neareſt leſſer root of the left-hand period; place the " figure ſo found in the quot; ſubtract its cube from " the ſaid period; and to the remainder bring down " the next period for a dividual or reſolvend."

The diviſor conſiſts of three parts which may be found as follows.

III. "The firſt part of the diviſor is found thus: "Multiply the ſquare of the quot by 3, and to the product annex two cyphers; then inquire how often this "firſt part of the diviſor is contained in the reſolvend, "and place the figure denoting the anſwer in the quot."

IV. "Multiply the former quot by 3, and the product by the figure now put in the quot; to this laſt "product annex a cypher; and you have the ſecond "part of the diviſor. Again, ſquare the figure now "put in the quot for the third part of the diviſor; "place theſe three parts under one another, as in addition; and their ſum will be the diviſor complete."

V. "Multiply the diviſor, thus completed, by the "figure laſt put in the quot, ſubtract the product from "the reſolvend, and to the remainder bring down the "following period for a new reſolvend, and then proceed as before."

Note 1. If the firſt part of the diviſor happen to be equal to or greater than the reſolvend, in this caſe, place 0 in the quot, annex two cyphers to the ſaid firſt part of the diviſor, to the reſolvend bring down another period, and proceed to divide as before.

Note 2. If the product of the quotient-figure into the diviſor happen to be greater than the reſolvend, you muſt go back, and give a leſſer figure to the quot.

Note 3. If, after every period of the given number is brought down, there happen at laſt to be a remainder, you may continue the operation by annexing periods of three cyphers till there be no remainder, or till you have as many decimal places in the root as you judge neceſſary.

Ex. 1st. Required the cube root of 12812904.

```
                       .  .  .
              Cube number 12812904(234 root
                          8
                          ----
 1st part 1200 )          )4812 reſolvend.
 2d  part  180 }
 3d  part    9 )
          ----
 1 diviſor 1389×3=4167 product
 ------------------------------------
 1st part 158700 )    )645904 reſolvend.
 2d  part   2760 }
 3d  part     16 )
          ------
 2 diviſor 161476×4=645904 product.
```

PROOF.

```
           234              Square 54756
           234                       234
          ----                  --------
           936                    219024
          702                    164268
         468                    109512
        ------                 ---------
 Square 54756                Cube 12812904
```

2d.] Required the cube root of 28¾.

```
                          .  .  .
                     28.750000(3.06 root.
                     27
                     ---
 270000 )             ) 1750000 reſolv.
   5400 }
     36 )
 ------
 Div. 275436 × 6 = 1652616 prod.
                   -------
                     97384 rem.
```

PROOF.

```
        3.06            Sq. 9.3636
        3.06                  3.06
        ----                ------
        1836                561816
        918                280908
      ------              --------
 Sq. 9.3636               28.652616
                              97384 rem.
                          ---------
                          28.750000 cube.
```

If the cube root of a vulgar fraction be required, find the cube root of the given numerator for a new numerator, and the cube root of the given denominator for a new denominator. Thus, the cube root of $\frac{8}{27}$ is $\frac{2}{3}$, and the cube root of $\frac{27}{64}$ is $\frac{3}{4}$; and thus the cube root of $\frac{125}{8}$ $(=15\frac{5}{8})$ is $\frac{5}{2}=2\frac{1}{2}$.

But if the root of either the numerator or denominator cannot be extracted without a remainder, reduce the vulgar fraction to a decimal, and then extract the root.

ARIUS, a divine of the fourth century, the head and founder of the Arians*, a ſect which denied the eternal divinity and conſubſtantiality of the Word. He was born in Libya, near Egypt. Euſebius biſhop of Nicomedia, a great favourite of Conſtantia ſiſter of the emperor Conſtantine and wife of Licinius, became a zealous promoter of Arianiſm. He took Arius under his protection, and introduced him to Conſtantia; ſo that the ſect increaſed, and ſeveral biſhops embraced it openly. There aroſe, however, ſuch diſputes in the cities, that the emperor, in order to remedy theſe diſorders, was obliged to aſſemble the council of Nice, where, in the year 325, the doctrine of Arius was condemned. Arius was baniſhed by the emperor, all his books were ordered to be burnt, and capital puniſhment was denounced againſt whoever dared to keep them. After five years baniſhment, he was recalled to Conſtantinople, where he preſented the emperor with a confeſſion of his faith, drawn up ſo artfully, that it fully ſatiſfied him. Notwithſtanding which, Athanaſius, now advanced to the ſee of Alexandria, refuſed to admit him and his followers to communion. This ſo enraged them, that, by their intereſt at court, they procured that prelate to be depoſed and baniſhed. But the church of Alexandria ſtill refuſing to admit Arius into their communion, the emperor ſent for him to Conſtantinople; where, upon delivering in a freſh confeſſion of his faith in terms leſs offenſive, the emperor commanded Alexander, the biſhop of that church, to receive him the next day into his communion: but that very evening Arius died. The manner of his death was very extraordinary: as his friends were conducting him in triumph to the great church of Conſtantinople, Arius, preſſed by a natural neceſſity, ſtepped aſide to eaſe himſelf; but expired on the ſpot, his bowels guſhing out.

But

*See *Arians*.

But the hereſy did not die with the hereſiarch: his party continued ſtill in great credit at court. Athanaſius, indeed, was ſoon recalled from baniſhment, and as ſoon removed again; the Arians being countenanced by the government, and making and depoſing biſhops as it beſt ſerved their purpoſes. In ſhort, this ſect continued with great luſtre above 300 years: it was the reigning religion of Spain for above two centuries; it was on the throne both in the eaſt and weſt; it prevailed in Italy, France, Pannonia, and Africa; and was not extirpated till about the end of the 8th century.

This hereſy was again ſet on foot in the weſt by Servetus, who, in 1531, wrote a little treatiſe againſt the myſtery of the Trinity. After his death, Arianiſm got footing in Geneva; from whence it removed into Poland; but, at length, degenerated, in a great meaſure, into Socinianiſm. Eraſmus ſeems to have aimed at reviving Arianiſm, in his commentaries on the New Teſtament; and the learned Grotius ſeems to lean a little that way.

With regard to the ſtate of Arianiſm in England, it may be ſufficient to obſerve, that from the numerous publications of that caſt which are daily making their appearance, it ſeems to be rather a growing, than exploded doctrine there.

Plate XLI. fig. 1.

ARK, or *Noah's* **Ark**, a floating veſſel built by Noah for the preſervation of his family and the ſeveral ſpecies of animals during the deluge.

The ark has afforded ſeveral points of curious inquiry among the critics and naturaliſts, relating to its form, capacity, materials, *&c.*

The wood whereof the ark was built is called in the Hebrew *Gopher-wood*, and in the Septuagint *ſquare timbers*. Some tranſlate the original *cedar*, others *pine*, others *box*, &c. Pelletier prefers cedar on account of its incorruptibility, and the great plenty of it in Aſia, whence Herodotus and Theophraſtus relate, that the kings of Egypt and Syria built whole fleets thereof, inſtead of deal.

The learned Mr Fuller, in his Miſcellanies, has obſerved, that the wood whereof the ark was built was nothing but that which the Greeks call κυπαρισσος, or the *cypreſs-tree*; for, taking away the termination, *kupar* and *gopher* differ very little in ſound. This obſervation the great Bochart has confirmed, and ſhewn very plainly that no country abounds ſo much with this wood as that part of Aſſyria which lies about Babylon.

In what place Noah built and finiſhed his ark is no leſs made a matter of diſputation. But the moſt probable opinion is, that it was built in Chaldea, in the territories of Babylon, where there was ſo great a quantity of cypreſs in the groves and gardens in Alexander's time, that that prince built a whole fleet out of it for want of timber. And this conjecture is confirmed by the Chaldean tradition, which makes Xithurus (another name for Noah) ſet ſail from that country.

The dimenſions of the ark, as given by Moſes, are 300 cubits in length, 50 in breadth, and 30 in height; which ſome have thought too ſcanty, conſidering the number of things it was to contain; and hence an argument has been drawn againſt the authority of the relation. To ſolve this difficulty many of the ancient fathers, and the modern critics, have been put to very miſerable ſhifts: But Buteo and Kircher have proved geometrically, that, taking the common cubit of a foot and a half, the ark was abundantly ſufficient for all the animals ſuppoſed to be lodged in it. Snellius computes the ark to have been above half an acre in area. Father Lamy ſhews, that it was 110 feet longer than the church of St Mary at Paris, and 64 feet narrower: and if ſo, it muſt have been longer than St Paul's church in London, from weſt to eaſt, and broader than that church is high in the inſide, and 54 feet of our meaſure in height; and Dr Arbuthnot computes it to have been 81062 tuns.

The things contained in it were, beſides eight perſons of Noah's family, one pair of every ſpecies of unclean animals, and ſeven pair of every ſpecies of clean animals, with proviſions for them all during the whole year. The former appears, at firſt view, almoſt infinite; but if we come to a calculation, the number of ſpecies of animals will be found much leſs than is generally imagined, not amounting to an hundred ſpecies of quadrupeds, nor to two hundred of birds; out of which, in this caſe, are excepted ſuch animals as can live in the water. Zoologiſts uſually reckon but an hundred and ſeventy ſpecies in all; and biſhop Wilkins ſhews that only 72 of the quadruped kind needed a place in the ark.

By the deſcription Moſes gives of the ark, it appears to have been divided into three ſtories, each ten cubits or 15 feet high; and it is agreed on, as moſt probable, that the loweſt ſtory was for the beaſts, the middle for the food, and the upper for the birds, with Noah and his family; each ſtory being ſubdivided into different apartments, ſtalls, &c. though Joſephus, Philo, and other commentators, add a kind of fourth ſtory under all the reſt; being, as it were, the hold of the veſſel, to contain the ballaſt and receive the filth and fæces of ſo many animals: but F. Calmet thinks, that what is here reckoned a ſtory, was no more than what is called the *keel* of ſhips, and ſerved only for a conſervatory of freſh water. Drexelius makes 300 apartments; F. Fournier, 333; the anonymous author of the Queſtions on Geneſis, 400; Buteo, Temporarius, Arias Montanus, Hoſtus, Wilkins, Lamy, and others, ſuppoſe as many partitions as there were different ſorts of animals. Pelletier makes only 72, *viz.* 36 for the birds, and as many for the beaſts. His reaſon is, that if we ſuppoſe a greater number, as 333 or 400, each of the eight perſons in the ark muſt have had 37, 41, or 50 ſtalls to attend and cleanſe daily, which he thinks impoſſible to have been done. But it is obſerved, that there is not much in this: to diminiſh the number of ſtalls without a diminution of animals is vain; it being perhaps more difficult to take care of 300 animals in 72 ſtalls, than in 300. As to the number of animals contained in the ark, Buteo computes that it could not be equal to 500 horſes; he even reduces the whole to the dimenſions of 56 pair of oxen. F. Lamy enlarges it to 64 pair of oxen, or 128 oxen; ſo that, ſuppoſing one ox equal to two horſes, if the ark had room for 256 horſes, there muſt have been room for all the animals. But the ſame author demonſtrates, that one floor of it would ſuffice for 500 horſes, allowing nine ſquare feet to a horſe.

As to the food in the ſecond ſtory, it is obſerved by Buteo from Columella, that 30 or 40 pounds of hay ordinarily ſuffices for an ox a-day; and that a ſolid

lid cubit of hay, as uſually preſſed down in our hay-ricks, weighs about 40 pounds; ſo that a ſquare cubit of hay is more than enough for one ox in one day. Now, it appears, that the ſecond ſtory contained 150,000 ſolid cubits; which divided between 206 oxen will afford each more hay, by two thirds, than he can eat in a year. Biſhop Wilkins computes all the carnivorous animals equivalent, as to the bulk of their bodies, and their food, to 27 wolves; and all the reſt to 280 beeves. For the former, he allows 1825 ſheep; and for the latter, 109,500 cubits of hay: all which will be eaſily contained in the two firſt ſtories, and a deal of room to ſpare. As to the third ſtory, nobody doubts of its being ſufficient for the fowls; with Noah, his ſons, and daughters. Upon the whole, the learned biſhop remarks, that of the two, it appears much more difficult to aſſign a number and bulk of neceſſary things to anſwer the capacity of the ark, than to find ſufficient room for the ſeveral ſpecies of animals already known to have been there. This he attributes to the imperfection of our liſt of animals, eſpecially thoſe of the unknown parts of the earth; adding, that the moſt expert mathematician at this day could not aſſign the proportion of a veſſel better accommodated to the purpoſe than is here done: and hence he finally concludes, that the capacity of the ark, which had been made an objection againſt ſcripture, ought to be eſteemed a confirmation of its divine authority; ſince, in thoſe ruder ages, men, being leſs verſed in arts and philoſophy, were more obnoxious to vulgar prejudices than now; ſo that, had it been an human invention, it would have been contrived according to thoſe wild apprehenſions which ariſe from a confuſed and general view of things as much too big as it had been repreſented too little.

But it muſt be obſerved, that, beſides the places requiſite for the beaſts and birds, and their proviſions, there was room required for Noah to lock up houſehold utenſils, the inſtruments of huſbandry, grains and ſeeds to ſow the earth with after the deluge; for which purpoſe it is thought that he might ſpare room in the third ſtory for 36 cabbins, beſides a kitchen, a hall, four chambers, and a ſpace about 48 cubits in length to walk in.

Plate XLI. fig. 2.

Ark *of the covenant*, a ſmall cheſt or coffer, three feet nine inches in length, two feet three inches in breadth, and two feet three inches in height, in which were contained the golden pot that had manna, and Aaron's rod, and the tables of the covenant. This coffer was made of ſhittim-wood, and was covered with the mercy-ſeat, which was of ſolid gold; at the two ends whereof were two cherubims, looking toward each other, with expanded wings, which, embracing the whole circumference of the mercy-ſeat, met on each ſide in the middle. The whole, according to the Rabbins, was made out of the ſame maſs, without joining any of the parts by ſolder. Here it was that the Schechinah or Divine Preſence reſted, both in the tabernacle and in the temple, and was viſibly ſeen in the appearance of a cloud over it; and from hence the Divine oracles were given out by an audible voice, as often as God was conſulted in the behalf of his people.

ARKLOW, a ſea-port town of Ireland, in the county of Wicklow, and province of Leinſter. W. Long. 6. 15. N. Lat. 52. 55.

ARLES, a city of Provence, in France, ſeated on the eaſt ſide of the Rhone, on a hill, whoſe declivity is towards the north. It is an archbiſhop's ſee; and is celebrated for its antiquities, both within and without the city. Thoſe of which any remains are now to be ſeen are the amphitheatre, the obeliſk, the Elyſian Fields, the ſepulchres, columns with their capitals, buſts, pedeſtals, aqueducts, with ſome remains of the capitol, and the temples of their gods. The other ancient monuments are entirely deſtroyed. Under the amphitheatre, in 1651, they found the ſtatue of Venus, which was worſhipped by this city; and has been ſince carried to the caſtle of Verſailles. It is a maſter-piece which will always be admired by connoiſſeurs.

The amphitheatre is one of the moſt remarkable pieces of antiquity; it was built by the Romans, but the time is unknown, though ſome ſay by Julius Cæſar. It is of an oval form, and about four hundred yards in circumference, and the front is thirty-four yards in height. The middle, called the *Arena*, is a hundred and forty-two yards wide, and a hundred and four broad. The porticos or piazzas are three ſtories, built with ſtone of a prodigious ſize. Each of them conſiſts of ſixty arches, which ſtill remain; and the walls are of a ſurpriſing thickneſs, but gone to decay.

The obeliſk is the only one of this kind to be ſeen in France. It ſeems to be one of the forty brought from Egypt to Rome, becauſe it is of the ſame oriental granite with them. They are generally full of hieroglyphic characters; but this is quite ſmooth. In 1675, it was found in a private garden near the walls of the city, not far from the Rhone. It conſiſts of one piece; and is fifty-two feet high, and ſeven in diameter at the baſe. It is now ſupported with four lions made of bronze; and on the top a blue ball is placed, with the arms of France, and over that a ſun.

The Pagans burying-place, called the *Elyſian Fields*, is without the city, upon an agreeable hill, divided into two parts. The firſt, called *Moulaires*, has very few tombs, they having been broken to build the walls of gardens, which are made in that place. The ſecond, called *Eliſcamp*, contains a great number. Thoſe of the Pagans have the letters D. M. which ſignifies *Diis Manibus*. Thoſe of the Chriſtians have a croſs. Pieces of coin of gold, ſilver, and bronze, are found here; as alſo urns, lamps, and cups, without number.

Here is a royal academy of ſciences, conſiſting of thirty members, who muſt be natives, gentlemen, and inhabitants of the city. It enjoys the ſame privileges as that at Paris. Arles is ſurrounded with marſhy land, which renders the air full of vapours, and makes it not very wholeſome. Long. 4. 48. E. Lat. 43. 40.

ARLEUX, an ancient town of the Netherlands, in Cambreſis, with a caſtle. It was taken by the French in 1645, and retaken by the allies in 1711; but the French got poſſeſſion again the ſame month. E. Long. 3. 16. N. Lat. 59. 17.

ARLON, an ancient town of the Netherlands, formerly a ſtrong place, but now diſmantled. It belongs to the houſe of Auſtria. E. Long. 15. 50. Lat. 49. 4.

ARM, a part of the human body, terminating at one end in the ſhoulder, and at the other in the hand[*].

Arm, among ſportſmen, is applied to a horſe, when, by preſſing down his head, he endeavours to defend himſelf againſt the bit, to prevent his being checked by it.

Arm, in geography, implies a branch of the ſea,

[*] See *Anatomy*, nº 48. &c.

Plate XLI

Fig. 1. NOAH'S ARK *floating on the waters of the Deluge*

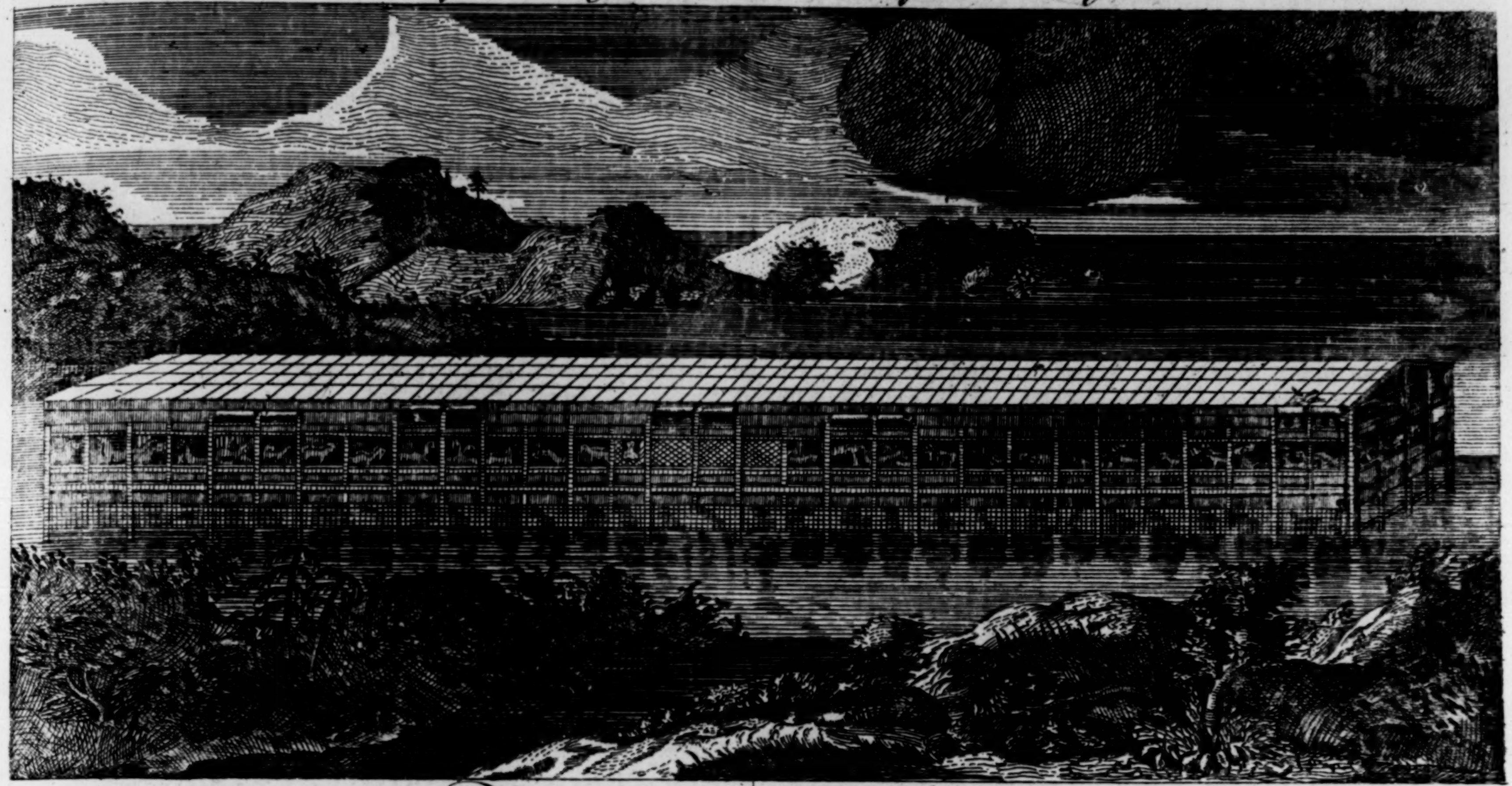
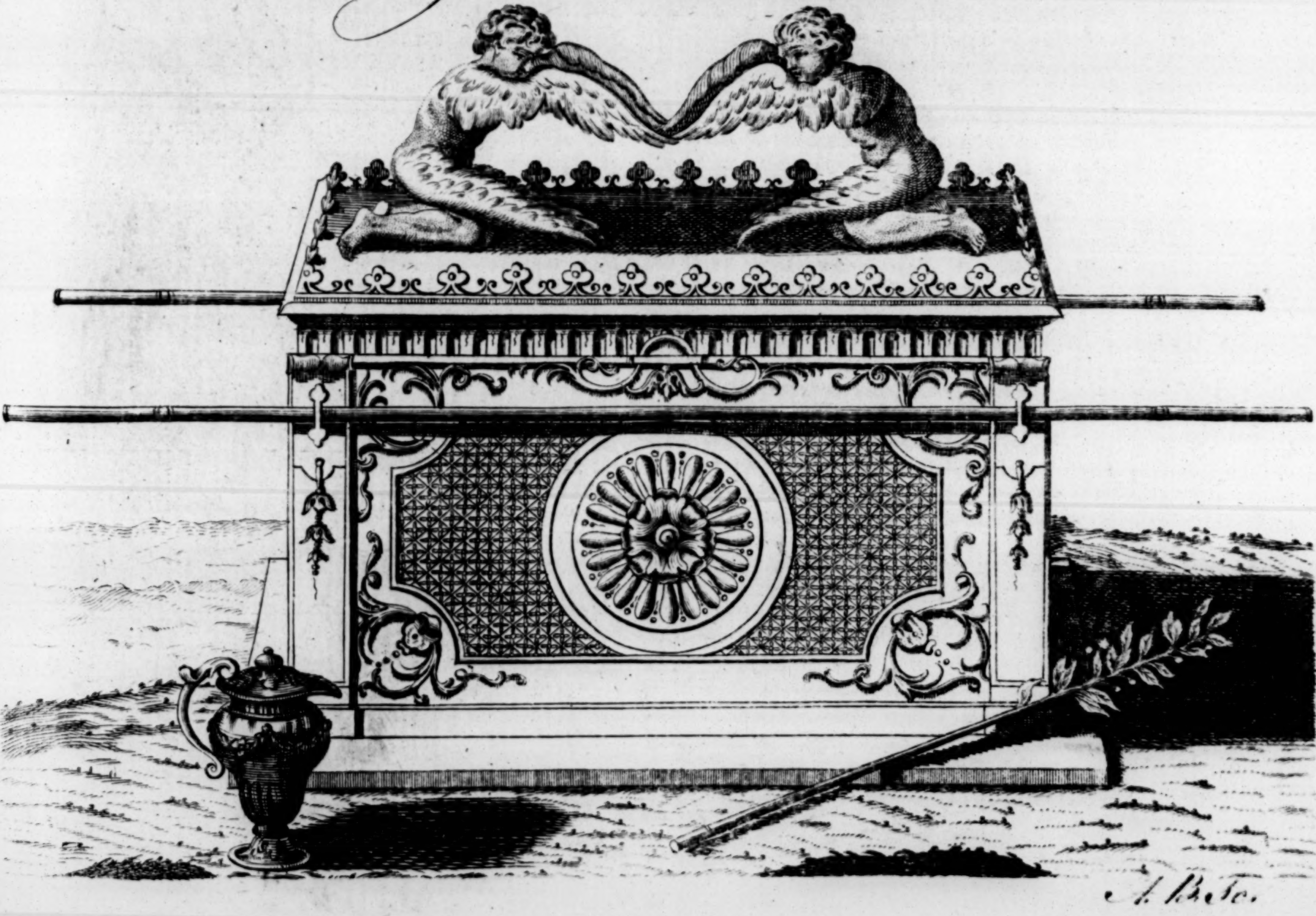


Fig. 2. ARK of the COVENANT



A. B. Sc.

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running ſome diſtance into the land.

ARMACALES, a river of Babylon, (Abydenus); called *Foſſa Regia*, the *Royal Trench*, or *Cut* (Polybius); the *Royal River*, (Ptolemy); *Almarchur*, (Pliny); *Naarmalcha*, (Ammian); a factitious channel, or cut, made by Nebuchadanoſor, and a horn or branch of the Euphrates, (Abydenus). The Euphrates naturally divides into two channels, one paſſing through Babylon, the other through Seleucia, and then falls into the Tigris: the factitious channel between theſe two is the Royal River; which mixes with the Tigris, a great deal lower down than Seleucia, at Apamea, (Ptolemy).

ARMADA, a Spaniſh term, ſignifying a fleet of men of war, as *armadilla* does a ſquadron.—The armada, which attempted to invade England in the time of Queen Elizabeth, is famous in hiſtory.

ARMADILLO, in zoology, a ſynonime of the daſypus. See Dasypus.

ARMAGH, a county of Ireland, bounded by Louth on the ſouth; Lough-neagh, on the north; Tyrone and Monaghan, on the weſt; and Down, in part, on the eaſt, from which it is ſeparated by the river Newry. It is in length 32 miles, in breadth 17; and is divided into five baronies, containing about 170,620 acres. Both the air and ſoil are good, eſpecially the latter, which is ſaid to be the richeſt in Ireland; only there is a certain tract in it called the *Fewes*, that is, *hilly* and *barren*. The members it ſends to parliament are ſix, *viz.* two for the city of Armagh, two for the county, and two for the borough of Charlemont.

Armagh, ſtanding near the river Kalin, gives name to the county, and is the ſee of the primate of all Ireland. It is ſaid to have been founded by St Patrick in the fifth century; and in 1142, it was conſtituted an archbiſhoprick, together with Dublin, Caſhel, and Tuam, by cardinal Papyreo, with the conſent of the king, dukes, biſhops, abbots, and ſtates of Ireland. This Papyreo was ſent into Ireland by Pope Eugenius, to reform the abuſes that had crept into the church-diſcipline of that country. Here was anciently a famous monaſtery built by St Columbo, or Columbanus, about the year 610. This town was firſt ſubjected to the Engliſh by John de Courcy; but afterwards entirely deſtroyed by Tir Oen, or O'Neal, in Queen Elizabeth's time. However, it was afterwards recovered, rebuilt, and garriſoned by the Engliſh.

ARMAGNAC, a province of Guienne, in France, 55 miles in length, and 40 in breadth; bounded on the eaſt by the river Garonne, on the ſouth by Bigorre and Bearn, on the weſt by Gaſcony, and on the north by Condomois and Agenois: Auch is the capital town. It is fertile in corn and wine, and carries on a conſiderable trade in brandy, wool, and bonchretien pears, which are excellent.

ARMED, in the ſea-language. A croſs-bar ſhot, is ſaid to be armed, when ſome rope-yarn or the like is rolled about the end of the iron-bar, which runs through the ſhot.

Armed, in heraldry, is uſed when the horns, feet, beak, or talons, of any beaſt or bird of prey, are of a different colour from the reſt of their body.

Armed-*Ship*, a veſſel occaſionally taken into the ſervice of the government in time of war, and employed to guard ſome particular coaſt, or attend on a fleet. She is therefore armed and equipped in all reſpects like a ſhip of war, and commanded by an officer of the navy, who has the rank of maſter and commander. All ſhips of this ſort are upon the eſtabliſhment of the king's ſloops, having a lieutenant, maſter, purſer, ſurgeon, &c.

ARMENE, or Armina, anciently a hamlet of Paphlagonia, (Ptolemy). The inhabitants encompaſſed it with a wall, becauſe of the coldneſs of the place, imagining by that means to render it warmer. But this proving ineffectual, gave riſe to the proverb *Armenen muro cingere*, uſed to expreſs ſome egregious folly.

ARMENIA, a country of Aſia, anciently divided into Armenia Major and Minor.—Armenia Major, according to Strabo, was bounded on the ſouth by mount Taurus, which ſeparated it from Meſopotamia; on the eaſt, by the two Medias; on the north, by Iberia and Albania, or rather that part of mount Caucaſus which ſurrounds them both; and on the weſt, by Armenia Minor, or the mountains Paryadres, ſome Pontic nations, and the Euphrates. The moſt conſiderable cities were Artaxata, Tigranocerta, and Thedoſiopolis.—Armenia Minor was bounded on the eaſt by the Euphrates; on the ſouth, by mount Taurus, which ſeparated it from Cilicia; on the weſt and north, by a long chain of mountains called in different places *Mons Scordiſcus*, *Amanus*, and *Antitaurus*, by which it was ſeparated from Cappadocia.

Whence this tract received the name of *Armenia* is not determined. The Greeks ſuppoſe it to be ſo called from one *Armenus*, who attended Jaſon in the Argonautic expedition, and afterwards ſettled in this country. Others, tranſforming Armenia into Aramia, derive its name from Aram the ſon of Shem, or from one of the kings of Armenia bearing that name. Bochart imagines it to be a contraction or compound of Aar, a Hebrew word ſignifying a *mountain*, and Mini ſignifying *metal*, and which was the name of a province of Armenia mentioned by the prophet Jeremiah.

Herodotus derives the ancient Armenians from the Phrygians, by reaſon that ſeveral Phrygian words were crept into the ancient Armenian language. But Strabo reckons them to have been originally Syrians, which Bochart looks upon to be the moſt probable opinion.

Armenia is ſaid to have been very early advanced to the honour of a kingdom. Beroſus makes one Sytha the firſt founder of this monarchy, whoſe ſucceſſor Bardanes, he ſays, was driven out by Ninus king of Aſſyria. Plutarch mentions one Araxes king of Armenia, who in a war with the Perſians, being aſſured of ſucceſs by an oracle, provided he ſacrificed his two daughters, cauſed the two daughters of one Mieſalcus, a nobleman of his court, to be ſacrificed in their ſtead, flattering himſelf that he thereby complied with the oracle. But Mieſalcus did not fail to revenge the death of his own daughters by putting the king's two daughters to death, and purſued himſelf ſo cloſely, that he was drowned in attempting to ſwim acroſs the Araxes, which was then called *Helmus*.

The Armenians were in proceſs of time ſubdued by the Medes, to whom Aſtyages made them tributaries, but allowed them to be governed by their own kings; but on the diſſolution of the Median empire by Cyrus, the kingdom was reduced to the form of a province, and they were governed by Perſian prefects or lieutenants.

nants. On the deſtruction of the Perſian empire by Alexander the Great, Armenia fell into the hands of the Macedonians; to whom it continued ſubject till the beginning of the reign of Antiochus the Great. This prince having appointed two prefects called *Zadriades* and *Artaxias* to govern Armenia, they excited the people to a revolt, and cauſed themſelves to be proclaimed kings of the provinces over which they preſided. Antiochus being then very young, they were attended with ſucceſs beyond their expectation; which encouraged them to attempt the enlargement of their territories. Accordingly, invading the neighbouring countries, they took from the Medes the provinces of Caſpiana, Phaunitis, and Baſoropida; from the Iberians, Chorzena and Gogorena on the other ſide of the Cyrus; from the Chalybes and Moſſynæci, the provinces of Pareneta and Herexena, which bordered on Armenia Minor.

On this occaſion, the abovementioned diviſion of the kingdom into Armenia Major and Minor firſt took place. Artaxias became king of Armenia Major, and Zadriades of Armenia Minor; and this diſtinction ſubſiſts even at this day.

By whom Artaxias was ſucceeded is not known; neither have we any account of the tranſactions of his reign, farther than that Antiochus led a powerful army againſt him and Zadriades, but without being able to recover a ſingle province. Upon this, he concluded a peace, deſigning to fall upon them at a proper opportunity; but they having entered into alliance with the Romans, by that means ſecured themſelves in the poſſeſſion of their kingdom. After this, Artaxias was defeated and taken priſoner by Antiochus Epiphanes; but, ſome how or other, ſeems to have been reſtored to his kingdom.

From this time we meet with a chaſm in the Armenian hiſtory for 70 years; during which all we know is, that Tigranes, the king's ſon, was delivered up as an hoſtage to the Parthians; from whence it is plain, that the Armenians had been carrying on an unſucceſsful war with that nation. On the news of his father's death, however, the Parthians ſet the young king at liberty, having firſt obliged him to give up a conſiderable part of his kingdom by way of ranſom.

Tigranes, being thus reſtored to his father's kingdom, was prevailed upon in the beginning of his reign to enter into an alliance with Mithridates Eupator againſt the Romans, whoſe power began to give jealouſy to all the princes of Aſia. One of the articles of this treaty was, that Mithridates ſhould have the cities and conquered countries, and Tigranes the captives and plunder. In conſequence of this, Tigranes was to invade Cappadocia, which he had lately been obliged, by a decree of the ſenate of Rome, to give up to Ariobarzanes. But before either of the princes took the field, a marriage was ſolemnized with all poſſible magnificence between Tigranes and Cleopatra the daughter of Mithridates.

Immediately after the nuptials, Tigranes ſet out on his intended expedition; and Ariobarzanes, on the firſt news of his march, abandoned his kingdom and fled to Rome. Thus Tigranes, without fighting a ſtroke, enriched himſelf with the booty, and then proclaimed Ariarathes, Mithridates's ſon, king of Cappadocia, to the univerſal ſatisfaction of the people.

In the mean time the Syrians, being harraſſed with a long and inteſtine war of the Seleucidæ, invited Tigranes to come and take poſſeſſion of their country; which he accordingly did, and kept it for 18 years, till he was driven out by Pompey, and Syria reduced to the form of a Roman province. Encouraged by this ſucceſs, he next invaded Armenia Minor; defeated and killed king Artanes, who oppoſed him with a conſiderable army; and in one campaign made himſelf maſter of the whole kingdom. From Armenia Minor he marched againſt the Aſiatic Greeks, the Adiabenians, the Aſſyrians, and the Gordians, carrying all before him, and obliging the people wherever he came to acknowledge him ſovereign. From this ſecond expedition he returned home loaded with booty, which he ſoon after increaſed by the ſpoils of Cappadocia, invading that kingdom a ſecond time at the inſtance of Mithridates, who had been obliged by the Romans to withdraw his forces from thence. From Cappadocia Tigranes, beſides other booty, brought back into Armenia no fewer than 300,000 captives, having ſurrounded the country with his numerous forces in ſuch a manner that none could eſcape. Theſe, together with the priſoners he had taken in his two firſt expeditions, he employed in building the city of Tigranocerta, which they afterwards peopled.

In the mean time Mithridates, who had concluded a peace with the Romans for no other end than to gain time, ſent a ſolemn embaſſy to Tigranes, inviting him to enter into a ſecond alliance againſt the common enemy. This he at firſt declined; but in the end was prevailed upon by his wife Cleopatra to ſend him conſiderable ſupplies, though he never came heartily into the war, not caring to provoke the Romans, who on their part kept fair with him, taking no notice for the preſent of the ſupplies he had ſent Mithridates. That unfortunate prince, being ſoon after defeated by Lucullus, was forced to fly for ſhelter into Armenia, where he met with a very cold reception from his ſon-in-law, who would neither ſee him, treat with him, nor own him as his relation: however, he promiſed to protect his perſon, and allowed him in one of his caſtles a princely retinue, and a table ſuitable to his former condition.

Though this total overthrow of Mithridates might have opened the eyes of Tigranes, and made him oppoſe with all his might the growing power of the Romans, he fooliſhly left them to finiſh their conqueſt of Pontus, while he marched at the head of a very numerous army againſt the Parthians, with a deſign to recover from them the dominions they had formerly extorted from him before they ſet him at liberty. Theſe he eaſily retook; and, not ſatisfied with what formerly belonged to him, he added to them all Meſopotamia, the countries that lay about Ninus and Arbela, and the fruitful province of Migdonia; the Parthians, tho' at that time a mighty people, flying every where before him. From Meſopotamia Tigranes marched into Syria to quell a rebellion which had been raiſed by Cleopatra ſurnamed *Selene*, who, after the death of her huſband Antiochus Pius, reigned jointly with her ſons in that part of Syria which Tigranes had not ſeized on. The malcontents were quickly reduced; and the queen herſelf was taken priſoner, and confined to the caſtle of Seleucia, where ſhe was ſoon after put to death by the king's order. From Syria Tigranes paſſed into Phœnice, which he ſubdued either entirely or in great part, ſpreading far and wide the terror of his arms, inſomuch that all the princes of Aſia, except thoſe who were in alliance with the Romans, either in perſon, or by their deputies, ſubmitted and paid homage to the conqueror.

The king, having now ſubdued all Syria to the borders of Egypt, and being elated with a long courſe of victories and proſperous events, began to look upon himſelf as far above the level of other crowned heads. He aſſumed the title of *King of kings*, and had many kings waiting upon him as menial ſervants. He never appeared on horſeback without the attendance of four kings dreſſed in livery, who run by his horſe; and when he gave anſwers to the nations that applied to him, the ambaſſadors ſtood on either ſide the throne with their hands claſped together, that attitude being of all others then accounted among the orientals the greateſt acknowledgment of vaſſalage and ſervitude. In the midſt of all this haughtineſs, however, he was unexpectedly viſited by an ambaſſador from Lucullus the Roman general, who without any ceremony told him, that he was come to demand Mithridates king of Pontus, who had taken refuge in his dominions, and, in caſe of his refuſal, to declare war againſt him. Notwithſtanding his high opinion of himſelf, Tigranes returned a mild anſwer to this meſſage: in which, however, he refuſed to deliver up his father-in-law; and being highly provoked at Lucullus for not giving him the title of *King of kings* in his letter, he did not ſo much as beſtow upon him the title of *general*, in his anſwer. In the mean time, being informed that Zarbienus king of the Gordians had entered into a private alliance with the Romans, he put him, his wife, and children, to death; and then, returning into Armenia, received with the greateſt pomp imaginable his father-in-law Mithridates, whom to that time he had not admitted into his preſence, though he had reſided a year and eight months in his dominions. They had ſeveral private conferences; and at laſt Mithridates was ſent back to Pontus with 10,000 horſe, to raiſe there what diſturbances he could.

Lucullus, on the other hand, hearing the king's reſolution to protect Mithridates, immediately began his march for Armenia, at the head of only two legions of foot and 3000 horſe, having left 6000 men in Pontus to keep that country quiet. Having paſſed the Euphrates without oppoſition, he detached two parties; one to beſiege a city where he heard that Tigranes's treaſure and concubines were kept; and the other under Sextilius, to block up Tigranocerta, in order to draw the king to a battle. But Tigranes, after having put to death the ſcout that brought him the firſt intelligence of the approach of the Romans, made towards Mount Taurus, which he had appointed for the place of the general rendezvous. The Roman general then diſpatched Muræna in purſuit of the king; who having overtaken him in a narrow paſs, defeated him, and, beſides all the baggage, carried off a great many priſoners, the king himſelf having fled in the beginning of the ſkirmiſh. After this, he ſent out ſeveral parties to ſcour the country, in order to prevent the innumerable forces of Tigranes from joining into one body. This, however, he was not able to effect: Tigranes was joined by ſuch numbers of Gordians, Medes, Adiabenians, Albanians, Iberians, &c. that, before he left Mount Taurus, his army conſiſted, according to Plutarch, of 150,000 foot armed cap-a-pee, 35,000 pioneers, 20,000 archers and ſlingers, and 55,000 horſe.

Lucullus was ſo far from being diſmayed at this formidable army, that the only fear he had was leſt the king ſhould follow the advice of Mithridates, which was not to engage the Romans, but, by ravaging the country, diſtreſs them for want of proviſions. In order to draw him to a battle, therefore, he formed the ſiege of Tigranocerta, imagining that Tigranes would never ſuffer that fine city to be taken without making any attempt to relieve it. The event fully anſwered his expectations: Tigranes having called a council of war, it was unanimouſly reſolved to attack the Romans; and Taxiles, whom Mithridates ſent to diſſuade the king from venturing a battle, was in danger of loſing his head on account of the advice he gave. The Roman general, finding Tigranes diſpoſed to come to an engagement, left Muræna with 6000 men to carry on the ſiege, while he himſelf marched againſt the king's vaſt army with only 10,000 men, according to ſome, and the higheſt computations make them no more than 18,000. The Romans were at firſt greatly diſheartened; but being encouraged by Lucullus, they immediately broke the Armenian army, who betook themſelves to flight almoſt at the firſt onſet. The Romans purſued them till night, making a moſt terrible ſlaughter. Plutarch informs us, that of the Armenians 100,000 foot were killed, and that very few of the cavalry eſcaped; whereas of the Romans only five men were killed, and 100 wounded. Antiochus the philoſopher, mentioning this battle, ſays, that the ſun never beheld the like; and Livy, that the Romans never fought at ſuch a diſadvantage; the conquerors not amounting to a twentieth part of the conquered. Tigranes in his flight having met with his ſon in as forlorn a condition as himſelf, reſigned to him his royal robes and diadem, deſiring him to ſhift for himſelf and ſave thoſe royal enſigns. The young prince delivered them to a truſty friend, who, being taken by the Romans, conſigned them to Lucullus.

While the king was making his eſcape after this terrible overthrow, he was met by Mithridates, who was marching to his aſſiſtance at the head of a conſiderable army. The king of Pontus cheered up his ſon-in-law as well as he could, and encouraged him to continue the war; adviſing him, inſtead of fruitleſsly bewailing the preſent diſaſter, to rally his troops, raiſe new ſupplies, and renew the war, not queſtioning but that in another campaign he might repair all the loſſes he had ſuſtained: but while the two kings were conſulting upon theſe matters, Lucullus made himſelf maſter of Tigranocerta. From this city he marched into the ſmall kingdom of Gordyene, where he celebrated, with the utmoſt pomp, the obſequies of king Zarbienus, whom Tigranes had put to death, lighting the funeral pile with his own hands. In this kingdom, beſides immenſe ſums of gold and ſilver, he met with ſuch ſtore of proviſions as enabled him to carry on the war without putting the republic to any charge.

The two kings, having levied new forces, appointed their troops to rendezvous in the ſpacious plains on the other ſide of Mount Taurus; whereupon Lucullus, leaving Gordyene, and paſſing by Mount Taurus, encamped cloſe by the enemy. Several ſkirmiſhes happened for ſome time between the two armies without any conſiderable advantage; but Lucullus could by no means draw them to a general engagement. Upon this, he decamped, as if he deſigned to march to Artaxata and lay ſiege to that place, where Tigranes had left his wife and children, with great part of his treaſures. He had ſcarce formed his camp when the enemy appeared, and ſat down cloſe by him. Lucullus did not allow them to fortify their camp, but immediately attacked them, and having put them to flight after a faint reſiſtance, purſued them all night with great ſlaughter, took moſt of the chief officers priſoners, and returned the next day loaded with booty.

The Roman ſoldiers now, finding the cold very ſevere, though it was no later in the year than the autumnal equinox, requeſted their general to allow them to retire into winter-quarters. This requeſt he rejected with indignation; upon which they mutinied. Lucullus did all he could to perſuade them to continue in their duty, and prevailed ſo far that they conſented to lay ſiege to Niſibis in hopes of booty. This place they took; and Lucullus, to the great ſatisfaction of his troops, took up his winter-quarters there. The next year, however, his forces again mutinied, accuſing him of amaſſing immenſe wealth for himſelf, and throwing their empty purſes at his feet, told him, that as he enriched himſelf alone, he might carry on the war by himſelf. He endeavoured to appeaſe them as much as poſſible; but the ſedition being fomented by a party who favoured Pompey the great, at that time aſpiring to the command of Lucullus' army, the latter found himſelf obliged to ſit ſtill and ſee Mithridates and Tigranes over-run Cappadocia, and recover all Armenia and great part of Pontus. They would have gained much greater advantages, had not a ſon of Tigranes taken arms againſt his father, and obliged him to divide his troops. The father and ſon coming to a pitched battle, the latter was defeated, and forced to ſave himſelf in Parthia, where he perſuaded Phrahates, king of that country, to aſſiſt him with a numerous army againſt his father. Phrahates having laid ſiege to Artaxata, Tigranes the elder was obliged to hide himſelf in the mountainous parts of his kingdom; upon which the king of Parthia returned home. Of this Tigranes the father being appriſed, he immediately abandoned the faſtneſſes of the mountains; and, falling upon his ſon at Artaxata, diſperſed the rebels with great ſlaughter, and entered his metropolis in triumph. Tigranes the ſon fled firſt to Mithridates; but finding him reduced to great ſtraits, having been overcome a few days before, with the loſs of 40,000 men, by Pompey, he went over to the Romans, and led them into Armenia againſt his father as an ally of Mithridates.

Tigranes, being now quite diſpirited, and unable to make head againſt the Romans, reſolved at once to ſubmit. Accordingly he waited on Pompey in his camp, and having delivered his ſword to two lictors, proſtrated himſelf before him, and laid his diadem at his feet. Pompey, however, gave him a gracious reception, reſtored him the kingdom of Armenia, but fined him of 6000 talents for making war on the Roman people without cauſe. As the king had appealed to the Roman general for juſtice againſt his ſon, Pompey heard both parties the next day, and made the ſon governor of Gordyene and Sophene; but the treaſures that were kept in the latter he adjudged to the father, becauſe without them he could not pay the fine. The ſon, being thus diſappointed, endeavoured firſt to make his eſcape, and afterwards, by private meſſengers, ſolicited the inhabitants not to deliver up the treaſures to his father. This being taken very much amiſs by Pompey, he cauſed him to be kept in irons; and even then he found means to ſtir up Phrahates king of Parthia, whoſe daughter he had married, againſt the Romans, and to form a conſpiracy againſt his father's life; whereupon Pompey ſent him in chains to Rome, where he was kept priſoner in the houſe of L. Flavius a ſenator, till the tribuneſhip of P. Clodius, who, being bribed with a large ſum of money, ſet him at liberty in ſpite of Pompey and the ſenate.

Tigranes being now thoroughly humbled, willingly yielded to the Romans Cappadocia, Syria, Cilicia, and that part of Phœnice which he poſſeſſed, contenting himſelf with his paternal kingdom; and not only paid the fine laid upon him, but made large preſents to Pompey, and all the officers of his army, which procured him the title of *the friend and ally of the Roman people*. He afterwards entered into a war with Phrahates king of Parthia, by whom he was overcome, and would have been driven out of his kingdom, had not a peace been brought about by the mediation of Pompey. He ever after cultivated a ſtrict friendſhip with the Romans; inſomuch that he not only refuſed to receive Mithridates, who fled to him after he had been routed by Pompey near Mount Stella, but even offered a reward of 100 talents to any one that would put him to death. His ſecond ſon alſo, by name Sariaſter, took up arms againſt him; but, by the aſſiſtance of the Romans, that rebellion was ſoon quelled. He died in the 85th year of his age; and was ſucceeded by his ſon Artuaſdes, called by Joſephus *Artabazes*, by Oroſius *Artabanes*, and by others *Artoadiſtes*.

From this time to the time of Trajan Armenia was governed by its own kings; but as they were plainly vaſſals to the Romans, though they did not take that title till the reign of the emperor Nero, their hiſtory falls to be conſidered under that of the Romans.

By Trajan the kingdom of Armenia Major was reduced to the form of a Roman province; but it ſoon recovered its liberty, and was again governed by its own kings in the reigns of Conſtantine the Great, and his ſucceſſor, to whom the kings of Armenia were feudatories. In the reign of Juſtin II. the Saracens ſubdued and held it till the irruption of the Turks, who poſſeſſed themſelves of this kingdom, and gave it the name of *Turcomania*. The Turks, after the reduction of Armenia, invaded Perſia, and other countries ſubject to the emperors of the eaſt; which gave the Armenians an opportunity of ſhaking off the Turkiſh yoke, and ſetting up kings of their own, by whom they were governed till the country was again ſubdued by Occadan, or, as ſome ſtyle him, *Heccata*, the ſon of Cingis, and firſt cham of the Tartars. Neither was the conqueſt of Armenia by the Tartars ſo abſolute as to extirpate the race of their kings; ſeeing we read of Haithon, ſurnamed the *Armenian*, reigning ſome time after, and going in perſon to treat with Mongo, the great cham of Tartary, of the concerns of his kingdom;

dom ; and in our chronicles we find mention made of Leo king of Armenia, who, in the reign of Richard II. came into England to ſue for aid againſt the Turks, by whom he had been driven from his kingdom. In the year 1472 of the Chriſtian æra, Uſſan Caſſanes king of Armenia ſucceeding to the crown of Perſia, made Armenia a province of that empire ; in which ſtate it continued till the year 1522, when it was ſubdued by Selim II. and made a province of the Turkiſh empire. Some ſay, that Selim I. reduced it on his return from Perſia, where he had gained a complete victory over the great Sophi Iſmael. But Sanſovin aſſures us, that in the reign of Selim I. who died in 1520, both the Leſſer and Greater Armenia had their own kings; and adds, that Selim cauſed the head of the king of the Leſſer Armenia to be cut off and ſent to Venice, as a mark of his victory. We read no where elſe of any kings of Armenia after it became a province of Perſia. Be that as it will, the Turkiſh annals cited by Calviſius inform us, that Selim II. conquered Armenia in 1522, ſince which time it has ever continued ſubject to the Turks, except the eaſtern part, which the Perſians are maſters of to this day.

Concerning Armenia Minor we find very little recorded, except what has been already mentioned, and what falls under the Roman hiſtory. It was made a Roman province by Veſpaſian, continued ſo till the diviſion of the empire, when it was ſubjected to the emperors of the eaſt; and, on the decline of their power, was ſubdued firſt by the Perſians, and afterwards by the Turks, who gave it the name of *Genech*, and have kept it ever ſince.

This country is ſtill divided into the Great and Small. Great Armenia comprehends what is now called *Turcomania*. It has Georgia on the north, from which it is ſeparated by high mountains ; the river Euphrates on the weſt ; Diarbeker, Curdiſtan, and Aderbijan, on the ſouth ; and Shirvan on the eaſt. The chief towns in that part of Armenia belonging to Turky are, Arzum the capital, near the ſprings of the Euphrates, a large city, and a great thoroughfare for the caravans between Turky and Perſia ; Kara, a ſtrong city, head of the government of the ſame name ; Bayazid, a republic of Hurds, near mount Ararat ; Baha, another republic of the ſame ; and Van or Wan, on the lake Van, the head of a government of the ſame name ; with other towns of leſs note. That part of Armenia ſubject to Perſia is chiefly contained in the province of Aran, in which are ſeveral fine towns ; as, Erivan or Rivan, the capital of the whole ; Ganjals, one of the fineſt cities in Perſia, in the north of the province, near the Kur ; Kapan, on the ſouth ſide, near the Aras ; beſides Nakchivan, Aſtabad Julſa, Ordabad, Baylakan or Pilkan, on the Aras ; Berdah and Shilkah on the Kur.

The country in general is full of mountains and valleys, lakes, and rivers ; particularly the country about the three churches, near Erivan, is admirably fine, being full of rivulets, which render it extremely fruitful. Beſides great quantities of all ſorts of grain, here are fields of a prodigious extent covered with tobacco : but it is not a native of the place, though ſuppoſed by ſome to be the terreſtial paradiſe ; for it all came originally from America. The reſt of the country produces rice, cotton, flax, melons, and grapes : in ſhort, there is nothing wanting but olives ; which is by ſome thought to prove that the ark could not reſt on mount Ararat, becauſe the dove brought an olive-branch in her mouth, and this tree never leaves a place where it once grew. It ſeems, however, to have been otherwiſe anciently ; for Strabo tells us, that the olive grew in Gogarene, a province of Armenia. They get oil to burn from the ricinus, and uſe linſeed-oil in the kitchen. The water-melons are as cool as ice in the hotteſt day, and melt in the mouth ; the beſt are produced in the ſalt-lands, near the three churches and the river Aras. After rain, the ſea-ſalt lies in cryſtals upon the fields, and even crackles under the feet. About ten miles from the three churches, in the road to Teflis, there are pits or quarries of foſſile ſalt, which yield enough to ſupply all Perſia, without being exhauſted ; they cut it into large pieces like ſtone, and each buffalo carries two of them ; the mountain from whence it is dug is nothing but a maſs of ſalt, which appears like a rock of ſilver, when the ſun ſhines, on the places not covered with earth.

This country has been remarkable for its extreme cold from the remoteſt antiquity : Sir John Chardin tells us, that he found ice in the rivulets in the mornings even of the month of July. In many places, alſo, if they had not the convenience of watering their grounds, they would be almoſt entirely barren.

The Armenians are an honeſt, civil, polite people, ſcarce troubling themſelves about any thing elſe but trade, which they carry on in moſt parts of the world, by which means they have ſpread themſelves over the eaſt, and alſo great part of Europe ; and wherever they come, commerce is carried on with ſpirit and advantage.

The religion of the Armenians is the Chriſtian, of the Eutychian ſect : that is, they own but one nature in Jeſus Chriſt ; and when they ſpeak of the hypoſtatical union, that he is perfect God and perfect man without mixture. They have a high eſteem for a book they call the *Little Goſpel*, which treats of the infancy of Jeſus, and ſays that the Virgin Mary being pregnant, her ſiſter Salome accuſed her of having proſtituted herſelf ; to which the Virgin anſwered, that ſhe needed only to lay her hand on her belly, and ſhe would know how ſhe came to be with child : this Salome accordingly did, and fire came out of her belly, which conſumed the half her arm ; upon which ſhe acknowledged her fault, and drew it back : after which it was healed by putting it to the ſame place.

The Armenian clergy conſiſt of patriarchs, archbiſhops, doctors, ſecular prieſts, and monks. The ſecular prieſts are not allowed to marry a ſecond time ; and therefore they take care to chuſe young healthy wives : they maintain themſelves and families by following ſome occupation, inſomuch that they have hardly time to perform their eccleſiaſtical functions : they lie in the churches on the vigils of thoſe days they are obliged to officiate.

The Armenian monks are of the order of St Baſil ; and every Wedneſday and Friday they eat neither fiſh, nor eggs, nor oil, nor any thing made of milk, and during Lent they live upon nothing but roots : they are allowed wine only on the Saturday in the Holy Week, and meat on the Eaſter Sunday. Beſides the great Lent, they have four others of eight days each, which are inſtituted to prepare for the four great feſtivals of the Nativity, the Aſcenſion, the Annunciation, and of St George; in which times they muſt not ſo much as ſpeak of eggs, fiſh, oil, or butter.

The Armenians have ſeven ſacraments; baptiſm, confirmation, penance, the euchariſt, extreme unction, orders, and matrimony. In baptiſm, the child is plunged three times into the water, and the ſame form of words that is uſed with us is repeated every time; the prieſt then puts a ſmall cord made with ſilk and cotton on the neck of the infant, and anoints his forehead, chin, ſtomach, arm-pits, hands, and feet, making the ſign of the croſs on each part. When the child is baptized, he is carried home by the godfather with the ſound of drums and trumpets. The women do not go to church till forty days after their delivery; and they obſerve many Jewiſh cuſtoms.

At the communion, to which infants of two or three months old are admitted, the prieſts give a piece of the conſecrated hoſt, ſoaked in the conſecrated wine. The elements are covered with a great veil, and placed in a cup-board near the altar, on the ſide of the goſpels. When the prieſt takes the chalice and pattin, he is followed by his deacons, and ſubdeacons, with flambeaux and plates of copper furniſhed with bells: in this manner, with a cenſer before him, he goes in proceſſion round the ſanctuary; he then ſets them on the altar, pronounces the words of conſecration, and turns himſelf to the people, who fall down, kiſs the earth, and beat their breaſts: then, after taking it himſelf, he diſtributes the hoſt ſoaked in wine to the people.

The Armenians ſeem to place the chief part of their religion in faſtings and abſtinences: and among the clergy, the higher the degree, the lower they muſt live; inſomuch that it is ſaid the archbiſhops live on nothing but pulſe. They conſecrate holy water but once a year, at which time every one fills a pot and carries it home, which brings in a conſiderable revenue to the church.

ARMENIACA. See Prunus.

ARMENIAN, ſomething belonging to or produced in Armenia: thus we ſay, *Armenian bole*, *Armenian ſtone*, &c. See Bole, and Armenus *Lapis*.

ARMENTIERS, a ſmall handſome town of the Netherlands, in the county of Flanders, and diſtrict of Ypres. It was taken by Lewis XIV. in 1667, who diſmantled it; and it now belongs to the French. It is ſeated on the river Lis. E. Long. 3. 3. N. Lat. 50. 40.

ARMENUS lapis, *Armenian ſtone*, in natural hiſtory, a mineral ſubſtance, which is but improperly called a *ſtone*; being no other than an ochreous earth, and properly called *blue ochre*. It is a very valuable ſubſtance in painting, being a bright and lively blue. It was in ſo high eſteem as a paint among the ancients, that counterfeits were continually attempted to ſerve in its place. Theophraſtus has recorded it as a thing judged worthy a place in the Egyptian annals, which of their kings had the honour of inventing the factitious kind; and he tells us the genuine native ſubſtance was a thing of that value, that preſents were made of it to great perſons, and that the Phœnicians paid their tribute in it.—It is a very beautiful earth, of an even and regular texture; and of a fine blue, ſometimes deeper, ſometimes paler, and frequently mixed with green. It is ſoft, tender, and light; of an even, but ſomewhat duſty, ſurface; it adheres firmly to the tongue, and is dry, but not harſh to the touch. It eaſily breaks between the fingers, and does not ſtain the hands. It is of a brackiſh diſagreeable taſte, and does not ferment with acids. It is a very ſcarce foſſil; but is found very pure, though in but ſmall quantities, in the mines at Goſſelaer in Saxony. It is frequently found ſpotted with green, and ſometimes with black; and very often is mixed among the green ochre, called *berggruen* by the Germans, which has thence been erroneouſly called by its name. See further the article Bice.

AMIERS, a town of Hainhault, in the French Netherlands, ſeated on the river Samber. E. Lon. 3. 45. N. Lat. 50. 15.

ARMIGER, a title of dignity, belonging to ſuch gentlemen as bear arms: and theſe are either by curteſy, as ſons of noblemen, eldeſt ſons of knights, &c.; or by creation, ſuch as the king's ſervants, &c. See Esquire.

ARMILLARY, in a general ſenſe, ſomething conſiſting of rings or circles.

Armillary *Sphere*, an artificial ſphere compoſed of a number of circles of the mundane ſphere, put together in their natural order, to eaſe and aſſiſt the imagination in conceiving the conſtitution of the heavens, and the motions of the celeſtial bodies. The armillary ſphere revolves upon its axis within a ſilvered horizon, which is divided into degrees, and moveable every way upon a braſs ſupporter. The other parts are the equinoctial, zodiac, meridian, the two tropics, and the two polar circles. See Geography.

ARMILUSTRIUM, in Roman antiquity, a feaſt held among the Romans, in which they ſacrificed armed, to the ſound of trumpets.

ARMINIANS, a religious ſect, or party, which aroſe in Holland, by a ſeparation from the Calviniſts. They followed the doctrine of Arminius, (ſee the next Article); who, thinking the doctrine of Calvin, with regard to free-will, predeſtination, and grace, too ſevere, returned to that of the Romiſh church, and maintained, that there is an univerſal grace given to all men, and that man is always free and at liberty to receive or reject grace. His colleague Gomarus, profeſſor of divinity in the ſame univerſity, ſtrenuouſly oppoſed him; and ſtood up for a particular or ſpecial grace given only to thoſe who were predeſtinated or elect, and for a poſitive decree both of election and reprobation. At length the diſpute was brought before the ſynod of Dort, where Arminianiſm was condemned in form. Nevertheleſs it continued to ſpread, and the republic of Holland was once in danger of being overturned by it.

The Arminians are likewiſe called *Remonſtrants*, from a remonſtrance which they preſented to the States-General in 1611, in which were laid down the chief articles of their faith.

The later Arminians have carried things much farther than Arminius himſelf, and ſome of them even come very near to Socinianiſm. In general, they deny, that authority is any proof of the truth of a doctrine; and, on this principle, they retrench abundance of things which have been looked upon as fundamental articles of religion. Many of them have quitted the doctrine of their maſter relating to the points of eternal election

tion and reprobation: for Epiſcopius lays it down, that God elects no perſon from all eternity, but only at the time when he is actually a believer. They ſpeak very ambiguouſly of the preſcience of God, which was the principal ſtrong hold of Arminius. They look on the doctrine of the Trinity as a point not neceſſary to ſalvation; and they generally avoid the term *ſatisfaction of Chriſt*. They contend for a general toleration of all thoſe who profeſs the Chriſtian religion.

ARMINIUS (James), whoſe real name in Low Dutch was James Harmanni, a famous Proteſtant divine, from whom the modern ſect of Arminians * take their name, was born at Oude-water, in Holland, in 1560. He was ordained miniſter at Amſterdam, on the 11th of Auguſt, 1588; when he ſoon diſtinguiſhed himſelf by his ſermons, which were remarkable for their ſolidity and learning, and gained him univerſal applauſe: but Martin Lydias, profeſſor of divinity at Franker, judging him a fit perſon to refute a writing in which Beza's doctrine of predeſtination had been attacked by ſome miniſters of Delft, Arminius at his intreaties undertook the taſk; but upon thoroughly examining the reaſons on both ſides, he came into the opinions he propoſed to deſtroy, and afterwards went ſtill farther than the miniſters of Delft had done. In 1600, he oppoſed thoſe who maintained that miniſters ſhould ſubſcribe the confeſſion and catechiſm every year. In 1602, a peſtilential diſeaſe raged at Amſterdam, during which he acted with the greateſt reſolution and courage, in aſſiſting the poor, and comforting the ſick; and Lucas Trelcatius and Francis Junius dying of that diſeaſe at Leyden, the curators of that univerſity choſe Arminius profeſſor of divinity there, and he was afterwards made doctor of divinity. Diſputes upon grace were ſoon after kindled in that univerſity; and he was at length engaged in a new conteſt, occaſioned by a diſputation of his concerning the divinity of the Son. Theſe conteſts, his continual labour, and the concern of ſeeing his reputation blaſted by a multitude of ſlanders in relation to his opinions, impaired his health, and threw him into a fit of ſickneſs, of which he died on the 19th of October, 1609.

Arminius was eſteemed an excellent preacher: his voice was low, but very agreeable; and his pronunciation admirable: he was eaſy and affable to perſons of all ranks, and facetious in his converſation amongſt his friends. His great deſire was, that Chriſtians would bear with one another in all controverſies which did not affect the fundamentals of their religion; and when they perſecuted each other for points of indifference, it gave him the utmoſt diſſatisfaction. The curators of the univerſity of Leyden had ſo great a regard for him, that they ſettled a penſion upon his wife and children.

He left ſeveral works, viz. 1. Diſputationes de diverſis Chriſtianæ religionis capitibus. 2. Orationes, itemque tractatus inſigniores aliquot. 3. Examen modeſti libelli Gulielmi Perkinſii de prædeſtinationis modo et ordine, itemque de amplitudine gratiæ divinæ. 4. Analyſis capitis noni ad Romanos. 5. Diſſertatio de vero et genuino ſenſu capitis ſeptimi epiſtolæ ad Romanos. 6. Amica collatio cum D. Franſciſco Junio de prædeſtinatione per literas habita. 7. Epiſtola ad Hippolytum a collibus.

ARMIRO, a town of Macedonia, in European Turky, ſeated on the Gulph de Velo. E. Long. 23. 40. N. Lat. 38. 34.

ARMISTICE, in military affairs, a temporary truce or ceſſation of arms for a very ſhort ſpace of time. The word is Latin, *armiſtitium*; and compounded of *arma*, arms, and *ſto*, to ſtand, or ſtop.

ARMOISIN, a ſilk ſtuff, or kind of taffety, manufactured in the Eaſt Indies, at Lyons in France, and at Lucca in Italy. That of the Indies is ſlighter than thoſe made in Europe.

ARMONIAC See Ammoniac.

ARMORIAL, ſomething relating to arms or coats of arms. See Arms.

ARMORIC, or Aremoric, ſomething that belongs to the province of Bretagne, or Britanny, in France. The name *Armorica* was anciently given to all the northern and weſtern coaſt of Gaul, from the Pyreneans to the Rhine; under which name it was known even in Cæſar's time. The word is of Bas Breton origin, and denotes as much as *maritime;* compounded, according to M. Menage, of *ar*, upon, and *more*, ſea.

ARMORIST, a perſon ſkilled in the knowledge of armory.

ARMORY, a warehouſe of arms, or a place where the military habiliments are kept to be ready for uſe.

Armory is alſo a branch of the ſcience of heraldry, conſiſting in the knowledge of coats of arms, as to their blazons and various intendments. See Heraldry.

ARMOUR denotes ſuch habiliments as ſerve to defend the body from wounds, eſpecially of darts, a ſword, a lance, &c. A complete ſuit of armour formerly conſiſted of a helmet, a ſhield, a cuiraſſe, a coat of mail, a gauntlet, &c. all now laid aſide.

ARMOURER, a perſon who makes or deals in arms and armour.

ARMOZA, or Harmozia, a town in Carmania, at the mouth of the Anamis, which falls into the Perſian Gulf, (Arrian); *Armuza*, (Ptolemy); and from this the neighbouring iſland, and a ſmall kingdom, take the modern name of *Ormus*. E. Long. 56. 17. N. Lat. 27. 20.

ARMS, in a general ſenſe, all kinds of weapons, whether offenſive or defenſive.

Arms, in a legal ſenſe, extend to any thing a perſon wears for his own defence, or takes in his hand, and uſes in anger, to ſtrike or throw at another.

Arms, or *Armories*, in heraldry, ſignify marks of honour borne upon ſhields, banners, and coats, in order to diſtinguiſh kingdoms, ſtates, families, and perſons *.

Charged Arms are ſuch as retain their ancient integrity, with the addition of ſome new honourable bearing.

Canting or *Vocal* Arms, thoſe in which there are ſome figures alluding to the name of the family.

Full or *Entire* Arms, ſuch as retain their primitive purity, without any alterations or abatements.

Falſe Arms, ſuch as are not conformable to the rules of heraldry.

Arms, in falconry, imply the legs of a hawk from the thigh to the foot.

ARMUYDEN, a ſea-port town of the United Provinces, in the iſland of Walcherin, formerly very flouriſhing; but now inconſiderable, the ſea having ſtopt up the harbour. The ſalt-works are its chief reſource. E. Long. 3. 40. N. Lat. 51. 30.

* See the preceding article.

* See *Heraldry*, chap. i.

ARMY, a large number of ſoldiers, conſiſting of horſe and foot, completely armed, and provided with artillery, ammunition, proviſions, &c. under the command of one general, having lieutenant-generals, major-generals, brigadiers, and other officers, under him. An army is compoſed of ſquadrons and battalions; and is uſually divided into three corps, and formed into three lines: the firſt line is called the *van-guard*, the ſecond the *main-body*, and the third the *rear-guard* or *body of reſerve*. The middle of each line is poſſeſſed by the foot; the cavalry form the right and left wing of each line; and ſometimes they place ſquadrons of horſe in the intervals between the battalions. When the army is drawn up in order of battle, the horſe are placed at five feet diſtance from each other, and the foot at three. In each line the battalions are diſtant from each other 180 feet, which is nearly equal to the extent of their front; and the ſame holds of the ſquadrons, which are about 300 feet diſtant, the extent of their own front. Theſe intervals are left for the ſquadrons and battalions of the ſecond line to range themſelves againſt the intervals of the firſt, that both may more readily march through theſe ſpaces to the enemy: the firſt line is uſually 300 feet diſtant from the ſecond, and the ſecond from the third, that there may be ſufficient room to rally when the ſquadrons and battalions are broken *.

This is to be underſtood of a land-army only. A naval or ſea-army is a number of ſhips of war, equipped and manned with ſailors and mariners, under the command of an admiral, with other inferior officers under him. See *Naval* TACTICS.

Long experience has ſhewn, that in Europe a prince with a million of ſubjects cannot keep an army of above 10,000 men, without ruining himſelf. It was otherwiſe in the ancient republics: the proportion of ſoldiers to the reſt of the people, which is now as about 1 to 100, might then be as about 1 to 8. The reaſon ſeems owing to that equal partition of lands which the ancient founders of commonwealths made among their ſubjects; ſo that every man had a conſiderable property to defend, and means to defend it with: whereas, among us, the lands and riches of a nation being ſhared among a few, the reſt have no way of ſubſiſting but by trades, arts, and the like; and have neither any free property to defend, nor means to enable them to go to war in defence of it, without ſtarving their families. A large part of our people are either artiſans or ſervants, and ſo only miniſter to the luxury and effeminacy of the great. While the equality of lands ſubſiſted, Rome, though only a little ſtate, being refuſed the ſuccours which the Latins were obliged to furniſh after the taking of the city in the conſulate of Camillus, preſently raiſed ten legions within its own walls; which was more, Livy aſſures us, than they were able to do in his time, tho' maſters of the greateſt part of the world. A full proof, adds the hiſtorian, that we are not grown ſtronger; and that what ſwells our city is only luxury, and the means and effects of it.

ARNALL (William), a noted political writer in defence of Sir Robert Walpole, was originally an attorney's clerk; but being recommended to Walpole, he employed him for a courſe of years in writing the *Free Briton* and other papers in defence of his adminiſtration. By the report of the ſecret committee, he appears to have received, in the ſpace of four years, no leſs than 10,997*l.* 6*s.* 8*d.* out of the treaſury for his writings! but ſpending his money as faſt as it came, and his ſupplies ſtopping on Sir Robert's reſignation, he died broken-hearted and in debt, in the 26th year of his age. His invention was ſo quick, that his honourable employer uſed to ſay, no man in England could write a pamphlet in ſo little time as Arnall.

ARNAUD DE MEYRVEILH, or MEREUIL, a poet of Provence, who lived at the beginning of the 13th century. He wrote a book intitled *Las recaſtenas de ſa comteſſe;* and a collection of poems and ſonnets. He died in the year 1220. Petrarch mentions him in his Triumph of Love.

ARNAUD DE VILLA NOVA, a famous phyſician, who lived about the end of the 13th and beginning of the 14th century. He ſtudied at Paris and Montpelier, and travelled through Italy and Spain. He was well acquainted with languages, and particularly with the Greek, Hebrew, and Arabic. He was at great pains to gratify his ardent deſire after knowledge; but this paſſion carried him rather too far in his reſearches: he endeavoured to diſcover future events by aſtrology, imagining this ſcience to be infallible; and upon this foundation he publiſhed a prediction, that the world would come to an end in the middle of the 14th century. He practiſed phyſic at Paris for ſome time: but having advanced ſome new doctrines, he drew upon himſelf the reſentment of the univerſity; and his friends, fearing he might be arreſted, perſuaded him to retire from that city. Upon his leaving France, he retired to Sicily, where he was received by king Frederic of Arragon with the greateſt marks of kindneſs and eſteem. Some time afterwards, this prince ſent him to France, to attend pope Clement in an illneſs; and he was ſhipwrecked on the coaſt of Genoa, about the year 1313. The works of Arnaud, with his life prefixed, were printed in one volume, in folio, at Lyons, in 1520; and at Baſil in 1585, with the notes of Nicholas Tolerus.

ARNAUD d'ANDILLY (Robert), the ſon of a celebrated advocate of the parliament of Paris, was born in 1588; and, being introduced young at court, was employed in many conſiderable offices, all which he diſcharged with great integrity and reputation. In 1644, he quitted buſineſs, and retired into the convent of Port Royal des Champs, where he paſſed the remainder of his days in a continued application to works of piety and devotion; and enriched the French language with many excellent tranſlations of different writers, as well as with religious compoſitions of his own. He died in 1674, and his works are printed in 8 vols folio.

ARNAUD (Anthony), brother of the preceding, and a doctor of the Sorbonne, was born in 1612. He publiſhed, in 1643, *A Treatiſe on frequent Communion*, which highly diſpleaſed the Jeſuits; and the diſputes upon grace, which broke out about this time in the univerſity of Paris, and in which he took a zealous part with the Janſeniſts, helped to increaſe the animoſity between him and the Jeſuits. But nothing raiſed ſo great a clamour againſt him, as the two letters he wrote on *Abſolution;* in the ſecond of which the faculty of divinity found two propoſitions which they condemned, and M. Arnaud was expelled the ſociety. Upon this he retired; and during a retreat which laſted near 25 years, he compoſed that great variety of works which are extant of his, on grammar, geometry, logic, metaphyſics,

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* See the article *War*.

taphyſics, and theology. In 1679, he withdrew from France, living in obſcurity in the Netherlands, and died in 1694. His heart, at his own requeſt, was ſent to be depoſited in the Port Royal. Arnaud had a remarkable ſtrength of genius, memory, and command of his pen, nor did theſe decay even to the laſt year of his life. Mr Bayle ſays, he had been told by perſons who had been admitted into his familiar converſation, that he was a man very ſimple in his manners; and that unleſs any one propoſed ſome queſtion to him, or deſired ſome information, he ſaid nothing that was beyond common converſation, or that might make one take him for a man of great abilities; but when he ſet himſelf to give an anſwer to ſuch as propoſed a point of learning, he ſeemed as it were transformed into another man: he would then deliver a multitude of fine things with great perſpicuity and learning, and had a particular talent at making himſelf intelligible to perſons of not the greateſt penetration.

ARNAY-LE-DUC, a town of France, in the duchy of Burgundy, which carries on a pretty good trade. It is ſeated on the Auxois, in a valley near the river Aroux. E. Long. 4. 26. N. Lat. 47. 7.

ARNDT (John), a famous proteſtant divine of Germany, born at Ballenſtad, in the duchy of Anhalt, in the year 1555. At firſt he applied himſelf to the ſtudy of phyſic: but falling into a dangerous ſickneſs, he made a vow to change his profeſſion for that of divinity, if he ſhould be reſtored to health; which he accordingly did, upon his recovery. He was miniſter firſt at Quedlinburg, and then at Brunſwick. He met with great oppoſition in this laſt city: his ſucceſs as a preacher raiſed the enmity of his brethren, who became his bitter enemies. In order to ruin his character, they aſcribed a variety of errors to him; and perſecuted him to ſuch a degree, that he was obliged to leave Brunſwick, and retire to Iſleb, where he was miniſter for three years. In 1611, George duke of Lunenburg, who had a high opinion of his integrity and ſanctity, gave him the church of Zell, and appointed him ſuperintendant of all the churches in the duchy of Lunenburg; which office he diſcharged for 11 years, and died in 1621. It is reported that he foretold his death, having ſaid to his wife, upon his return home after his laſt ſermon, that now he had preached his funeral ſermon. He wrote in High Dutch A Treatiſe on true Chriſtianity, which has been tranſlated into ſeveral languages.

ARNHEIM, a town of the Low Countries, in the province of Guelderland, capital of Veluive. It was adorned with ſeveral fine churches, particularly that of St Walburg and of St Euſebius; which laſt has a very high tower. The town has five gates, and ſeveral fine ramparts, part of which are waſhed by the Rhine, and the other parts have wide and deep ditches before them. There is a canal made between this place and Nimeguen, at the expence of both towns, on which boats paſs backwards and forwards to carry on a trade between them. The air is very healthful; on which account it is inhabited by perſons of diſtinction. E. Long. 5. 55. N. Lat. 52. 0.

ARNICA, LEOPARDS BANE, in botany, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants.

Species. There are ſeven ſpecies of arnica, all of which are natives of Ethiopia, except the two following: 1. The montana, with oval leaves, grows naturally on the Alps, and alſo upon many of the high mountains in Germany, and other cold parts of Europe. The roots of this ſpecies, when planted in a proper ſoil and ſituation, ſpread very far under the ſurface, and put out many entire oval leaves, from between which the flower-ſtems ariſe, which grow about a foot and an half high. The top is terminated by a ſingle yellow flower, compoſed of many florets, like thoſe of the dandelion. Theſe are ſucceeded by oblong ſeeds, which are covered with down. 2. The ſcorpioides, with ſawed leaves growing alternately, is a native of Bohemia and Siberia. The roots of this ſort are much jointed, and divide into many irregular fleſhy off-ſets, which are variouſly contorted; from whence ſome ſuperſtitious perſons have imagined, that they would expel the poiſon of ſcorpions, and cure the wounds made by the ſting of that animal.

Culture. The firſt ſpecies delights in a moiſt ſhady ſituation: it may be propagated by parting the roots in autumn when the ſtalks begin to decay; or by the ſeeds ſown in autumn ſoon after they are ripe, for thoſe ſown in the ſpring often fail. The ſecond ſort is to be propagated in the ſame manner. Both are very hardy, and require no other care than to be kept free from weeds.

Medicinal Uſes. The leaves and roots of the firſt ſpecies were formerly eſteemed a ſpecific in reſolving coagulated blood, for which purpoſe they are ſtill preſcribed in Germany where they grow; but their violent operation has made them fall into diſuſe in this country.

ARNISÆUS (Henningus), a philoſopher and phyſician of great reputation, about the beginning of the 17th century. He was born at Halberſtad in Germany, and was profeſſor of phyſic in the univerſity of Helmſtad. His political works are much eſteemed. The moſt remarkable of them is his book *De authoritate principum in populum ſemper inviolabili*, printed at Francfort in 1612. In this he maintains that the authority of princes ought not to be violated. He wrote alſo upon the ſame doctrine his three books *De jure majeſtatis*, printed at the ſame place in 1610; and his *Reflectiones politicæ*, printed at Francfort in 1615. Having received an invitation to go to Denmark, he went thither, and was made counſellor and phyſician to the king. He travelled into France and England, and died in November 1635. Beſides the pieces already mentioned, he wrote ſeveral philoſophical, medicinal, and political treatiſes.

ARNOBIUS, profeſſor of rhetoric at Sicca, in Numidia, towards the end of the third century. It was owing to certain dreams which he had, that he became deſirous of embracing Chriſtianity. For this purpoſe he applied to the biſhops, to be admitted into the church. But they, remembering the violence with which he had always oppoſed the true faith, had ſome diſtruct of him; and, before they would admit him, inſiſted on ſome proofs of his ſincerity. In compliance with this demand, he wrote againſt the Gentiles; wherein he has refuted the abſurdities of their religion, and ridiculed their falſe gods. In this treatiſe he has employed all the flowers of rhetoric, and diſplayed great learning: but from an impatience to be admitted into the body of the faithful, he is thought to have been in too great a hurry in compoſing his work, and thence it is that there does not appear in this piece ſuch an exact order and diſpoſition as could be wiſhed; and not having a perfect and exact knowledge of the Chriſtian faith, he publiſhed ſome very dangerous errors. Mr Bayle remarks, that his notions about the origin of the ſoul, and the cauſe of natural evil, and ſeveral other important points, are highly pernicious. St Jerom, in his epiſtle to Paulinus, is of opinion that his ſtyle is unequal and too diffuſe, and that his book is written without any method; but Dr Cave thinks this judgment too ſevere, and that Arnobius wants neither elegance nor order in his compoſition. Voſſius ſtyles him *the Varro of the eccleſiaſtical writers*. Du Pin obſerves that his work is written in a manner worthy of a profeſſor of rhetoric: the turn of his ſentiments is very oratorical; but his ſtyle is a little African, his expreſſions being harſh and inelegant. We have ſeveral editions of this work of Arnobius againſt the Gentiles, one publiſhed at Rome in 1542, at Baſil in 1546 and 1560, at Paris in 1570, at Atwerp in 1582, and one at Hamburg in 1610, with notes by Gebhard Elmenhorſtius, beſides many others. He wrote alſo a piece intitled *De rhetorica inſtitutione*; but this is not extant.

ARNOLD, of Breſcia, in Italy, diſtinguiſhed himſelf by being the founder of a ſect, which oppoſed the wealth and power of the Romiſh clergy. He went into France, where he ſtudied under the celebrated Peter Abelard. Upon his return to Italy, he put on the habit of a monk, and maintained in his ſermons, That the pope and the clergy ought not to enjoy any temporal eſtate; and that thoſe eccleſiaſtics who had any eſtates of their own, or held any lands, were entirely cut off from the leaſt hopes of ſalvation: that the clergy ought to ſubſiſt upon the alms and voluntary contributions of Chriſtians; and that all other revenues belonged to princes and ſtates, in order to be diſpoſed of amongſt the laity, as they thought proper. He maintained alſo ſeveral hereſies with regard to baptiſm and the Lord's ſupper. St Bernard has drawn his character in very ſtrong colours. "Would to God (ſays he) that his doctrine was as holy as his life is ſtrict: would you know what ſort of man this is? Arnold of Breſcia is a man that neither eats nor drinks; who, like the devil, is hungry and thirſty after the blood of ſouls; who goes to and fro upon the earth, and is always doing among ſtrangers what he cannot do amongſt his own countrymen; who ranges like a roaring lion, always ſeeking whom he may devour; an enemy to the croſs of Chriſt, an author of diſcords, an inventor of ſchiſms, and a diſturber of the public peace: he is a man, whoſe converſation has nothing but ſweetneſs, and his doctrine nothing but poiſon in it; a man who has the head of a dove, and the tail of a ſcorpion." He engaged a great number of perſons in his party, who were diſtinguiſhed by his name, and proved very formidable to the popes. His doctrines rendered him ſo obnoxious, that he was condemned in the year 1139, in a council of near 1000 prelates, held in the church of St John Lateran at Rome, under Pope Innocent II. Upon this he left Italy, and retired to Swiſſerland. After the death of that pope, he returned to Italy, and went to Rome, where he raiſed a ſedition againſt Pope Eugenius III. and afterwards againſt Hadrian IV. who laid the people of Rome under an interdict till they had baniſhed Arnold and his followers. This had its deſired effect: the Romans ſeized upon the houſes which the Arnoldiſts had fortified, and obliged them to retire to Otricoli in Tuſcany; where they were received with the utmoſt affection by the people, who conſidered Arnold as a prophet. However, he was ſeized ſome time after by cardinal Gerard; and notwithſtanding the efforts of the viſcounts of Campanio, who had reſcued him, he was carried to Rome, and condemned by Peter, the prefect of that city, to be hanged, and was accordingly executed in the year 1155. Thirty of his followers went from France to England, about the year 1160, in order to propagate their doctrine there; but they were immediately ſeized and deſtroyed.

ARNOLDISTS, in church-hiſtory, a ſect ſo called from their leader Arnold of Breſcia. See the preceding article.

ARNOLDUS (Gothofredus), paſtor and inſpector of the churches of Perleberg, and hiſtoriographer to the king of Pruſſia, was born at Annaburg in the mountains of Miſnia, in 1666. He was a zealous defender of Pietiſts, a ſect among the German Proteſtants, and compoſed a great number of religious works; particularly an *Eccleſiaſtical Hiſtory*, which expoſed him to the reſentment of the divines; and another giving an account of the doctrines and manners from the firſt ages, in which he frequently animadverts upon Cave's primitive Chriſtianity. He died in 1714. Various are the opinions concerning Arnoldus in Germany; ſome of his own countrymen and profeſſion extolling him to the ſkies as a ſaint of the laſt century, and ſetting an ineſtimable value upon his works; while others pronounce damnation upon him as an arch-heretic, and condemn his writings as heterodox.

ARNOT, in botany, the Engliſh name of the bunium. See BUNIUM.

ARNOTTO. The ſame with ANNOTTO; which ſee.

ARNSTADE, a town of Germany, in Thuringia, on the river Gera. E. Long. 11. 3. N. Lat. 50. 54.

ARNULPH, or ERNULPH, biſhop of Rocheſter in the reign of Henry I. He was born in France, where he was ſome time a monk of St Lucian de Beauvais. The monks led moſt irregular lives in this monaſtery; for which reaſon he reſolved to quit it, but firſt took the advice of Lanfranc archbiſhop of Canterbury, under whom he had ſtudied in the abbey of Becc, when Lanfranc was prior of that monaſtery. This prelate invited him over to England, and placed him in the monaſtery of Canterbury, where he lived a private monk till Lanfranc's death. When Anſelm came to the archiepiſcopal ſee, Arnulph was made prior of the monaſtery of Canterbury, and afterwards abbot of Peterborough. In 1115, he was conſecrated biſhop of Rocheſter, which ſee he held 9 years, and died in March 1124, aged 84.

Arnulph wrote, 1. A piece in Latin concerning the foundation, endowment, charters, laws, and other things relating to the church of Rocheſter: it is generally known by the title of *Textus Roffenſis*, and is preſerved in the archives of the cathedral church of Rocheſter. 2. An Epiſtle in Anſwer to ſome Queſtions of Lambert, abbot of Munſter; and, 3. An Epiſtle on inceſtuous Marriage.

ARNUS, now *Arno*, a very rapid river of Tuſcany, which it divides, and in its courſe waſhes Florence and Piſa; riſing in the Apennine, to the eaſt of Florence, near a village called *S. Maria delle Gratie*, on the borders of Romagna, 15 miles to the weſt of the ſources of the Tiber; and then turning ſouthward towards Arretium, it is there increaſed by the lakes of the Clanis; after which it runs weſtward, dividing Florence into two parts, and at length waſhing Piſa, falls eight miles below it into the Tuſcan Sea.

ARNWAY (John), a clergyman diſtinguiſhed by his benevolence and loyalty to King Charles I. was deſcended from a very good family in the county of Salop, from which he inherited a conſiderable eſtate. He was educated at Oxford; and, having received holy orders, obtained the rectories of Hodnet and Ightfield, where he diſtinguiſhed himſelf by his piety and exemplary charity: for it was his cuſtom to clothe annually 12 poor people, and every Sunday to entertain as many at his table, not only plentifully, but with intimacy and reſpect. The civil war breaking out, he preached againſt rebellion, and raiſed and clothed eight troopers for the ſervice of King Charles I. upon which his houſe was plundered by the parliament's army. He then went to Oxford to ſerve the king in perſon, which ſubjected him to a new train of misfortunes: for his eſtate was ſoon after ſequeſtered, and himſelf impriſoned till the king's death; after which, he went to the Hague, where he publiſhed, 1. The Tablet, or the Moderation of Charles I. the Martyr; and, 2. An Alarm to the ſubjects of England. He at laſt went to Virginia, where he died in 1653.

AROLEO, an American weight, equal to 25 of our pounds.

AROMA PHILOSOPHORUM, denotes either ſaffron, or the aroph of Paracelſus; as *aroma germanicum* denotes elecampane. See AROPH.

AROMATA, a town of Lydia, famous for its generous wines; and hence the appellation, (Strabo). Alſo the name of a trading town, and promontory of Ethiopia, at the termination of the Sinus Avalites of the Red Sea, (Arrian).

AROMATIC, an appellation given to ſuch plants as yield a briſk fragrant ſmell, and a warm taſte; as all kinds of ſpices, *&c.* See MAT. MED. nº 49, *&c.*

ARONA, a town of Italy, in the duchy of Milan, with a ſtrong caſtle. It ſtands on the lake Maggiore. E. Long. 8. 25. N. Lat. 45. 41.

ARONCHES, a town of Portugal, in Alentejo, on the confines of Spain, ſeated on the river Caro. It is well fortified, and has about 500 inhabitants. W. Long. 5. 16. N. Lat. 14. 39.

AROOL, a town of the empire of Ruſſia, in the Ukrain, ſeated on the river Occa. E. Long. 38. 15. N. Lat. 51. 48.

AROPH, a contraction of *aroma philoſophorum;* a name given to ſaffron.

AROPH *Paracelſi;* a name given to a kind of chemical flowers, probably of the ſame nature with the Ens Veneris, elegantly prepared by ſublimation from equal quantities of lapis hæmatitis and ſal ammoniac.

AROPH is alſo a term uſed frequently by Paracelſus in a ſenſe ſynonymous with *lithontriptic*.

AROSBAY, a town of the Eaſt Indies, on the coaſt of the iſland of Madura, near Java. E. Long. 14. 30. N. Lat. 9. 30.

AROURA, a Grecian meaſure of 50 feet. It was more frequently uſed for a ſquare-meaſure of half the plethron. The Egyptian aroura was the ſquare of 100 feet.

ARPAGIUS, or HARPAGIUS, among the ancients, a perſon who died in the cradle, at leaſt in early youth. The word is formed from the Greek αϱπαζω, *I ſnatch.*—The Romans made no funerals for their *arpagii.* They neither burnt their bodies, nor made tombs, monuments, or epitaphs for them; which occaſioned Juvenal to ſay,

—Terra clauditur infans
Et minor igne rogi.

In after times it became the cuſtom to burn ſuch as had lived to the age of 40 days, and had cut any teeth; and theſe they called 'Αϱπακτοι, or 'Αϱπαγμενοι, q. d. *rapti, raviſhed.* The uſage ſeems to have been borrowed from the Greeks; among whom, Euſtathius aſſures us, it was the cuſtom never to bury their children either by night or full day, but at the firſt appearance of the morning; and that they did not call their departure by the name of *death*, but by a ſofter appellation, 'Ημεϱας αϱπαγη, importing that they were raviſhed by Aurora, or taken away to her embraces.

ARPENT, ſignifies an acre or furlong of ground; and, according to the old French account in domeſday-book, 100 perches make an arpent. The moſt ordinary acre, called *l'arpent de France*, is 100 perches ſquare: but ſome account it but half an acre.

ARPINAS, or ARPINO, (Joſeph Cæſar), a famous painter, born in the year 1560, at the caſtle of Arpinas, in the kingdom of Naples. He lived in great intimacy with Pope Clement VIII. who conferred upon him the honour of knighthood, and beſtowed on him many other marks of his friendſhip. In the year 1600, he went to Paris with cardinal Aldobrandin, who was ſent legate to the French court on the marriage of Henry IV. with Mary of Medicis. His Chriſtian majeſty gave Arpinas many conſiderable preſents, and created him a knight of St Michael. The colouring of this painter is thought to be cold and inanimate; yet there is ſpirit in his deſigns, and his compoſitions have ſomewhat of fire and elevation. The touches of his pencil being free and bold, give therefore pleaſure to connoiſſeurs in painting; but they are generally incorrect. What he painted of the Roman hiſtory is the moſt eſteemed of all his works. The French king has in his collection the following pieces of this maſter, *viz.* the nativity of our Saviour, Diana and Acteon, the rape of Europa, and a Suſanna. He died at Rome in 1640.

ARPINUM, a town of the Volſci, a little to the eaſt of the confluence of the rivers Liris and Fibrenus, in the Terra di Lavora; now decayed, and called *Arpino.* It was the native place of Cicero, and of C. Marius, (Salluſt).

ARQUA, a town of Italy, in the Paduan, and territory of Venice, remarkable for the tomb of Petrarch. E. Long. 11. 43. N. Lat. 45. 43.

ARQUEBUS. See HARQUEBUS.

ARQUES, a town of Normandy, in France, ſeated on a ſmall river of the ſame name. E. Long. 1. 30. N. Lat. 49. 54.

ARRACHEE, in heraldry, a term applied to the repreſentations of plants torn up by the roots.

ARRACK. See ARACK.

ARRAGON. See ARAGON.

ARRAIGNMENT, in law, the arraigning or ſetting a thing in order, as a perſon is ſaid to arraign a writ of novel diſſeiſin, who prepares and fits it for trial.

ARRAIGNMENT is moſt properly uſed to call a perſon to anſwer in form of law upon an indictment, &c.

When brought to the bar, the criminal is called upon by name to hold up his hand: which, though it may ſeem a trifling circumſtance, yet is of this importance, that by the holding up of his hand *conſtat de perſona*, and he owns himſelf to be of that name by which he is called. However, it is not an indiſpenſable ceremony; for, being calculated merely for the purpoſe of identifying the perſon, any other acknowledgement will anſwer the purpoſe as well: therefore, if the priſoner obſtinately and contemptuouſly refuſes to hold up his hand, but confeſſes he is the perſon named, it is fully ſufficient.

Then the indictment is to be read to him diſtinctly in the Engliſh tongue (which was law, even while all other proceedings were in Latin), that he may fully underſtand his charge. After which it is to be demanded of him, whether he be guilty of the crime whereof he ſtands indicted, or not guilty.

When a criminal is arraigned, he either ſtands mute, or confeſſes the fact; or elſe he pleads to the indictment.

1. If he ſays nothing, the court ought *ex officio* to impanel a jury to inquire whether he ſtands obſtinately mute, or whether he be dumb *ex viſitatione Dei*. If the latter appears to be the caſe, the judges of the court (who are to be of counſel for the priſoner, and to ſee that he hath law and juſtice) ſhall proceed to the trial, and examine all points as if he had pleaded not guilty. But whether judgment of death can be given againſt ſuch a priſoner, who hath never pleaded, and can ſay nothing in arreſt of judgment, is a point yet undetermined.

If he be found to be obſtinately mute (which a priſoner hath been held to be, that hath cut his own tongue), then, if it be on an indictment of high treaſon, it hath long been clearly ſettled, that ſtanding mute is equivalent to a conviction, and he ſhall receive the ſame judgment and execution.

The Engliſh judgment of penance for ſtanding mute was as follows: That the priſoner be remanded to the priſon from whence he came; and put into a low, dark chamber; and there be laid on his back, on the bare floor, naked, unleſs where decency forbids; that there be placed upon his body as great a weight of iron as he could bear, and more; that he have no ſuſtenance, ſave only, on the firſt day, three morſels of the worſt bread; and, on the ſecond day, three draughts of ſtanding water, that ſhould be neareſt to the priſon-door; and in this ſituation this ſhould be alternately his daily diet, *till he died*, or, as anciently the judgment ran, *till he anſwered*.

It hath been doubted whether this puniſhment ſubſiſted at the common law, or was introduced in conſequence of the ſtatute Weſtm. 1. 3 Edw. I. c. 12. which ſeems to be the better opinion. For not a word of it is mentioned in Glanvil or Bracton, or in any ancient author, caſe, or record (that hath yet been produced), previous to the reign of Edward I: but there are inſtances on record in the reign of Henry III. where perſons accuſed of felony, and ſtanding mute, were tried in a particular manner, by two ſucceſſive juries, and convicted; and it is aſſerted by the judges in 8 Henry IV. that, by the common law before the ſtatute, ſtanding mute on an appeal amounted to a conviction of the felony. This ſtatute of Edward I. directs ſuch perſons, “as will not put themſelves upon “inqueſts of felonies before the judges at the ſuit of “the king, to be put into hard and ſtrong priſon “(*ſoient mys en la priſone fort et dure*), as thoſe which “refuſe to be at the common law of the land.” And, immediately after this ſtatute, the form of the judgment appears in Fleta and Britton to have been only a very ſtrait confinement in priſon, with hardly any degree of ſuſtenance; but no weight is directed to be laid upon the body, ſo as to haſten the death of the miſerable ſufferer: and indeed any ſurcharge of puniſhment on perſons adjudged to penance, ſo as to ſhorten their lives, is reckoned by Horne in the Mirror as a ſpecies of criminal homicide. It alſo clearly appears, by a record of 31 Edw. III. that the priſoner might then poſſibly ſubſiſt for 40 days under this lingering puniſhment. It is therefore imagined that the practice of loading him with weights, or, as it is uſually called, *preſſing him to death*, was gradually introduced between 31 Edward III. and 8 Henry IV. at which laſt period it firſt appears upon the books; being intended as a ſpecies of mercy to the delinquent, by delivering him the ſooner from his torment: and hence it is alſo probable, that the duration of the penance was then firſt altered; and inſtead of continuing *till he anſwered*, it was directly to continue *till he died*, which muſt very ſoon happen under an enormous preſſure.

The uncertainty of its original, the doubts that were conceived of its legality, and the repugnance of its theory (for it rarely was carried into practice) to the humanity of the laws of England, all concurred to require a legiſlative abolition of this cruel proceſs, and a reſtitution of the ancient common law; whereby the ſtanding mute in felony, as well as in treaſon and in treſpaſs, amounted to a confeſſion of the charge.

2. If the priſoner made a ſimple and plain confeſſion, the court hath nothing to do but to award judgment: but it is uſually very backward in receiving and recording ſuch confeſſion, out of tenderneſs to the life of the ſubject; and will generally adviſe the priſoner to retract it, and

3. Plead to the indictment; as to which, ſee the article PLEA *of Indictment*.

ARRAN, an iſland of Scotland, in the Frith of Clyde, between Kintyre and Cunningham. Of this iſland the beſt deſcription we have is that given by Mr Pennant, in his Tour through Scotland, Vol. II. 172—184, which we ſhall therefore tranſcribe.

“Arran, or properly *Arr-inn*, or the iſland of mountains, ſeems not to have been noticed by the ancients, notwithſtanding it muſt have been known to the Romans, whoſe navy, from the time of Agricola, had its ſtation in the *Glota Æſtuarium*, or the *Frith of Clyde*: Camden indeed makes this iſland the Glota of Antonine, but no ſuch name occurs in his itinerary; it therefore was beſtowed on Arran by ſome of his commentators.

1
Arran probably famous in ancient times

“By the immenſe cairns, the vaſt monumental ſtones, and many reliques of druidiſm, this iſland muſt have been conſiderable in very ancient times. Here are ſtill traditions of the hero Fingal, or Fin-mac-coul, who is ſuppoſed here to have enjoyed the pleaſures of the chace; and many places retain his name: but I can diſcover nothing but oral hiſtory that relates to the iſland, till the time of Magnus the barefooted, the Norwegian victor, who probably included Arran in his conqueſts of Kintyre. If he did not conquer that iſland, it was certainly included among thoſe that Donald-bane was to cede; for it appears that Acho, one of the ſucceſſors of Magnus, in 1263, laid claim to Arran, Bute, and the Cumrays, in conſequence of that promiſe: the two firſt he ſubdued, but the defeat he met with at Largs ſoon obliged him to give up his conqueſts.

2 Hiſtory of the iſland.

“ Arran was the property of the crown. Robert Bruce retired thither during his diſtreſſes, and met with protection from his faithful vaſſals: numbers of them followed his fortunes; and after the battle of Bannockburn he rewarded ſeveral, ſuch as the Mac-cooks, Mackinnons, Mac-brides, and Mac-louis, or Fullertons, with different charters of lands in their native country. All theſe are now abſorbed by this great family, except the Fullertons, and a Stewart, deſcended from a ſon of Robert III. who gave him a ſettlement here. In the time of the Dean of the Iſles, his deſcendent poſſeſſed caſtle Douan; and *he and his bluid*, ſays the dean, *are the beſt men in that countrey*.

“ About the year 1334, this iſland appears to have formed part of the eſtate of Robert Stewart, great ſteward of Scotland, afterwards Robert II. At that time they took arms to ſupport the cauſe of their maſter; who afterwards, in reward, not only granted at their requeſt an immunity from their annual tribute of corn, but added ſeveral new privileges, and a donative to all the inhabitants that were preſent.

“ In 1456, the whole iſland was ravaged by Donald earl of Roſs and lord of the iſles. At that period, it was ſtill the property of James II. but in the reign of his ſucceſſor James III. when that monarch matched his ſiſter to Thomas lord Boyd, he created him earl of Arran, and gave him the iſland as a portion: ſoon after, on the diſgrace of that family, he cauſed the counteſs to be divorced from her unfortunate huſband; and beſtowed both the lady and iſland on Sir James Hamilton, in whoſe family it continues to this time, a very few farms excepted.

3 Extent, &c.

“ Arran is of great extent, being 23 miles from Sgreadan point north to Beinnean ſouth; and the number of inhabitants are about 7000, who chiefly inhabit the coaſts; the far greater part of the country being uninhabited by reaſon of the vaſt and barren mountains. Here are only two pariſhes, Kilbride and Kill-more; with a ſort of chapel of eaſe to each, founded in the laſt century, in the golden age of this iſland, when it was bleſſed with Anne Dutcheſs of Hamilton, whoſe amiable diſpoſition and humane attention to the welfare of Arran render at this diſtant time her memory dear to every inhabitant.

4 Mountains.

“ The principal mountains of Arran are, Goatfield, or Gaoilbheinn, or the mountain of the winds, of a height equal to moſt of the Scottiſh Alps, compoſed of immenſe piles of moor-ſtone, in form of woolpacks, clothed only with lichens and moſſes, inhabited by eagles and ptarmigans; Bein-bharrain, or the ſharp-pointed; Ceum-na-caillich, the ſtep of the carline or old hag; and Grianan-Athol, that yields to none in ruggedneſs.

5 Lakes, &c.

“ The lakes are Loch-jorſa, where ſalmon come to ſpawn; Lochtana; Loch-nah-jura, on the top of a high hill; Loch-mhachrai, and Loch-knoc a charbeil, full of large eels. The chief rivers are Abhan-mhor, Moina-mhor, Slondrai-machrei, and Jorſa; the two laſt remarkable for the abundance of ſalmon.

6 Animals.

“ The quadrupeds are very few; only otters, wild cats, ſhrew-mice, rabbits, and bats: the ſtags, which uſed to abound, are now reduced to about a dozen. The birds are eagles, hooded crows, wild pigeons, ſtares, black game, grous, ptarmigans, daws, green plovers, and curlews. Mr Stuart, in aſcending Goatfield, found the ſecondary feather of an eagle, white, with a brown ſpot at the baſe, which ſeemed to belong to ſome unknown ſpecies. It may be remarked, that the partridge at preſent inhabits this iſland, a proof of the advancement of agriculture.

7 Climate.

“ The climate is very ſevere; for beſides the violence of wind, the cold is very rigorous; and ſnow lay here in the valleys for 13 weeks of the laſt winter. In ſummer, the air is remarkably ſalubrious; and many invalids reſort here on that account, and to drink the whey of goats milk.

8 Diſeaſes and remedies.

“ The principal diſeaſe here is the pleuriſy: ſmall-pox, meaſles, and chin-cough, viſit the iſland once in ſeven or eight years. The practice of bleeding twice every year ſeems to have been intended as a preventative againſt the pleuriſy: but it is now performed with the utmoſt regularity at ſpring and fall. The duke of Hamilton keeps a ſurgeon in pay; who, at thoſe ſeaſons, makes a tour of the iſland. On notice of his approach, the inhabitants of each farm aſſemble in the open air; extend their arms; and are bled into a hole made in the ground, the common receptacle of the vital fluid.

“ In burning fevers, a tea of *wood-ſorrel* is uſed with ſucceſs, to allay the heat.

9 Inhabitants.

“ An infuſion of *ramſons*, or *allium urſinum*, in brandy is eſteemed here a good remedy for the gravel.

“ The men are ſtrong, tall, and well made; all ſpeak the Erſe language, but the ancient habit is entirely laid aſide. Their diet is chiefly potatoes and meal; and during winter, ſome dried mutton or goat is added to their hard fare. A deep dejection appears in general thro' the countenances of all: no time can be ſpared for amuſement of any kind; the whole being given for procuring the means of paying their rent, of laying in their fuel, or getting a ſcanty pittance of meat and clothing.

“ The leaſes of farms are 19 years. The ſucceeding tenants generally find the ground a little better than a *caput mortuum*: and for this reaſon; Should they at the expiration of the leaſe leave the lands in a good ſtate, ſome avaritious neighbours would have the preference in the next ſetting, by offering a price more than the perſon who had expended part of his ſubſtance in enriching the farm could poſſibly do. This induces them to leave it in the original ſtate.

10 Method of ſetting farms.

“ The method of ſetting a farm is very ſingular: each is commonly poſſeſſed by a number of ſmall tenants; thus a farm of 40*l*. a-year is occupied by 18 different people, who by their leaſes are bound, conjunctly and ſeverally, for the payment of the rent to the proprie-

Arran.

tor. Theſe live in the farm in houſes cluſtered together, ſo that each farm appears like a little village. The tenants annually divide the arable land by lot; each has his ridge of land, to which he puts his mark, ſuch as he would do to any writing: and this ſpecies of farm is called *run-rig*, i. e. ridge. They join in ploughing; every one keeps a horſe or more; and the number of thoſe animals conſume ſo much corn as often to occaſion a ſcarcity; the corn and peas raiſed being (much of it) deſigned for their ſubſiſtence, and that of the cattle, during the long winter. The paſture and moor-land annexed to the farm is common to all the poſſeſſors.

“ All the farms are open. Incloſures of any form, except in two or three places, are quite unknown: ſo that there muſt be a great loſs of time in preſerving their corn, &c. from treſpaſs. The uſual manure is ſea-plants, coral, and ſhells.

“ The run-rig farms are now diſcouraged: but ſince the tenements are ſet by roup, or auction, and advanced by an unnatural force to above double the old rent, without any allowance for incloſing, any example ſet in agriculture, any ſecurity of tenure by lengthening the leaſes, affairs will turn retrograde, and the farms relapſe into their old ſtate of rudeneſs; migration will encreaſe (for it has begun), and the rents be reduced even below their former value: the late rents were ſcarce 1200 l. a-year; the expected rents 3000.

11
Produce, &c.

“ The produce of the iſland is oats; of which about 5000 bolls, each equal to nine Wincheſter buſhels, are ſown: 500 of beans, a few peas, and above 1000 bolls of potatoes, are annually ſet: notwithſtanding this, 500 bolls of oat-meal are annually imported, to ſubſiſt the natives.

“ The live ſtock of the iſland is 3183 milch-cows; 2000 cattle, from one to three years old; 1058 horſes; 1500 ſheep; and 500 goats: many of the two laſt are killed at Michaelmas, and dried for winter-proviſion, or ſold at Greenock. The cattle are ſold from 40 to 50 s. per head, which brings into the iſland about 1200 l. per annum: I think that the ſale of horſes alſo brings in about 300 l. Hogs were introduced here only two years ago. The herring-fiſhery round the iſland brings in 300 l. the ſale of herring-nets 100 l. and that of thread about 300 l. for a good deal of flax is ſown here. Theſe are the exports of the iſland; but the money that goes out for mere neceſſaries is a melancholy drawback.

“ The women manufacture the wool for the cloathing of their families; they ſet the potatoes, and dreſs and ſpin the flax. They make butter for exportation, and cheeſe for their own uſe.

“ The inhabitants in general are ſober, religious, and induſtrious; great part of the ſummer is employed in getting peat for fuel, the only kind in uſe here; or in building or repairing their houſes, for the badneſs of the materials requires annual repairs: before and after harveſt, they are buſied in the herring-fiſhery; and during winter, the men make their herring-nets; while the women are employed in ſpinning their linen and woollen yarn. The light they often uſe is that of lamps. From the beginning of February to the end of May, if the weather permits, they are engaged in labouring their ground: in autumn they burn a great quantity of fern, to make kelp. So that, excepting at new-years-day, at marriages, or at the two or three fairs in that iſland, they have no leiſure for any amuſements: no wonder then at their depreſſion of ſpirits.

“ This forms part of the county of Bute, and is ſubject to the ſame ſort of government: but, beſides, juſtice is adminiſtered at the baron's baily-court, who has power to fine as high as 20 s.; can decide in matters of property, not exceeding 40 s.; can impriſon for a month; and put delinquents into the ſtocks for three hours, but that only during day-time.

12
Antiquities and curioſities.

“ Take a ride into the country: deſcend into the valley, at the head of the bay; fertile in barley, oats, and peas. See two great ſtones, in form of columns, ſet erect, but quite rude: theſe are common to many nations; are frequent in North-Wales, where they are called *main hirion*, i. e. tall ſtones, *meini gwir*, or men-pillars, and *lleche*; are frequent in Cornwal, and are alſo found in other parts of our iſland: their uſe is of great antiquity; are mentioned in the Moſaic writings as memorials of the dead, as monuments of friendſhip, as marks to diſtinguiſh places of worſhip, or of ſolemn aſſemblies: the northern nations erected them to perpetuate the memory of great actions, ſuch as remarkable duels, of which there are proofs both in Denmark and in Scotland; and the number of ſtones was proportionable to the number of great men who fell in the fight: but they were beſides erected merely as ſepulchral for perſons of rank, who had deſerved well of their country.

Joſh. xxiv. 26.

“ Not far from hence is a ſtone the moſt ſingular that I ever remember to have ſeen, and the only one of the kind that ever fell within my obſervation: this lies on the ground, is 12 feet long, two broad, one thick; has, at one end, the rude attempt to carve a head and ſhoulders, and was certainly the firſt deviation from the former ſpecies of monument, the firſt eſſay to give to ſtone a reſemblance to the human body. All that the natives ſay of this is, that it was placed over a giant, and is called *Mac Bhrolchin*'s ſtone.

“ Aſcend a ſteep hill, with vaſt gullies on the ſide; and, on deſcending, arrive in a plain inhabited by curlews, reſorting there to breed, and which flew round our heads like lapwings. At a place called *Moni-quil* is a ſmall circle of ſmall ſtones, placed cloſe to each other: whether a little druidical place of worſhip, or of aſſembly; or whether a family place of ſepulture, as is uſual with the northern nations, is not eaſy to determine. If an urn is found in the centre of this coronet, as is not uncommon, the doubt will ceaſe.

“ Paſs by the river Machrai, flowing thro' a rocky channel, which in one part has worn thro' a rock, and left ſo contracted a gap at the top as to form a very eaſy ſtep a-croſs. Yet not long ago a poor woman in the attempt, after getting one foot over, was ſtruck with ſuch horror at the tremendous torrent beneath, that ſhe remained for ſome hours in that attitude, not daring to bring her other foot over, till ſome kind paſſenger luckily came by, and aſſiſted her out of her diſtreſs.

“ Arrive at Tormore, an extenſive plain of good ground, but quite in a ſtate of nature: ſeems formerly to have been cultivated; for there appear ſeveral veſtiges of dikes, which might have ſerved as boundaries. There is a tradition, that in old times the ſhores were covered with woods, and this was the habitable part.

“ The want of trees in the internal part at preſent, and the kindly manner in which they grow about Brodwic, favour this opinion.

“ On this plain are the remains of four circles, in a line, extending N. E. by S. W.; very few ſtones are ſtanding to perfect the incloſure, but thoſe are of a great ſize, and ſtand remote from each other. One is 15 feet high, and 11 in circumference. On the outſide of theſe circles are two others: one differs from all I have ſeen, conſiſting of a double circle of ſtones and a mound within the leſſer. Near theſe are the reliques of a ſtone cheſt, formed of five flat ſtones, the length of two yards in the inſide: the lid or top is loſt. In the middle of theſe repoſitories were placed the urn filled with the aſhes of the dead, to prevent its being broken, or to keep the earth from mixing with the burnt remains. In all probability there had been a cairn or heap of ſtones above.

“ By the number of the circles, and by their ſequeſtred ſituation, this ſeems to have been ſacred ground. Theſe circles were formed for religious purpoſes: Boethius relates, that Mainus, ſon of Fergus I. a reſtorer and cultivator of religion, after the Egyptian manner (as he calls it) inſtituted ſeveral new and ſolemn ceremonies, and cauſed great ſtones to be placed in form of a circle; the largeſt was ſituated towards the ſouth, and ſerved as an altar for the ſacrifices to the immortal gods. Boethius is right in part of his account: but the object of the worſhip was the ſun; and what confirms this, is the ſituation of the altar pointed towards that luminary in his meridian glory. In this place the altar and many of the ſtones are loſt; probably carried to build houſes and dikes not very remote from the place.

“ At a ſmall diſtance farther is a cairn of a moſt ſtupendous ſize, formed of great pebbles; which are preſerved from being ſcattered about by a circle of large ſtones that ſurround the whole baſe, a circumſtance ſometimes uſual in theſe monumental heaps.

“ Deſcend thro' a narrow cleft of a rock to a part of the weſtern ſhore called *Druim-an-dùin*, or the ridge of the fort, from a round tower that ſtands above. The beach is bounded by cliffs of whitiſh grit ſtone, hollowed beneath into vaſt caves. The moſt remarkable are thoſe of Fin-mac cuil, or Fingal, the ſon of Cumhal the father of Oſſian, who, tradition ſays, reſided in this iſland for the ſake of hunting. One of theſe caverns is 112 feet long, and 30 high, narrowing to the top like a Gothic arch; towards the end it branches into two: within theſe two receſſes, which penetrate far, are on each ſide ſeveral ſmall holes, oppoſite to each other: in theſe were placed tranſverſe beams, that held the pots in which the heroes ſeethed their veniſon; or probably, according to the mode of the times, the bags formed of the ſkins of animals ſlain in the chace, which were filled with fleſh, and ſerved as kettles ſufficiently ſtrong to warm the contents; for the heroes of old devoured their meat half raw, holding, that the juices contained the beſt nouriſhment.

“ On the front of the diviſion, between theſe receſſes and on one ſide, are various very rude figures, cut on the ſtone, of men, of animals, and of a *clymore* or two-handed ſword: but whether theſe were the amuſements of the Fingallian age, or of after-times, is not eaſy to be aſcertained; for caves were the retreats of pirates as well as heroes. Here are ſeveral other hollows adjacent, which are ſhewn as the ſtable, cellars, and dog-kennel, of the great Mac-cuil: one cave, which is not honoured with a name, is remarkably fine, of great extent, covered with a beautiful flat roof, and very well lighted by two auguſt arches at each end: through one is a fine perſpective of the promontory Carn-baan, or the white heap of ſtones; whoſe ſide exhibits a long range of columnar rocks (not baſaltic) of hard grey whin-ſtone, reſting on a horizontal ſtratum of red-ſtone: at the extremity, one of the columns is inſulated, and forms a fine obeliſk.

“ After riding ſome time along the ſhore, aſcend the promontory. On the ſummit is an ancient retreat, ſecured on the land ſide by a great dike of looſe ſtones, that incloſes the acceſſible part: within is a ſingle ſtone, ſet erect; perhaps to mark the ſpot where the chieftain held his council, or from whence he delivered his orders.

“ From this ſhore is a fine view of Kintyre, the weſtern ſide of Arran being ſeparated from it by a ſtrait about eight miles wide.

“ Leave the hills, and ſee, at *Feorling*, another ſtupendous cairn 114 feet over, and of a vaſt height; and from two of the oppoſite ſides are two vaſt ridges; the whole formed of rounded ſtones, or pebbles, brought from the ſhores. Theſe immenſe accumulations of ſtones are the ſepulchral protection of the heroes among the ancient natives of our iſlands: the ſtone cheſts, the repoſitory of the urns and aſhes, are lodged in the earth beneath; ſometimes one, ſometimes more, are found thus depoſited; and I have one inſtance of as many as 17 of theſe ſtone cheſts being diſcovered under the ſame cairn. The learned have aſſigned other cauſes for theſe heaps of ſtones: have ſuppoſed them to have been, in times of inauguration, the places where the chieftain-elect ſtood to ſhew himſelf to beſt advantage to the people; or the place from whence judgment was pronounced; or to have been erected on the road-ſide in honour of Mercury; or to have been formed in memory of ſome ſolemn compact. Theſe might have been the reaſons, in ſome inſtances, where the evidences of ſtone-cheſts and urns are wanting; but thoſe generally are found to overthrow all other ſyſtems.

“ Theſe piles may juſtly be ſuppoſed to have been proportioned in ſize to the rank of the perſon, or to his popularity: the people of a whole diſtrict aſſembled to ſhew their reſpect to the deceaſed; and, by an active honouring of his memory, ſoon accumulated heaps equal to thoſe that aſtoniſh us at this time. But theſe honours were not merely thoſe of the day; as long as the memory of the deceaſed endured, not a paſſenger went by without adding a ſtone to the heap: they ſuppoſed it would be an honour to the dead, and acceptable to his manes.

> Quanquam feſtinas, non eſt mora longa: licebit,
> Injecto ter pulvere, curras.

To this moment there is a proverbial expreſſion among the highlanders alluſive to the old practice: a ſuppliant will tell his patron, *Curri mi cloch er do charne*, “ I will add a ſtone to your cairn;” meaning, When you are no more, I will do all poſſible honour to your memory.

“ There was another ſpecies of honour paid to the chieftains, that I believe is ſtill retained in this iſland, but the reaſon is quite loſt; that of ſwearing by his name, and paying as great a reſpect to that as to the moſt ſacred oath: a familiar one in Arran is, "by *Nail;*" it is at preſent unintelligible, yet is ſuſpected to have been the name of ſome ancient hero.

"The cairns are to be found in all parts of our iſlands, in Cornwal, Wales, and all parts of North Britain; they were in uſe among the northern nations; Dahlberg, in his 323^{d} plate, has given the figure of one. In Wales they are called *carneddau;* but the proverb taken from them, with us, is not of the complimental kind: *Karn ar dy ben*, or, A cairn on your head, is a token of imprecation."

ARRAS, the capital city of Artois, a province in the French Netherlands. It is ſeated on a mountain; and the parts about it are full of quarries, where they get ſtone for building. It is divided into two parts, the town and the city. The abbe of St Vaaſt is lord of the town, and the biſhop of Arras of the city, which is the leaſt part. They are divided by a ſtrong wall, a large foſſe, and the little river Chrinchron, which 100 paces below falls into the Scarp. They are both well fortified, incloſed by high ramparts, and by double deep foſſes, which in ſeveral places are cut out of the rock. It has four gates; and, ſince the French are become maſters of it, has a ſtrong citadel with five baſtions. The moſt remarkable places are, the great ſquare where the principal market is kept; this is full of fine buildings, with piazzas all round it like thoſe of Covent-garden. Not far from this is the leſſer market, which contains the town houſe, a very noble ſtructure, with a high tower covered with a crown, on the top of which is a brazen lion which ſerves for a vane. In the midſt of this market is the chapel of the Holy Candle, which the papiſts pretend was brought by the Virgin Mary herſelf above 600 years ago, when the city was afflicted with divers diſeaſes, and every one that touched the candle was cured; it is kept in a ſilver ſhrine. This chapel has a ſpire-ſteeple, adorned with ſeveral ſtatues. The cathedral church of Notre-Dame ſtands in the city: it is a very large Gothic building, extremely well adorned; the tower is very high, and has a fine clock embelliſhed with little figures in bronze, which repreſent the paſſion of Jeſus Chriſt; they paſs before the bell to ſtrike the hours and half hours. In this church there is a ſilver ſhrine, enriched with pearls and diamonds, which contains a ſort of wool, which they call *manna;* that they ſay fell from heaven in the time of a great drought, almoſt 1400 years ago: they carry it very ſolemnly in proceſſion when they want rain. The abbey-church of St Vedaſt is the greateſt ornament of Arras, it being adorned with a fine ſteeple, and ſeats for the monks of admirable workmanſhip; the pulpit is of braſs, faſhioned like a tree, ſupported by two bears of the ſame metal, ſitting on their hind legs; there are little bears in different poſtures coming to climb up the tree. The chimes are remarkable for the different tunes which they play. There are 11 pariſh churches, and a great many convents of men and women. It is from this city that the tapeſtry called *arras hangings* takes its denomination.—E. Long. 2. 56. N. Lat. 50. 17.

ARRAS, or *Araxes*, is alſo the name of a river of Georgia, which diſcharges itſelf into the Caſpian ſea.

ARRAY, in law, the ranking or ſetting forth of a jury, or inqueſt of men impanelled on a cauſe.

Battle-ARRAY, the order or diſpoſition of an army, drawn up with a view to engage the enemy *.

ARREARS, the remainder of a ſum due, or money remaining in the hands of an accountant. It likewiſe ſignifies the money due for rent, wages, &c. or what remains unpaid of penſions, taxes, &c.

ARRENTATION, in the foreſt laws, implies the licenſing the owner of lands in a foreſt to incloſe them with a low hedge and a ſmall ditch, in conſideration of a yearly rent.

ARREST, in Engliſh law, (from the French word *arreſter*, to *ſtop* or *ſtay*), is the reſtraint of a man's perſon, obliging him to be obedient to the law; and is defined to be the execution of the command of ſome court of record or office of juſtice. An arreſt is the beginning of impriſonment; where a man is firſt taken, and reſtrained of his liberty, by power or colour of a lawful warrant.

Arreſts are either in *civil* or *criminal* caſes.

1. An arreſt in a *civil cauſe* is defined to be the apprehending or reſtraining one's perſon by proceſs in execution of the command of ſome court.

An arreſt muſt be by corporal ſeiſing or touching the defendant's body; after which the bailiff may juſtify breaking open the houſe in which he is, to take him: otherwiſe he has no ſuch power; but muſt watch his opportunity to arreſt him. For every man's houſe is looked upon by the law to be his caſtle of defence and aſylum, wherein he ſhould ſuffer no violence. Which principle is carried ſo far in the civil law, that, for the moſt part, not ſo much as a common citation or ſummons, much leſs an arreſt, can be executed upon a man within his own walls. Peers of the realm, members of parliament, and corporations, are privileged from arreſts; and of courſe from outlawries. And againſt them the proceſs to inforce an appearance muſt be by ſummons and diſtreſs *infinite*, inſtead of a *capias*. Alſo clerks, attorneys, and all other perſons attending the courts of juſtice (for attorneys, being officers of the court, are always ſuppoſed to be there attending), are not liable to be arreſted by the ordinary proceſs of the court, but muſt be ſued by bill (called uſually a *bill of privilege)* as being perſonally preſent in court. Clergymen performing divine ſervice, and not merely ſtaying in the church with a fraudulent deſign, are for the time privileged from arreſts, by ſtatute 50 Edw. III. c. 5. and 1 Rich. II. c. 16.; as likewiſe members of convocation actually attending thereon, by ſtatute 8 Hen. VI. c. 1. Suitors, witneſſes, and other perſons, neceſſarily attending any courts of record upon buſineſs, are not to be arreſted during their actual attendance, which includes the neceſſary coming and returning. Seamen in the king's ſervice are privileged from arreſts for debts under 20*l.* (1 Geo. II. c. 14. and 14 Geo. II c. 38.); and ſoldiers or marines are not liable to arreſts for a debt of leſs than 10*l.* (30 Geo. II. c. 6, 11.) And no arreſt can be made in the king's preſence, nor within the verge of his royal palace, nor in any place where the king's juſtices are actually ſitting. The king hath moreover a ſpecial prerogative (which indeed is very ſeldom exerted), that he may by his *writ of protection* privilege a defendant from all perſonal, and many real, ſuits, for one year at a time, and no longer; in reſpect of his being engaged in his ſervice out of the realm.

* See *Army*.

* See *Warrant*.

* See *Hue and Cry*.

And the king alſo by the common law might take his creditor into his protection, ſo that no one might ſue or arreſt him till the king's debt were paid: but by the ſtatute 25 Edw. III. ſt. 5. c. 19. notwithſtanding ſuch protection, another creditor may proceed to judgment againſt him, with a ſtay of execution, till the king's debt be paid; unleſs ſuch creditor will undertake for the king's debt, and then he ſhall have execution for both. And, laſtly, by ſtatute 29 Car. II. c. 7. no arreſt can be made, nor proceſs ſerved, upon a Sunday, except for treaſon, felony, or breach of the peace.

2. An arreſt in a *criminal cauſe* is the apprehending or reſtraining one's perſon, in order to be forthcoming to anſwer an alleged crime. To this arreſt all perſons whatſoever are, without diſtinction, equally liable; and doors may be broken open to arreſt the offender: but no man is to be arreſted, unleſs charged with ſuch a crime as will at leaſt juſtify holding him to bail when taken. There is this difference alſo between arreſts in civil and criminal caſes, that none ſhall be arreſted for debt, treſpaſs, or other cauſe of action, but by virtue of a precept or commandment out of ſome court; but for treaſon, felony, or breach of the peace, any man may arreſt with or without warrant or precept *. But the king cannot command any one by word of mouth to be arreſted; for he muſt do it by writ, or order of his courts, according to law: nor may the king arreſt any man for ſuſpicion of treaſon, or felony, as his ſubjects may; becauſe, if he doth wrong, the party cannot have an action againſt him.

* See *Warrant.*

Arreſts by private perſons are in ſome caſes commanded. Perſons preſent at the committing of a felony muſt uſe their endeavours to apprehend the offender, under penalty of fine and impriſonment; and they are alſo, with the utmoſt diligence, to purſue and endeavour to take all thoſe who ſhall be guilty thereof, out of their view, upon a hue and cry levied againſt them *. By the vagrant act 17 Geo. II. c. 5. every perſon may apprehend beggars and vagrants; and every private perſon is bound to aſſiſt an officer requiring him to apprehend a felon.

* See *Hue and Cry.*

In ſome caſes likewiſe arreſts by private perſons are rewarded by law. By the 4 and 5 William and Mary, c. 8. perſons apprehending highwaymen, and proſecuting them to a conviction, are intitled to a reward of 40 *l.* and if they are killed in the attempt, their executors, &c. are intitled to the like reward. By the 6 and 7 William III. c. 17. perſons apprehending counterfeiters and clippers of the coin, and proſecuting them to conviction, are intitled to 40 *l.*

By 5 Ann, c. 31. perſons who ſhall take any one guilty of burglary, or the felonious breaking and entering any houſe in the day-time, and proſecute them to conviction, ſhall receive the ſum of 40 *l.* within one month after ſuch conviction.

With regard to arreſts by public officers, as watchmen, conſtables, &c. they are either made by their own authority, which differs but very little from the power of a private perſon; or they are made by a warrant from a juſtice of peace. See WARRANT.

ARREST *of Judgment*, in law, the aſſigning juſt reaſon why judgment ſhould not paſs: as, Want of notice of the trial; a material defect in the pleading; when the record differs from the deed impleaded; when perſons are miſ-named; where more is given by the verdict than is laid in the declaration, &c. This may be done either in criminal or civil caſes.

ARRESTMENT, in Scots law, ſignifies the ſecuring of a criminal till trial, or till he find caution to ſtand trial, in what are called *bailable crimes*. In civil caſes, it ſignifies either the detaining of ſtrangers or natives *in meditatione fugæ*, till they find caution *judicio ſiſti*, or the attaching the effects of a ſtranger in order to found juriſdiction. But, in the moſt general acceptation of the word, it denotes that diligence by which a creditor detains the goods or effects of his debtor in the hands of third parties till the debt due to him be either paid or ſecured. See Law, Part III. N° clxxviii.

ARRESTO FACTO SUPER BONIS, &c. a writ brought by a denizen againſt the goods of aliens found within this kingdom, as a recompence for goods taken from him in a foreign country.

ARRESTS, in farriery, mangy tumours upon a horſe's hinder-legs, between the ham and the paſtern.

ARRETIUM, (Cicero, Cæſar); *Arrhetium*, (Ptolemy); *Urbs Arrhetinorum*, (Polybius); one of the twelve ancient towns of Tuſcany, near the Arnus and Clanis, ſituated in a pleaſant valley. Now *Arezzo*, 42 miles eaſt of Florence. E. Long. 13. 18. Lat. 43. 15.

ARRHABONARII, a ſect of Chriſtians, who held that the euchariſt is neither the real fleſh or blood of Chriſt, nor yet the ſign of them; but only the pledge or earneſt thereof.

ARRHEPHORIA, a feaſt among the Athenians, inſtituted in honour of Minerva, and Herſe daughter of Cecrops.

ARRIAN, a famous philoſopher and hiſtorian under the emperor Hadrian and the two Antonines, was born at Nicomedia in Bithynia. His great learning and eloquence procured him the title of *The ſecond Xenophon;* and raiſed him to the moſt conſiderable dignities at Rome, even the conſulſhip itſelf. We have 4 books of his *Diſſertations upon Epictetus*, whoſe ſcholar he had been; and his *Hiſtory of Alexander the Great*, in 7 books, is greatly admired by the beſt judges.

ARRIERE, the hinder or poſterior part of any thing.

ARRIERE *Ban*, in the French cuſtoms, is a general proclamation, whereby the king ſummons to the war all that hold of him, both his vaſſals, *i. e.* the nobleſſe, and the vaſſals of his vaſſals.

ARRIERE *Fee* or *Fief*, is a fee dependant on a ſuperior one. Theſe fees commenced, when the dukes and counts, rendering their governments hereditary in their families, diſtributed to their officers parts of the royal domains which they found in their reſpective provinces, and even permitted thoſe officers to gratify the ſoldiers under them in the ſame manner.

ARROBAS, or AROBAS, a weight uſed in Spain, Portugal, and the foreign dominions of both. The Arrobas of Portugal is alſo called *Arata*, and contains 32 Liſbon pounds; that of Spain contains 25 Spaniſh pounds. In Peru it is called *Arroue*.

ARROE, a ſmall iſland of Denmark, in the Baltic Sea, a little ſouth of the iſland of Funen. It is eight miles in length, and about two in breadth; and produces corn, anniſeed, black cattle, and horſes. It has three pariſhes, the moſt conſiderable of which is Koping. It ſtands at the ſouth ſide of the iſland, in the bottom of a bay, and has a port with ſome trade. E. Long. 9. 40. N. Lat. 55. 20.

ARROJO, de St Servan, a town of Spain, in Eſtramadura. W. Long. 5. 20. N. Lat. 38. 40.

ARRONDEE, in heraldry, a croſs, the arms of which are compoſed of ſections of a circle, not oppoſite to each other, ſo as to make the arms bulge out thicker in one part than another; but the ſections of each arm lying the ſame way, ſo that the arm is every where of an equal thickneſs, and all of them terminating at the edge of the eſcutcheon like the plain croſs.

ARROW, a miſſive weapon of offence, ſlender, pointed, and barbed, to be caſt or ſhot with a bow *. Arrows are alſo called *ſhafts*.

* See *Bow*.

Arrow-*Makers* are called *fletchers*; and were formerly, as well as bowyers, perſons of great conſequence in the commonwealth.

ARSCHIN, in commerce, a long meaſure uſed in China to meaſure ſtuffs. Four arſcins made three yards of London.

ARSHOT, a town of the Auſtrian Netherlands, ſituated about fourteen miles eaſt of the city of Mechlin, in E. Long. 4. 45. N. L. 51. 5.

ARSENAL, a royal or public magazine, or place appointed for the making and keeping of arms neceſſary either for defence or aſſault.

ARSENIC, a poiſonous mineral preparation, which is either white, red, or yellow, prepared from the flowers of cobalt *.

* See *Chemiſtry*, nº 60, 160, 260, 408, 460.

ARSENIUS, a deacon of the Roman church, of great learning and piety. He was pitched upon by the Pope to go to the emperor Theodoſius, as tutor to his ſon Arcadius. Arſenius arrived at Conſtantinople in the year 383. The emperor happening one day to go into the room where Arſenius was inſtructing Arcadius, his ſon was ſeated and the preceptor ſtanding; at this he was exceedingly diſpleaſed, took from his ſon the imperial ornaments, made Arſenius ſit in his place, and ordered Arcadius for the future to receive his leſſons ſtanding uncovered. Arcadius, however, profited but little by his tutor's inſtructons, for ſome time after he formed a deſign of diſpatching him. The officer, to whom Arcadius had applied for this purpoſe, divulged the affair to Arſenius, who retired to the deſarts of Scete, where he paſſed many years in the exercîſes of the moſt ſtrict and fervent devotion. He died there, at 95 years of age.

ARSIS *and* Thesis, in muſic, is a term applied to compoſitions in which one part riſes and the other falls.

ARSMART, in botany. See Persicaria.

ARSON, in Engliſh law, is the malicious and wilful burning of the houſe or out-houſe of another man; which is felony at common law.

This is an offence of very great malignity, and much more pernicious to the public than ſimple theft: becauſe, firſt, it is an offence againſt that right of habitation which is acquired by the law of nature as well as by the laws of ſociety; next, becauſe of the terror and confuſion that neceſſarily attends it; and, laſtly, becauſe in ſimple theft the thing ſtolen only changes its maſter, but ſtill remains *in eſſe* for the benefit of the public, whereas by burning the very ſubſtance is abſolutely deſtroyed. It is alſo frequently more deſtructive than murder itſelf, of which too it is often the cauſe: ſince murder, atrocious as it is, ſeldom extends beyond the felonous act deſigned; whereas fire too frequently involves in the common calamity perſons unknown to the incendiary, and not intended to be hurt by him, and friends as well as enemies.

ART is defined by Lord Bacon, A proper diſpoſal of the things of nature by human thought and experience, ſo as to anſwer the ſeveral purpoſes of mankind; in which ſenſe, *art* ſtands oppoſed to *nature*.

Art is principally uſed for a ſyſtem of rules ſerving to facilitate the performance of certain actions; in which ſenſe it ſtands oppoſed to *ſcience*, or a ſyſtem of ſpeculative principles.

Arts are commonly divided into *uſeful* or *mechanic*, *liberal* or *polite*. The former are thoſe wherein the *hand* and *body* are more concerned than the mind; of which kind are moſt of thoſe which furniſh us with the *neceſſaries* of life, and are properly known by the name of *trades*; as baking, brewing, carpentry, ſmithery, weaving, &c.—The latter are ſuch as depend more on the labour of the mind than that of the hand; they are the produce of the *imagination*, their eſſence conſiſts in *expreſſion*, and their end is *pleaſure*. Of this kind are poetry, painting, muſic, &c.

1 Origin and progreſs of uſeful arts. [*Kaims's Sketches*, Sk. V.]

Progreſs of the Arts. Some uſeful arts muſt be nearly coeval with the human race; for food, cloathing, and habitation, even in their original ſimplicity, require ſome art. Many other arts are of ſuch antiquity, as to place the inventors beyond the reach of tradition. Several have gradually crept into exiſtence, without an inventor. The buſy mind, however, accuſtomed to a beginning in things, cannot reſt till it finds or imagines a beginning to every art. The moſt probable conjectures of this nature the reader may ſee in the hiſtorical introductions to the different articles.

In all countries where the people are barbarous and illiterate, the progreſs of arts is extremely ſlow. It is vouched by an old French poem, that the virtues of the loadſtone were known in France before anno 1180. The mariner's compaſs was exhibited at Venice anno 1260, by Paulus Venetus, as his own invention. John Goya of Amalphi was the firſt who, many years afterward, uſed it in navigation; and alſo paſſed for being the inventor. Tho' it was uſed in China for navigation long before it was known in Europe, yet to this day it is not ſo perfect as in Europe. Inſtead of ſuſpending it in order to make it act freely, it is placed upon a bed of ſand, by which every motion of the ſhip diſturbs its operation. Hand-mills, termed *querns*, were early uſed for grinding corn; and when corn came to be raiſed in greater quantity, horſe-mills ſucceeded. Water-mills for grinding corn are deſcribed by Vitruvius. Wind-mills were known in Greece and in Arabia as early as the ſeventh century; and yet no mention is made of them in Italy till the fourteenth. That they were not known in England in the reign of Henry VIII. appears from a houſhold book of an earl of Northumberland, cotemporary with that king, ſtating an allowance for three mill-horſes, "two to draw in the "mill, and one to carry ſtuff to the mill and fro." Water-mills for corn muſt in England have been of a later date. The ancients had mirror-glaſſes, and employed glaſs to imitate cryſtal vaſes and goblets: yet they never thought of uſing it in windows. In the 13th century, the Venetians were the only people who had the art of making cryſtal glaſs for mirrors. A clock that ſtrikes the hours was unknown in Europe till the end of the 12th century. And hence the cuſtom of employing men to proclaim the hours during night; which to this day continues in Germany, Flanders, and England. Galileo was the firſt who conceived an idea that a pendulum might be uſeful for meaſuring time; and Huygens was the firſt who put the idea in execution, by making a pendulum clock. Hook, in the year 1660, invented a ſpiral ſpring for a watch, though a watch was far from being a new invention. Paper was made no earlier than the 14th century; and the invention of printing was a century later. Silk manufactures were long eſtabliſhed in Greece before ſilkworms were introduced there. The manufacturers were provided with raw ſilk from Perſia: but that commerce being frequently interrupted by war, two monks, in the reign of Juſtinian, brought eggs of the ſilkworm from Hindoſtan, and taught their countrymen the method of managing them.—The art of reading made a very ſlow progreſs. To encourage that art in England, the capital puniſhment for murder was remitted if the criminal could but read, which in law-language is termed *benefit of clergy*. One would imagine that the art muſt have made a very rapid progreſs when ſo greatly favoured: but there is a ſignal proof of the contrary; for ſo ſmall an edition of the Bible as 600 copies, tranſlated into Engliſh in the reign of Henry VIII. was not wholly ſold off in three years. The people of England muſt have been profoundly ignorant in Queen Elizabeth's time, when a forged clauſe added to the 20th article of the Engliſh creed paſſed unnoticed till about 40 years ago.

The diſcoveries of the Portugueſe in the weſt coaſt of Africa is a remarkable inſtance of the ſlow progreſs of arts. In the beginning of the 15th century, they were totally ignorant of that coaſt beyond Cape Non, 28 deg. north latitude. In 1410, the celebrated Prince Henry of Portugal fitted out a fleet for diſcoveries, which proceeded along the coaſt to Cape Bojadore in 26 deg. but had not courage to double it. In 1418, Triſtan Vaz diſcovered the iſland Porto Santo; and the year after, the iſland Madeira was diſcovered. In 1439, a Portugueſe captain doubled Cape Bojadore; and the next year the Portugueſe reached Cape Blanco, lat. 20. deg. In 1446, Nuna Triſtan doubled Cape Verd, lat. 14. 40. In 1448, Don Gonzallo Vallo took poſſeſſion of the Azores. In 1449, the iſlands of Cape Verd were diſcovered for Don Henry. In 1471, Pedro d'Eſcovar diſcovered the iſland St Thomas and Prince's iſland. In 1484, Diego Cam diſcovered the kingdom of Congo. In 1486, Bartholomew Diaz, employed by John II. of Portugal, doubled the Cape of Good Hope, which he called *Carbo Tormentoſo*, from the tempeſtuous weather he found in the paſſage.

2
Cauſes which advance the progreſs of art.

The exertion of national ſpirit upon any particular art, promotes activity to proſecute other arts. The Romans, by conſtant ſtudy, came to excel in the art of war, which led them naturally to improve upon other arts. Having, in the progreſs of ſociety, acquired ſome degree of taſte and poliſh, a talent for writing broke forth. Nevius compoſed in verſe ſeven books of the Punic war; beſides comedies, replete with bitter raillery againſt the nobility. Ennius wrote annals, and an epic poem. Lucius Andronicus was the father of dramatic poetry in Rome. Pacuvius wrote tragedies. Plautus and Terence wrote comedies. Lucilius compoſed ſatires, which Cicero eſteems to be ſlight and void of erudition. Fabius Pictor, Cincius Alimentus, Piſo Frugi, Valerius Antias, and Cato, were rather annaliſts than hiſtorians, confining themſelves to naked facts, ranged in order of time. The genius of the Romans for the fine arts was much inflamed by Greek learning, when free intercourſe between the two nations was opened. Many of thoſe who made the greateſt figure in the Roman ſtate commenced authors; Cæſar, Cicero, *&c.* Sylla compoſed memoirs of his own tranſactions, a work much eſteemed even in the days of Plutarch.

The progreſs of art ſeldom fails to be rapid, when a people happen to be rouſed out of a torpid ſtate by ſome fortunate change of circumſtances: proſperity contraſted with former abaſement, gives to the mind a ſpring, which is vigorouſly exerted in every new purſuit. The Athenians made but a mean figure under the tyranny of Piſiſtratus; but upon regaining freedom and independence, they were converted into heroes. Miletus, a Greek city of Ionia, being deſtroyed by the king of Perſia, and the inhabitants made ſlaves; the Athenians, deeply affected with the miſery of their brethren, boldly attacked the king in his own dominions, and burnt the city of Sardis. In leſs than 10 years after, they gained a ſignal victory at Marathon; and, under Themiſtocles, made head againſt that prodigious army with which Xerxes threatened utter ruin to Greece. Such proſperity produced its uſual effect: arts flouriſhed with arms, and Athens became the chief theatre for ſciences as well as for fine arts. The reign of Auguſtus Cæſar, which put an end to the rancour of civil war, and reſtored peace to Rome with the comforts of ſociety, proved an auſpicious æra for literature; and produced a cloud of Latin hiſtorians, poets, and philoſophers, to whom the moderns are indebted for their taſte and talents. One who makes a figure rouſes emulation in all: one catches fire from another, and the national ſpirit is every where triumphant: claſſical works are compoſed, and uſeful diſcoveries made in every art and ſcience. With regard to Rome, it is true, that the Roman government under Auguſtus was in effect deſpotic: but deſpotiſm, in that ſingle inſtance, made no obſtruction to literature, it having been the politic of that reign to hide power as much as poſſible. A ſimilar revolution happened in Tuſcany about three centuries ago. That country having been divided into a number of ſmall republics, the people, excited by mutual hatred between ſmall nations in cloſe neighbourhood, became ferocious and bloody, flaming with revenge for the ſlighteſt offence. Theſe republics being united under the Great Duke of Tuſcany, enjoyed the ſweets of peace in a mild government. That comfortable revolution, which made the deeper impreſſion by a retroſpect to recent calamities, rouſed the national ſpirit, and produced ardent application to arts and literature. The reſtoration of the royal family in England, which put an end to a cruel and envenomed civil war, promoted improvements of every kind: arts and induſtry made a rapid progreſs among the people, though left to themſelves by a weak and fluctuating adminiſtration. Had the nation, upon that favourable turn of fortune, been bleſſed with a ſucceſſion of able and virtuous princes, to what a height might not arts and ſciences have been carried! In Scotland, a favourable period for improvement was the reign of the firſt Robert, after ſhaking off the Engliſh yoke: but the domineering ſpirit of the feudal ſyſtem rendered abortive every attempt. The reſtoration of the royal family, mentioned above, animated the legiſlature of Scotland to promote manufactures of various kinds: but in vain; for the union of the two crowns had introduced deſpotiſm into Scotland, which ſunk the genius of the people, and rendered them heartleſs and indolent. Liberty, indeed, and many other advantages, were procured to them by the union of the two kingdoms; but the ſalutary effects were long ſuſpended by mutual enmity, ſuch as commonly ſubſiſts between neighbouring nations. Enmity wore out gradually, and the eyes of the Scots were opened to the advantages of their preſent condition; the national ſpirit was rouſed to emulate and to excel; talents were exerted, hitherto latent; and Scotland at preſent makes a figure in arts and ſciences, above what it ever made while an independent kingdom.

Another cauſe of activity and animation, is the being engaged in ſome important action of doubtful event; a ſtruggle for liberty, the reſiſting a potent invader, or the like. Greece, divided into ſmall ſtates frequently at war with each other, advanced literature and the fine arts to unrivalled perfection. The Corſicans, while engaged in a perilous war for defence of their liberties, exerted a vigorous national ſpirit: they founded an univerſity for arts and ſciences, a public library, and a public bank. After a long ſtupor during the dark ages of Chriſtianity, arts and literature revived among the turbulent ſtates of Italy. The royal ſociety in London, and the academy of ſciences in Paris, were both of them inſtituted after civil wars that had animated the people and rouſed their activity.

As the progreſs of arts and ſciences toward perfection is greatly promoted by emulation, nothing is more fatal to an art or ſcience than to remove that ſpur, as where ſome extraordinary genius appears who ſoars above rivalſhip. Mathematics ſeem to be declining in Britain: the great Newton, having ſurpaſſed all the ancients, has not left to the moderns even the fainteſt hope of equalling him; and what man will enter the liſts who deſpairs of victory?

In a country thinly peopled, where even neceſſary arts want hands, it is common to ſee one perſon exerciſing more arts than one: in ſeveral parts of Scotland, one man ſerves as a phyſician, ſurgeon, and apothecary. In every populous country, even ſimple arts are ſplit into parts, and each part has an artiſt appropriated to it. In the large towns of ancient Egypt, a phyſician was confined to a ſingle diſeaſe. In mechanic arts that method is excellent. As a hand confined to a ſingle operation becomes both expert and expeditious, a mechanic art is perfected by having its different operations diſtributed among the greateſt number of hands: many hands are employed in making a watch; and a ſtill greater number in manufacturing a web of woollen cloth. Various arts or operations carried on by the ſame man, envigorate his mind, becauſe they exerciſe different faculties; and as he cannot be equally expert in every art or operation, he is frequently reduced to ſupply want of ſkill by thought and invention. Conſtant application, on the contrary, to a ſingle operation, confines the mind to a ſingle object, and excludes all thought and invention: in ſuch a train of life, the operator becomes dull and ſtupid, like a beaſt of burden. The difference is viſible in the manners of the people: in a country, where, from want of hands, ſeveral occupations muſt be carried on by the ſame perſon, the people are knowing and converſable: in a populous country, where manufactures flouriſh, they are ignorant and unſociable. The ſame effect is equally viſible in countries where an art or manufacture is confined to a certain claſs of men. It is viſible in Indoſtan, where the people are divided into caſts, which never mix even by marriage, and where every man follows his father's trade. The Dutch lint-boors are a ſimilar inſtance: the ſame families carry on the trade from generation to generation; and are accordingly ignorant and brutiſh even beyond other Dutch peaſants. The inhabitants of Buckhaven, a ſea-port in the county of Fife, were originally a colony of foreigners, invited hither to teach our people the art of fiſhing. They continue fiſhers to this day, marry among themſelves, have little intercourſe with their neighbours, and are dull and ſtupid to a proverb.

3
Progreſs of the *fine arts*.

Uſeful arts paved the way to fine arts. Men upon whom the former had beſtowed every convenience, turned their thoughts to the latter. Beauty was ſtudied in objects of ſight; and men of taſte attached themſelves to the fine arts, which multiplied their enjoyments and improved their benevolence. Sculpture and painting made an early figure in Greece; which afforded plenty of beautiful originals to be copied in theſe imitative arts. Statuary, a more ſimple imitation than painting, was ſooner brought to perfection: the ſtatue of Jupiter by Phidias, and of Juno by Polycletes, though the admiration of all the world, were executed long before the art of light and ſhade was known. Apollodorus, and Zeuxis his diſciple, who flouriſhed in the 15th Olympiad, were the firſt who figured in that art. Another cauſe concurred to advance ſtatuary before painting in Greece, viz. a great demand for ſtatues of their gods. Architecture, as a fine art, made a ſlower progreſs. Proportions, upon which its elegance chiefly depends, cannot be accurately aſcertained, but by an infinity of trials in great buildings: a model cannot be relied on; for a large and a ſmall building, even of the ſame form, require different proportions.

4
Literary compoſition

From the fine arts mentioned, we proceed to literature. It is agreed, among all antiquaries, that the firſt writings were in verſe, and that writing in proſe was of a much later date. The firſt Greek who wrote in proſe was Pherecides Syrus: the firſt Roman was Appius Cæcus, who compoſed a declamation againſt Pyrrhus. The four books of the Chatah Bhade, which is the ſacred book of Hindoſtan, are compoſed in verſe ſtanzas; and the Arabian compoſitions in proſe followed long after thoſe in verſe. To account for that ſingular fact, many learned pens have been employed; but without ſucceſs. By ſome it has been urged, that as memory is the only record of events where writing is unknown, hiſtory originally was compoſed in verſe, for the ſake of memory. This is not ſatisfactory. To undertake the painful taſk of compoſing in verſe, merely for the ſake of memory, would require more foreſight than ever was exerted by a Barbarian: not to mention that other means were uſed for preſerving the memory of remarkable events; a heap of ſtones, a pillar, or other object that catches the eye. The account given by Longinus is more ingenious. In a fragment of his treatiſe on verſe, the only part that remains, he obſerves, "that meaſure or verſe belongs to poetry, "becauſe poetry repreſents the various paſſions with "their language; for which reaſon the ancients, in "their ordinary diſcourſe, delivered their thoughts in "verſe rather than in proſe." Longinus thought, that anciently men were more expoſed to accidents and dangers, than when they were protected by good government and by fortified cities. But he ſeems not to have adverted, that fear and grief, inſpired by dangers and misfortunes, are better ſuited to humble proſe than to elevated verſe. It may be added, that however natural poetical diction may be when one is animated with any vivid paſſion, it is not ſuppoſeable that the ancients never wrote nor ſpoke but when excited by paſſion. Their hiſtory, their laws, their covenants, were certainly not compoſed in that tone of mind.

An important article in the progreſs of the fine arts, which writers have not ſufficiently attended to, will, perhaps, explain this myſtery. The article is the profeſſion of a bard, which ſprung up in early times, before writing was known *, and died away gradually as writing turned more and more common †.

The ſongs of the bards, being univerſal favourites, were certainly the firſt compoſitions that writing was employed upon: they would be carefully collected by the moſt ſkilful writers, in order to preſerve them in perpetual remembrance. The following part of the progreſs is obvious. People acquainted with no written compoſitions, but what were in verſe, compoſed in verſe their laws, their religious ceremonies, and every memorable tranſaction that was intended to be preſerved in memory by writing. But when ſubjects of writing multiplied, and became more and more involved; when people began to reaſon, to teach, and to harangue; they were obliged to deſcend to humble proſe; for to confine a writer or ſpeaker to verſe in handling ſubjects of that nature, would be a burden unſupportable.

5
History.

The proſe compoſitions of early hiſtorians are all of them dramatic. A writer deſtitute of art is naturally prompted to relate facts as he ſaw them performed: he introduces his perſonages as ſpeaking and conferring; and he himſelf relates what was acted, and not ſpoke. The hiſtorical books of the Old Teſtament are compoſed in that mode; and ſo addicted to the dramatic are the authors of thoſe books, that they frequently introduce God himſelf into the dialogue. At the ſame time, the ſimplicity of that mode is happily ſuited to the poverty of every language in its early periods. The dramatic mode has a delicious effect in expreſſing ſentiment, and every thing that is ſimple and tender. Read, as an inſtance of a low incident becoming, by that means, not a little intereſting, Ruth i. 8. to iv. 16.

The dramatic mode is far from pleaſing ſo much in relating bare hiſtorical facts. Read, as an example, the ſtory of Adonijah in 1 Kings i. 11.—49.

In that paſſage there are frequent repetitions; not however by the ſame perſon, but by different perſons who have occaſion in the courſe of the ſtory to ſay the ſame things; which is natural in the dramatic mode, where things are repreſented preciſely as they were tranſacted. In that view, Homer's repetitions are a beauty, not a blemiſh; for they are confined to the dramatic part, and never occur in the narrative.

But the dramatic mode of compoſition, however pleaſing, is tedious and intolerable in a long hiſtory. In the progreſs of ſociety new appetites and new paſſions ariſe; men come to be involved with each other in various connections; incidents and events multiply, and hiſtory becomes intricate by an endleſs variety of circumſtances. Dialogue accordingly is more ſparingly uſed, and in hiſtory plain narration is mixed with it. Narration is as it were the ground-work; and dialogue is raiſed upon it, like flowers in embroidery. Homer is admitted by all to be the great maſter in that mode of compoſition.

The narrative mode came in time ſo to prevail, that in a long chain of hiſtory, the writer commonly leaves off dialogue altogether. Early writers of that kind appear to have very little judgment in diſtinguiſhing capital facts from minute circumſtances, ſuch as can be ſupplied by the reader without being mentioned. The hiſtory of the Trojan war by Dares Phrygius is a curious inſtance of that cold and creeping manner of compoſition. The Roman hiſtories before the time of Cicero are chronicles merely. Cato, Fabius Pictor, and Piſo, confined themſelves to naked facts. In the Auguſtæ Hiſtoriæ Scriptores we find nothing but a jejune narrative of facts, commonly of very little moment, concerning a degenerate people, without a ſingle incident that can rouſe the imagination or exerciſe the judgment. The Monkiſh hiſtories are all of them compoſed in the ſame manner.

The dry narrative manner being very little intereſting or agreeable, a taſte for embelliſhment prompted ſome writers to be copious and verboſe. Saxo-Grammaticus, who in the 12th century compoſed in Latin a hiſtory of Denmark, ſurpriſingly pure at that early period, is extremely verboſe and full of toutologies. Such a ſtyle, at any rate unpleaſant, is intolerable in a modern tongue, before it is enriched with a ſtock of phraſes for expreſſing aptly the great variety of incidents that enter into hiſtory.

The perfection of hiſtorical compoſition, which writers at laſt attain to after wandering through various imperfect modes, is a relation of intereſting facts, connected with their motives and conſequences. An hiſtory of that kind is truly a chain of cauſes and effects.

The hiſtory of Thucydides, and ſtill more that of Tacitus, are ſhining inſtances of that mode.

6
Eloquence.

Eloquence was of a later date than the art of literary compoſition; for till the latter was improved, there were no models for ſtudying the former. Cicero's oration for Roſcius is compoſed in a ſtyle diffuſe and highly ornamented; which, ſays Plutarch, was univerſally approved, becauſe at that time the ſtyle in Aſia, introduced into Rome with its luxury, was in high vogue. But Cicero, in a journey to Greece, where he leiſurely ſtudied Greek authors, was taught to prune off ſuperfluities, and to purify his ſtyle, which he did to a high degree of refinement. He introduced into his native tongue a ſweetneſs, a grace, a ma-

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* See the article *Writing*.

† See *Bard*.

jeſty, that ſurpriſed the world, and even the Romans themſelves. Cicero obſerves with great regret, that if ambition for power had not drawn Julius Cæſar from the bar to command legions, he would have become the moſt complete orator in the world. So partial are men to the profeſſion in which they excel. Eloquence triumphs in a popular aſſembly, makes ſome figure in a court of law compoſed of many judges, very little where there is but a ſingle judge, and none at all in a deſpotic government. Eloquence flouriſhed in the republics of Athens and of Rome; and makes ſome figure at preſent in a Britiſh houſe of Commons.

7 Tragedy.

The Greek ſtage has been juſtly admired among all polite nations. The tragedies of Sophocles and Euripides in particular are by all critics held to be perfect in their kind, excellent models for imitation, but far above rivalſhip. If the Greek ſtage was ſo early brought to maturity, it is a phenomenon not a little ſingular in the progreſs of arts. The Greek tragedy made a rapid progreſs from Theſpis to Sophocles and Euripides, whoſe compoſitions are wonderful productions of genius, conſidering that the Greeks at that period were but beginning to emerge from roughneſs and barbarity into a taſte for literature. The compoſitions of Eſchylus, Sophocles, and Euripides, muſt have been highly reliſhed among a people who had no idea of any thing more perfect. We judge by compariſon, and every work is held to be perfect that has no rival. It ought at the ſame time to be kept in view, that it was not the dialogue which chiefly enchanted the Athenians, nor variety in the paſſions repreſented, nor perfection in the actors; but machinery and pompous decoration, joined with exquiſite muſic. That theſe particulars were carried to the greateſt height, we may with certainty conclude from the extravagant ſums beſtowed on them: the exhibiting a ſingle tragedy was more expenſive to the Athenians, than their fleet or their army in any ſingle campaign.

One would imagine, however, that theſe compoſitions were too ſimple to enchant for ever; as variety in action, ſentiment, and paſſion, is requiſite, without which the ſtage will not continue long a favourite entertainment: and yet we find not a ſingle improvement attempted after the days of Sophocles and Euripides. The manner of performance, indeed, prevented abſolutely any improvement. A fluctuation of paſſion and refined ſentiments would have made no figure on the Grecian ſtage. Imagine the diſcording ſcene between Brutus and Caſſius in Julius Cæſar to be there exhibited, or the handkerchief in the Moor of Venice: how ſlight would be their effect, when pronounced in a maſk, and through a pipe? The workings of nature upon the countenance, and the flections of voice expreſſive of various feelings, ſo deeply affecting in modern repreſentation, would have been entirely loſt. If a great genius had ariſen with talents for compoſing a pathetic tragedy in perfection, he would have made no figure in Greece. An edifice muſt have been erected of a moderate ſize: new actors muſt have been trained to act with a bare face, and to pronounce in their own voice. And after all there remained a greater miracle ſtill to be performed, *viz.* a total reformation of taſte in the people of Athens. In one word, the ſimplicity of the Greek tragedy was ſuited to the manner of acting; and that manner excluded all improvements.

8 Comedy.

With reſpect to comedy, it does not appear that the Greek comedy ſurpaſſed the tragedy in its progreſs toward perfection. Horace mentions three ſtages of Greek comedy. The firſt well ſuited to the rough and coarſe manners of the Greeks, when Eupolis, Cratinus, and Ariſtophanes, wrote. Theſe authors were not aſhamed to repreſent on the ſtage real perſons, not even diſguiſing their names: of which we have a ſtriking inſtance in a comedy of Ariſtophanes, called *The Clouds*, where Socrates is introduced, and moſt contemptuouſly treated. This ſort of comedy, ſparing neither gods nor men, was reſtrained by the magiſtrates of Athens, ſo far as to prohibit perſons to be named on the ſtage. This led writers to do what is done at preſent: the characters and manners of known perſons were painted ſo much to the life, that there could be no miſtake; and the ſatire was indeed heightened by this regulation, as it was an additional pleaſure to find out the names that were meant in the repreſentation. This was termed the *middle comedy*. But as there ſtill remained too great ſcope for obloquy and licentiouſneſs, a law was made prohibiting real events or incidents to be introduced upon the ſtage. This law happily baniſhed ſatire againſt individuals, and confined it to manners and cuſtoms in general. Obedient to this law are the comedies of Menander, Philemon, and Diphilus, who flouriſhed about 300 years before the Chriſtian æra. And this is termed the *third ſtage* of Greek comedy. The comedies of Ariſtophanes, which ſtill remain, err not leſs againſt taſte than againſt decency. But the Greek comedy is ſuppoſed to have been conſiderably refined by Menander and his cotemporaries. Their works, however, were far from perfection, if we can draw any conjecture from their imitator Plautus, who wrote about a century later. Plautus was a writer of genius; and it may be reaſonably ſuppoſed that his copies did not fall much ſhort of the originals, at leaſt in matters that can be faithfully copied; and he ſhews very little art, either in his compoſitions, or in the conduct of his pieces. With reſpect to the former, his plots are wondrous ſimple, very little varied, and very little intereſting. The ſubject of almoſt every piece is a young man in love with a muſic-girl, deſiring to purchaſe her from the procurer, and employing a favourite ſlave to cheat his father out of the price; and the different ways of accompliſhing the cheat is all the variety we find. In ſome few of his comedies the ſtory riſes to a higher tone, the muſic-girl being diſcovered to be the daughter of a free-man, which removes every obſtruction to a marriage between her and her lover. In the conduct of his pieces there is a miſerable defect of art. Inſtead of unfolding the ſubject in the progreſs of the action, as is done by Terence, and by every modern writer, Plautus introduces a perſon for no other end but to explain the ſtory to the audience. In one of his comedies, a houſehold-god is ſo obliging as not only to unfold the ſubject, but to relate before-hand every particular that is to be repreſented, not excepting the cataſtrophe.

The Roman theatre, from the time of Plautus to that of Terence, made a rapid progreſs. Ariſtotle defines comedy to be "an imitation of light and trivial ſubjects, provoking laughter." The comedies of Plautus correſpond accurately to that definition: thoſe of Terence riſe to a higher tone.

Nothing is more evident than the ſuperiority of Terence above Plautus in the art of writing; and, conſidering that Terence is a later writer, nothing would appear more natural, if they did not copy the ſame originals. It may be owing to genius that Terence excelled in purity of language, and propriety of dialogue; but how account for his ſuperiority over Plautus in the conſtruction and conduct of a play? It will not certainly be thought, that Plautus would imitate the worſt conſtructed plays, leaving the beſt to thoſe who ſhould come after him. This difficulty does not ſeem to have occurred to any of the commentators. Had the works of Menander and of his cotemporaries been preſerved, they probably would have explained the myſtery; which for want of that light will probably remain a myſtery for ever.

9 Epopee.

Homer has for more than 2000 years been held the prince of poets. Such perfection in an author who flouriſhed when arts were far ſhort of maturity, is truly wonderful. The nations engaged in the Trojan war are deſcribed by him as in a progreſs from the ſhepherd-ſtate to that of agriculture. Frequent mention is made in the Iliad of the moſt eminent men being ſhepherds. Andromache, in particular, mentions ſeven of her brethren who were ſlain by Achilles as they tended their father's flocks and herds. In that ſtate, garments of woollen cloth were uſed; but the ſkins of beaſts, the original clothing, were ſtill worn as an upper garment: every chief in the Iliad appears in that dreſs. Such indeed was the ſimplicity of this early period, that a black ewe was promiſed by each chief to the man who would undertake to be a ſpy. In times of ſuch ſimplicity, literature could not be far advanced; and it is a great doubt, whether there was at that time a ſingle poem of the epic kind for Homer to imitate or improve upon. Homer is undoubtedly a wonderful genius, perhaps the greateſt that ever exiſted: his fire, and the boldneſs of his conceptions, are inimitable. But in that early age, it would fall little ſhort of a real miracle, to find ſuch ripeneſs of judgment, and correctneſs of execution, as in modern writers are the fruits of long experience and progreſſive improvements during the courſe of many centuries. Accordingly, that Homer is far from being ſo ripe, or ſo correct, cannot eſcape the obſervation of any reader of taſte and diſcernment. One ſtriking particular is, his digreſſions without end, which draw our attention from the principal ſubject. Diomedes, for inſtance, meeting with Glaucus in the field of battle, and doubting, from his majeſtic air, whether he might not be an immortal, inquires who he was, declaring that he would not fight with a god. Glaucus lays hold of this very ſlight opportunity, in the very heat of action, to give a long hiſtory of his family. In the mean time, the reader's patience is put to a trial, and his ardour cools. Again, Agamemnon deſiring advice how to reſiſt the Trojans, Diomedes ſprings forward; but, before he offers advice, gives the hiſtory of all his progenitors, and of their characters, in a long train. And, after all, what was the ſage advice that required ſuch a preface? It was, that Agamemnon ſhould exhort the Greeks to fight bravely. At any rate, was Diomedes ſo little known, as to make it proper to ſuſpend the action at ſo critical a juncture, for a genealogical hiſtory? There is a third particular, which juſtly merits cenſure; and that is, an endleſs number of minute circumſtances, eſpecially in the deſcription of battles, where they are moſt improper. The capital beauty of an epic poem is, the ſelection of ſuch incidents and circumſtances as make a deep impreſſion, keeping out of view every thing low or familiar. An account of a ſingle battle employs the whole fifth book of the Iliad, and a great part of the ſixth: yet in the whole there is no general action; but unknown warriors, whom we never heard of before, killed at a diſtance with an arrow or a javelin; and every wound deſcribed with anatomical accuracy. The whole ſeventeenth book is employed in the conteſt about the dead body of Patroclus, ſtuffed with minute circumſtances, below the dignity of an epic poem. In ſuch ſcenes the reader is fatigued with endleſs particulars; and has nothing to ſupport him but the melody of Homer's verſification.

10 Cauſes of the decline of the fine arts.

Having traced the progreſs of the fine arts toward maturity, in a ſummary way, the decline of theſe arts comes next in order. An art, in its progreſs toward maturity, is greatly promoted by emulation; and, after arriving at maturity, its downfal is not leſs promoted by it. It is difficult to judge of perfection but by compariſon; and an artiſt, ambitious to outſtrip his predeceſſors, cannot ſubmit to be an imitator, but muſt ſtrike out ſomething new, which, in an art advanced to ripeneſs, ſeldom fails to be a degeneracy. This cauſe of the decline of the fine arts may be illuſtrated by various inſtances. The perfection of vocal muſic is to accompany paſſion, and to enforce ſentiment. In ancient Greece, the province of muſic was well underſtood; which, being confined within its proper ſphere, had an enchanting influence. Harmony at that time was very little cultivated, becauſe it was of very little uſe: melody reaches the heart, and it is by it chiefly that a ſentiment is enforced, or a paſſion ſoothed: harmony, on the contrary, reaches the ear only; and it is a matter of undoubted experience, that the moſt melodious airs admit but of very ſimple harmony. Artiſts, in latter times, ignorant why harmony was ſo little regarded by the ancients, applied themſelves ſeriouſly to its cultivation; and they have been wonderfully ſucceſsful. But they have been ſucceſsful at the expence of melody; which, in modern compoſitions, generally ſpeaking, is loſt amid the blaze of harmony. Theſe compoſitions tickle the ear by the luxury of complicated ſounds, but ſeldom make any impreſſion on the heart. The Italian opera, in its form, reſembles the Greek tragedy, from which it is evidently copied; but very little in ſubſtance. In the latter, muſic being made ſubſervient to ſentiment, the dialogue is nervous and ſublime: in the former, the whole weight is laid on muſic; and the dialogue, devoid of ſentiment, is weak and ſpiritleſs. Reſtleſs man knows no golden mean, but will be attempting innovations without end.—By the ſame ambition, architecture has viſibly declined from its perfection. The Ionic was the favourite order when architecture was in its height of glory. The Corinthian order came next; which, in attempting greater perfection, has deviated from the true ſimplicity of nature: and the deviation is ſtill greater in the Compoſite order. With reſpect to literary productions, the firſt eſſays of the Romans were very imperfect. We may judge of this from Plautus, whoſe compoſitions are abundantly rude, though much admired by his cotemporaries, being the beſt that exiſted at that time. The exalted ſpirit of the Romans hurried them on to the grand and beautiful; and literary productions of all kinds were in perfection when Auguſtus reigned. In attempting ſtill greater perfection, the Roman compoſitions became a ſtrange jumble of inconſiſtent parts: they were tumid and pompous; and, at the ſame time, full of antitheſes, conceit, and tinſel wit. Every thing new in the fine arts pleaſes, though leſs perfect than what we are accuſtomed to; and, for that reaſon, ſuch compoſitions were generally reliſhed. We ſee not by what gradual ſteps writers, after the time of Auguſtus, deviated from the patterns that were before them; for no book of any moment after that time is preſerved, till we come down to Seneca, in whoſe works nature and ſimplicity give place to artificial thought and baſtard wit. He was a great corrupter of the Roman taſte; and after him nothing was reliſhed but brilliant ſtrokes of fancy, with very little regard to ſentiment: even Virgil and Cicero made no figure in compariſon. Lucan has a forced elevation of thought and ſtyle, very difficult to be ſupported; and, accordingly, he ſinks often into puerile reflections; witneſs his encomium on the river Po, which, ſays he, would equal the Danube, had it the ſame number of tributary ſtreams. Quintilian, a writer of true and claſſical taſte, who was protected and encouraged by Veſpaſian, attempted to ſtem the tide of falſe writing. His rhetoric is compoſed in an elegant ſtyle; and his obſervations contain every delicacy of the critical art. At the ſame time flouriſhed Tacitus, poſſeſſing a more extenſive knowledge of the nature of man than any other author, ancient or modern, if Shakeſpeare be not excepted. His ſtyle is original, conciſe, compact, and comprehenſive; and, in what is properly called his *hiſtory*, perfectly correct and beautiful. He has been imitated by ſeveral, but never equalled by any. Brutus is ſaid to be the laſt of the Romans for love of liberty: Quintilian and Tacitus may be ſaid to be the laſt of the Romans for literary genius. Pliny the Younger is no exception: his ſtyle is affected, turgid, and full of childiſh brilliancy. Seneca and Pliny are proper examples of writers who ſtudy ſhow more than ſubſtance, and who make ſenſe yield to ſound. The difference between theſe authors and thoſe of the Auguſtan age, reſembles the difference between Greek and Italian muſic. Muſic, among the Greeks, limited itſelf to the employment to which it is deſtined by nature, *viz.* to be the handmaid of ſenſe, to inforce, enliven, or ſweeten a ſentiment. In the Italian opera, the miſtreſs is degraded to be handmaid; and harmony triumphs, with very little regard to ſentiment.

Another great cauſe that precipitates the downfal of every fine art is deſpotiſm. The reaſon is obvious; and there is a diſmal example of it in Rome, particularly with regard to eloquence. We learn from a dialogue accounting for the corruption of the Roman eloquence, that in the decline of the art it became faſhionable to ſtuff harangues with impertinent poetical quotations, without any view but ornament merely; and this alſo was long faſhionable in France. It happened unluckily for the Romans, and for the world, that the fine arts were at their height in Rome, and not much upon the decline in Greece, when deſpotiſm put an end to the republic. Auguſtus, it is true, retarded their fall, particularly that of literature; it being the politic of his reign to hide deſpotiſm, and to give his government an air of freedom. His court was a ſchool of urbanity, where people of genius acquired that delicacy of taſte, that elevation of ſentiment, and that purity of expreſſion, which characterize the writers of his time. He honoured men of learning, admitted them to his table, and was bountiful to them. It would be painful to follow the decline of the fine arts in Rome to their total extirpation. The tyrrany of Tiberius, and of ſubſequent emperors, broke at laſt the elevated and independent ſpirit of the brave Romans, reduced them to abject ſlavery, and left not a ſpark of genius. The ſcience of law is the only exception, as it flouriſhed even in the worſt of times: the Roman lawyers were a reſpectable body, and leſs the object of jealouſy than men of power and extenſive landed property. Among the Greeks alſo, a conquered people, the fine arts decayed; but not ſo rapidly as at Rome; the Greeks, farther removed from the ſeat of government, being leſs within the reach of a Roman tyrant. During their depreſſion, they were guilty of the moſt puerile conceits: witneſs verſes compoſed in the form of an ax, an egg, wings, and ſuch like. The ſtyle of Greek authors, in the reign of the emperor Adrian, is unequal, obſcure, ſtiff, and affected. Lucian is the only exception that may be made.

We need ſcarce any other cauſe but deſpotiſm, to account for the decline of ſtatuary and painting in Greece. Theſe arts had arrived at their utmoſt perfection about the time of Alexander the Great; and from that time they declined gradually with the vigour of a free people; for Greece was now enſlaved by the Macedonian power. It may in general be obſerved, that when a nation becomes ſtationary in that degree of power which it acquires from its conſtitution and ſituation, the national ſpirit ſubſides, and men of talents become rare. It is ſtill worſe with a nation that is ſunk below its former power and pre-eminence; and worſt of all when it is reduced to ſlavery. Other cauſes concurred to accelerate the downfal of the arts mentioned. Greece, in the days of Alexander, was filled with ſtatues of excellent workmanſhip; and there being little demand for more, the later ſtatuaries were reduced to heads and buſts. At laſt the Romans put a total end both to ſtatuary and painting in Greece, by plundering it of its fineſt pieces; and the Greeks, expoſed to the avarice of the conquerors, beſtowed no longer any money on the fine arts.

The decline of the fine arts in Rome is by a * writer of taſte and elegance aſcribed to a cauſe different from any above mentioned, a cauſe that overwhelms manhood as well as the fine arts where-ever it prevails; and that is opulence, joined with its faithful attendants avarice and luxury. "In ancient times (ſays he), when naked virtue had her admirers, the liberal arts were in their higheſt vigour; and there was a generous conteſt among men, that nothing of real and permanent advantage ſhould long remain undiſcovered. Democritus extracted the juice of every herb and plant; and, leſt the virtue of a ſingle ſtone or twig ſhould eſcape him, he conſumed a lifetime in experiments. Eudoxus, immerſed in the ſtudy of aſtronomy, ſpent his age upon the top of a mountain. Chryſippus, to

ſtimulate

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* Petronius Arbiter.

ſtimulate his inventive faculty, thrice purified his genius with hellebore. To turn to the imitative arts: Lyſippus, while labouring on the forms of a ſingle ſtatue, periſhed from want. Myron, whoſe powerful hand gave to the braſs almoſt the ſoul of man, and animals,—at his death found not an heir! Of us of modern times what ſhall we ſay? Immerſed in drunkenneſs and debauchery, we want the ſpirit to cultivate thoſe arts which we poſſeſs. We inveigh againſt the manners of antiquity; we ſtudy vice alone; and vice is all we teach. Where now is the art of reaſoning? Where aſtronomy? Where is the right path of wiſdom? What man now-a-days is heard in our temples to make a vow for the attainment of eloquence, or for the diſcovery of the fountain of true philoſophy? Nor do we even pray for health of body, or a ſound underſtanding. One, while he has ſcarce entered the porch of the temple, devotes a gift in the event of the death of a rich relation; another prays for the diſcovery of a treaſure; a third for a miniſterial fortune. The ſenate itſelf, the exemplary preceptor of what is good and laudable, has promiſed a thouſand pounds of gold to the capitol; and, to remove all reproach from the crime of avarice, has offered a bribe to Jupiter himſelf. How ſhould we wonder that the art of painting has declined, when, in the eyes both of the gods and men, there is more beauty in a maſs of gold, than in all the works of Phidias and Apelles."—In England, the fine arts are far from ſuch perfection as to ſuffer by opulence. They are in a progreſs, it is true, toward maturity; but they proceed in a very ſlow pace.

There is ſtill another cauſe that never fails to undermine a fine art in a country where it is brought to perfection, abſtracting from every one of the cauſes above mentioned. It is remarked a little above, that nothing is more fatal to an art or to a ſcience than a performance ſo much ſuperior to all of the kind as to extinguiſh emulation. This remark is exemplified in the great Newton, who, having ſurpaſſed all the ancients, has not left to his countrymen even the fainteſt hope of rivalling him; and to that cauſe is attributed the viſible decline of mathematics in Great Britain. The ſame cauſe would have been fatal to the arts of ſtatuary and painting among the Greeks, even though they had continued a free people. The decay of painting in modern Italy is, probably, owing to the ſame cauſe: Michael Angelo, Raphael, Titian, &c. are lofty oaks that bear down young plants in their neighbourhood, and intercept from them the ſunſhine of emulation. Had the art of painting made a ſlower progreſs in Italy, it might have there continued in vigour to this day. Velleius Paterculus ſays judiciouſly, "Ut " primo ad conſequendos quos priores ducimus accendi- " mur; ita, ubi aut præteriri aut æquari eos poſſe de- " ſperavimus, ſtudium cum ſpe ſeneſcit; et quod adſe- " qui non poteſt, ſequi deſinit: præteritoque eo in quo " eminere non poſſimus, aliquid in quo nitamur con- " quirimus."

The decline of an art or ſcience proceeding from the foregoing cauſe, is the moſt rapid where a ſtrict compariſon can be inſtituted between the works of different maſters. The ſuperiority of Newton above every other mathematician can be aſcertained with preciſion; and hence the ſudden decline of that ſcience in Great Britain. In Italy a talent for painting continued many years in vigour, becauſe no painter appeared with ſuch ſuperiority of genius as to carry perfection in every branch of the art. As one ſurpaſſed in deſigning, one in colouring, one in graceful attitudes, there was ſtill ſcope for emulation. But when at laſt there was not a ſingle perfection but what one or other maſter had excelled in, from that period the art began to languiſh. Architecture continued longer in vigour than painting, becauſe the principles of compariſon in the former are leſs preciſe than in the latter. The artiſt who could not rival his predeceſſors in an eſtabliſhed mode, ſought out a new mode for himſelf, which, though perhaps leſs elegant or perfect, was for a time ſupported by novelty.

11 Uſeful arts leſs ſubject to decline.

Uſeful arts will never be neglected in a country where there is any police; for every man finds his account in them. Fine arts are more precarious. They are not reliſhed but by perſons of taſte, who are rare; and ſuch as can ſpare great ſums for ſupporting them are ſtill more rare. For that reaſon, they will never flouriſh in any country, unleſs patronized by the ſovereign, or by men of power and opulence. They merit ſuch patronage, as one of the ſprings of government: and a capital ſpring they make, by multiplying amuſements, and humanizing manners; upon which account they have always been encouraged by good princes.

12 THEORY of the polite arts.

General Theory of the Polite ARTS. The eſſence of the polite arts, as before obſerved, conſiſts in *expreſſion*. The end of all theſe arts is *pleaſure*; whereas the end of the ſciences is *inſtruction* and *utility*. Some of the polite arts indeed, as eloquence, poetry, and architecture, are frequently applied to objects that are uſeful, or exerciſed in matters that are inſtructive, as we ſhall ſhow more particularly in their proper place; but in theſe caſes, though the ground-work belongs to thoſe ſciences which employ the underſtanding, yet the expreſſion ariſes from the inventive faculty. It is a picture that is deſigned by Minerva, to which the muſes add the colouring, and the graces the frame. This union forms therefore the perfection of the art, according to that ſententious and well known precept of Horace: *Omne tulit punctum, qui miſcuit utile dulci.*

13 What arts ſo denominated.

Under the denomination, therefore, of Polite Arts, we comprehend, 1. Eloquence; 2. Poetry; 3. Muſic; 4. Painting; 5. Sculpture; 6. Graving; 7. Architecture; 8. Declamation; 9. Dancing. Particular deſcriptions of theſe arts are given under their reſpective names. This branch of the preſent article is intended as a general introduction to them; and, as ſuch, will be occaſionally referred to.

14 Uſe of precepts.

There is one very eſſential reflection, which it appears to us proper to make in the firſt place, on the polite arts in general. All the rules in the world are not ſufficient to make a great poet, an able orator, or an excellent artiſt; becauſe the quality, neceſſary to form theſe, depends on the natural diſpoſition, the fire of genius, which no human art can confer, but which is the pure gift of heaven. The rules, however, will prevent a man from being a bad artiſt, a dull orator, or a wretched poet; ſeeing they are the reflections of the greateſt maſters in thoſe arts, and that they point out the rocks which the artiſt ſhould ſhun in the exerciſe of his talents. They are of uſe, moreover, in facilitating his labours, and in directing him

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Arts.

to arrive by the ſhorteſt and ſureſt road to perfection. They refine, ſtrengthen, and confirm, his taſte. Nature, abandoned to herſelf, has conſtantly ſomething wild and ſavage. Art, founded on juſt and ſagacious rules, gives her elegance, dignity, and politeneſs; and it is impoſſible to ſacrifice properly to the graces, without knowing the incenſe that is pleaſing to them.

15
Beauty, genius, taſte, what.

Beauty is the object of all the polite arts. It is not however ſo eaſy, as it may ſeem, to give a clear and determinate idea of what we preciſely mean by that term*. Many able writers, who have treated expreſsly on the ſubject, have ſhewn that they were totally ignorant of what it was. It is one of thoſe expreſſions that we comprehend immediately, that preſent us with a clear and preciſe idea, that leave a diſtinct impreſſion on our minds, when it is ſimply written or pronounced; but which philoſophers envelope in darkneſs, when they attempt to elucidate it by definitions and deſcriptions; and the more, as mankind have different ideas of beauty, their opinions and taſtes being as various as their underſtandings and phyſiognomies. We may ſay however, in general, that beauty reſults from the various perfections of which any object is ſuſceptible, and which it actually poſſeſſes; and that the perfections which produce beauty conſiſt principally in the agreeable and delightful proportions which are found, 1. Between the ſeveral parts of the ſame object; 2. Between each part and the whole together; 3. Between the parts and the end or deſign of the object to which they belong. *Genius*, or invention, is that faculty of the mind by which *beauty* is produced. *Taſte*†, diſpoſition, or rather the natural ſenſation of the mind refined by art, ſerves to guide the genius in diſcerning, embracing, and producing, that which is beautiful of every kind. From whence it follows, that the general theory of the polite arts is nothing more than the knowledge of what they contain that is truly beautiful and agreeable; and it is this knowledge, this theory, which modern philoſophers call by the Latin name of *æſthetica*.

* See the article *Beauty*.

† See *Taſte*.

It ſhould be conſtantly remembered, that the eſſence of the polite arts conſiſts in expreſſion. This expreſſion lies ſometimes in the words, and ſometimes in the pen; ſometimes in ſounds and their harmony, and at others in corporeal attitudes; ſometimes in the pencil or in the chiſel, and at others in the graver; ſometimes in a proper diſpoſition or judicious employment of the mechanic arts, and at others merely in their manner of acting. From whence ariſe thoſe arts that we have mentioned, and which are deſcribed in their order.

16
Firſt general rule.

The general theory of the polite arts, or *eſthetics*, neceſſarily ſuppoſes, therefore, certain rules; but theſe general rules are of no great number. The firſt is, That whoever would devote himſelf to the polite arts, ſhould above all things *conſult his genius;* diveſt himſelf of all ſelf-love; and examine if he be a true ſon of Apollo, and cheriſhed by the muſes: for

> In vain, raſh author, doſt thou ſtrive to climb,
> By lofty verſe, Parnaſſus' height ſublime,
> If heaven does not by ſecret powers inſpire,
> Or if thy natal ſtar darts not poetic fire.

17
Imagination, what.

18
Novelty and *Invention.*

This precept with regard to poetry in particular, is applicable to all the polite arts in general; for their moſt happy ſucceſs is founded on *imagination*. By this term we underſtand, in general, a faculty of the mind, a particular genius, a lively invention, a certain ſubtile ſpirit, which gives a facility in diſcovering ſomething new. But it is neceſſary alſo to preſcribe juſt bounds to this term *new*, which muſt not be here taken in an abſolute ſenſe. Solomon wiſely remarks, that, even in his time, *there was nothing new under the ſun*. In fact, all that exiſts, and all that is capable of being diſcovered in the known world, has already been diſcovered. The fine arts in their imitations of nature, in their expreſſions, can borrow images, figures, compariſons, from thoſe things only that exiſt and are known. As there have been, from the beginning of the world to our days, millions of authors in each of the polite arts, almoſt all the poſſible combinations of the various ſubjects have been produced by their lively imaginations; and when we hear the ignorant part of mankind talk of a work of wit or of art *that is entirely new*, that offers ideas which were before utterly unknown, that had never entered into the brain of any other man, we ſhould refer ſuch aſſertions to the claſs of popular errors; and reflect on thoſe ſtories we every day hear of certain empirics, who pretend to be alone poſſeſſed of marvellous methods of cure by means of ſimples; as if there were any plant, any ſtalk of graſs that grows in our world, that can have eſcaped the reſearches of botaniſts. But the novelty, of which we here ſpeak, conſiſts in the ingenious uſe of combinations of all the various objects of nature, that are new, happy, and agreeable, that have not yet been exhauſted, and which appear even to be inexhauſtible; and of the uſe which the artiſt makes of all new diſcoveries, which he turns to his advantage, by a judicious application. Invention therefore ſuppoſes a conſiderable fund of preliminary knowledge, ſuch as is capable of furniſhing ideas and images, to form new combinations. But there is no art by which invention itſelf can be produced; for that, as we have already ſaid, is the gift of heaven; and it is an endowment which we cannot even make uſe of whenever we pleaſe. We would rather ſay, therefore, that invention conſiſts in producing, in works of genius, *that which is unexpected;* an object, a harmony, a perfection, a thought, an expreſſion, of which we had no idea, that we could not foreſee, nor hope to find, where the artiſt has ſo happily placed it, and where we perceive it with delight. This idea appears applicable to ſuch of the polite arts as affect the mind by the hearing as well as by the ſight; and it is a matter that is highly eſſential.

19
2d Rule, Improvement of taſte.

The ſecond rule is, That every artiſt ought inceſſantly to labour in the improvement of his *taſte;* in acquiring that ſenſible, refined, and clear diſcernment, by which he will be enabled to diſtinguiſh the real beauties in each object, the ornaments that are agreeable to it, and the proportions and relations that ſubſiſt among the ſeveral parts: and by this faculty, he will be regulated in the employment of his natural talents. This labour conſiſts not only in the profound reflections he will make on the properties of objects as they relate to the fine arts, but alſo in a conſtant, aſſiduous ſtudy of the grand models of beauty.

20
3d, Imitation of nature.

The third rule, to be obſerved in the practice of the polite arts, is *the imitation of nature*. Every object in the univerſe has its peculiar nature, of which the artiſt ſhould never loſe ſight in his manner of treating it. In vain will he otherwiſe ornament his work with the moſt refined and moſt brilliant ſtrokes; for, if nature be not juſtly imitated, it will for ever remain imperfect. The ſublime Homer has ſometimes ſinned againſt this rule: for, as the gods have a nature peculiar to themſelves, it cannot be a juſt imitation when we attribute to them paſſions that are ſcarce pardonable in mortals, and make them frequently converſe in a language that is at once vulgar and ridiculous. It was not to imitate nature, to put into the mouth of a hero, at the moment of a deciſive battle, an harangue that muſt become tedious by its exceſſive length, and which certainly could not have been heard by the thouſandth part of a numerous army: but we have already touched upon ſome of the faults that are ſtrewed over the poems of that great man; to multiply or dwell upon them would be ungrateful. We muſt however obſerve, that this imitation of nature, which appears at firſt view ſo ſimple and ſo eaſy, is of all things the moſt difficult in practice; and that it requires a diſcernment ſo ſagacious, and an expreſſion ſo happy, as is rarely beſtowed by heaven on mortal man.

21 4th, Perſpicuity.

Perſpicuity forms the fourth rule of expreſſion. In all the fine arts, in general, an obſcure, perplexed, ambiguous, and elaborate expreſſion, is always bad. The true, ſtriking beauty muſt be manifeſt, and perceptible to the moſt ignorant of mankind as well as the moſt learned. Thoſe are ever falſe or inferior beauties that have occaſion for a covering, a kind of veil that may make them appear greater than they really are: true beauty wants no veil, but ſhines by its native luſtre. From the union of the true imitation of nature with perſpicuity of expreſſion ariſes that *truth* which is ſo eſſential in the productions of the fine arts.

22 5th, Elevation of ſentiment.

In all the polite arts, and in all the ſubjects they embrace, there muſt neceſſarily reign an elevation of ſentiment, that expreſſes each object in the greateſt perfection of which it is ſuſceptible; that imitates nature in her moſt exalted beauty. This makes the fifth general rule. The deſign of the fine arts being to excite pleaſure by the expreſſion of that which is beautiful, every artiſt ſhould raiſe himſelf above his ſubject; and, chuſing the moſt favourable light wherein to place it, ſhould there embelliſh it with the greateſt, moſt noble, and beautiful ornaments, that his own genius can ſuggeſt; ſtill, however, obſerving a ſtrict imitation of nature.

23 6th, The ſublime to be endeavoured after.

From the obſervation of theſe two laſt rules reſults the *ſublime*, which is the union of the greateſt perſpicuity with the ſtricteſt truth and moſt exalted elevation poſſible. It is neceſſary to remark here, that the moſt ſimple and common ſubjects are ſuſceptible of a ſublime that is agreeable to their nature. An idyl or landſcape may be as ſublime in their kinds as an epic poem or a hiſtory-piece. When Moſes begins the book of Geneſis with theſe words, *In the beginning God created the heaven and the earth*; or when he tells us, that God ſaid, *Let there be light, and there was light*; theſe expreſſions are ſublime in the higheſt degree, becauſe they are perfectly clear, true, and elevated. Every author ſhould therefore endeavour after the ſublime * in every ſubject that he undertakes; and this makes the ſixth and laſt general rule in the practice of the polite arts. But if he cannot attain to this, it is, however, indiſpenſably neceſſary that he conſtantly make uſe of expreſſions that are *noble and refined*. Every thing that is *low*, *indecent*, or *diſagreeable*, is naturally repugnant to the ſublime, and ought to be for ever baniſhed from all works that proceed from the noble and liberal arts.

* See the article Grandeur *and Sublimity*.

Art is alſo an appellation given to ſeveral ſuperſtitious practices, as, *St Anſelhm's art*, *St Paul's art*, &c.

Art *and Part*, in Scots law. See Accessory.

ARTA, by ſome called *Larta*, a town of Lower Albania, in Turky in Europe, with a Greek archbiſhop's ſee. It is a pretty large town, and contains about 7 or 8000 inhabitants, Greeks and Turks, but the former are the moſt numerous. The cathedral has as many windows and doors as there are days in the year. It is ſupported by above 2000 marble pillars; and was built by Michael Ducas Commeno emperor of Conſtantinople, as appears by an inſcription over the great door. It carries on a conſiderable trade, particularly in tobacco and furs. E. Long. 31. 30. N. Lat 39. 28.

ARTABANUS, the name of ſeveral kings of Parthia. See Parthia.

ARTABAZUS, the ſon of Pharnaces, commanded the Parthians and Choraſmians in the famous expedition of Xerxes. After the battle of Salamis, he eſcorted the king his maſter to the Helleſpont with 60,000 choſen men; and after the battle of Platea, in which Mardonius engaged contrary to his advice, he made a noble retreat, and returned to Aſia with 40,000 men under his command.

ARTAXATA, *orum*, the royal reſidence, and metropolis of Armenia Major, (Strabo, Pliny, Juvenal), and built according to a plan of Hannibal, for king Artaxias, after whom it was called. It was ſituated on an elbow of the river Araxes, which formed a kind of peninſula, and ſurrounded the town like a wall, except on the ſide of the Iſthmus, but this ſide was ſecured by a rampart and ditch. This town was deemed ſo ſtrong, that Lucullus, after having defeated Tigranes, durſt not lay ſiege to it; but Pompey compelled him to deliver it up without ſtriking a blow. It was then levelled with the ground; but the Armenians have a tradition that the ruins of it are ſtill to be ſeen at a place called *Ardachat*. Sir John Chardin ſays, that it has the name of *Ardachat* from Artaxias, whom in the eaſt they call *Ardechier*. Here are the remains of a ſtately palace which the Armenians take to be that of Tiridates who reigned in the time of Conſtantine the Great. One front of this building is but half ruined, and there are many other fine antiquities which the inhabitants call *Tact. Tardat*, that is, the throne of Tiridates. Tavernier alſo mentions the ruins of Artaxata between Erivan and mount Ararat, but does not ſpecify them. The ancient geographers mention another city of the ſame name, likewiſe ſituated on the Araxes, but in the northern part of Media, known among the ancients by the name of *Atropatia*.

ARTAXERXES, the name of ſeveral kings of Perſia. See Persia.

ARTEDIA, a genus of the digynia order, belonging to the pentandria claſs of plants, for which there is no Engliſh name.

Species. 1. The ſquamata, with ſquamoſe ſeeds, is a native of the eaſt; Rewvolf found it growing on mount Libanus. It is an annual plant, whoſe ſtalks riſe about two feet high, ſending out a few ſide-branches, which are garniſhed with narrow compound leaves reſembling thoſe of dill; the extremity of the ſtalk is terminated by a large umbel of white flowers, compoſed of five unequal petals. Theſe are ſucceeded by roundiſh compreſſed fruit, each having two ſeeds, whoſe borders are ſcaly. 2. The aculeata, with prickly ſeeds, grows upon the African ſhore on the Mediterranean, as alſo in Spain. This is alſo an annual plant, with an upright ſtalk near three feet high, and puts out many ſhoots. The leaves are hairy, and greatly reſemble thoſe of the common carrot: the ſtalks are terminated by umbels of large white flowers ſhaped like thoſe of the former, and are ſucceeded by a prickly fruit containing two ſeeds.

Both theſe plants decay as ſoon as they perfect their ſeeds, and often before they are ripe in Britain: for unleſs the ſeeds are ſown in autumn, and the plants come up before winter, they rarely perfect their ſeeds here. The ſeeds ſhould be ſown on a warm border where the plants are to remain, for they will not bear tranſplanting.

ARTEMIDORUS, famous for his Treatiſe upon Dreams. He was born at Epheſus, but took upon him the ſurname of *Daldianus* in this book, by way of reſpect to his mother's country Daltis. He ſtyled himſelf *the Epheſian* in his other performances. He not only bought up all that had been written concerning the explication of dreams, which amounted to many volumes; but he likewiſe ſpent many years in travelling, in order to contract an acquaintance with fortune-tellers: he alſo carried on an extenſive correſpondence with all the people of this ſort in the cities and aſſemblies of Greece, Italy, and the moſt populous iſlands; collecting at the ſame time all the old dreams, and the events which are ſaid to have followed them. The work which he wrote on dreams conſiſted of five books: the firſt three were dedicated to one Caſſius Maximus; and the laſt two to his ſon, whom he took a good deal of pains to inſtruct in the nature and interpretation of dreams. This work, though filled with frivolous obſervations, contains ſome things that are intereſting. It was firſt printed in Greek, at Venice, in 1518; and Rigaltius publiſhed an edition at Paris, in Greek and Latin, in 1603, and added ſome notes. Artemidorus wrote alſo a treatiſe upon Auguries, and another upon Chiromancy; but they are not extant. He lived under the emperor Antoninus Pius.

ARTEMISIA, wife of Mauſolus king of Caria, has immortalized herſelf by the honours which ſhe paid to the memory of her huſband. She built for him in Halicarnaſſus a very magnificent tomb, called the *Mauſoleum*, which was one of the ſeven wonders of the world, and from which the title of *Mauſoleum* was afterwards given to all tombs remarkable for their grandeur: but ſhe died of regret and ſorrow before the Mauſoleum was finiſhed. She appointed panegyrics to be made in honour of him, and propoſed a prize of great value for the perſon who ſhould compoſe the beſt. He died about the end of the 106th Olympiad, 351 years before the Chriſtian æra.

Artemisia, queen of Caria, and the daughter of Ligdamis, marched in perſon in the expedition of Xerxes againſt the Greeks, and performed wonders in the ſea-fight near Salamis, 480 years before the Chriſtian æra. Being purſued by an Athenian veſſel, ſhe attacked one of the Perſian ſhips, commanded by Damaſithymus, king of Calyndus, her enemy, and ſunk it; on which the Athenians, thinking that her ſhip was on the ſide of the Greeks, ceaſed their purſuit: but Xerxes was the principal perſon impoſed upon in this affair; for believing ſhe had ſunk an Athenian veſſel, he declared, that "the men had behaved like women, and the women like men." Xerxes intruſted her with the care of the young princes of Perſia, his ſons; when, agreeably to her advice, he abandoned Greece, in order to return to Aſia. Theſe great qualities did not ſecure her from the weakneſs of love: ſhe was paſſionately fond of a man of Abydos, whoſe name was Dardanus, and was ſo enraged at his neglect of her, that ſhe put out his eyes while he was aſleep. The gods, in order to puniſh her for this, inſpired her with ſtill a ſtronger paſſion for him; ſo that the oracle having adviſed her to go to Leucas, which was the uſage of deſperate lovers, ſhe took the leap from thence, and was interred at that place.—Many writers confound this Artemiſia with the former, the wife of Mauſolus.

Artemisia, (ſo called, according to ſome, from Artemiſia, wife of Mauſolus king of Caria, who brought this plant into uſe, whereas, before, it was called *Parthenia*, the virgin goddeſs being ſaid to have given name to it), *Mugwort*, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants.

Species. Of this genus there are upwards of 20 ſpecies enumerated by botanical writers; but thoſe moſt worthy of notice are the following. 1. The vulgaris, or common mugwort. This grows naturally on banks and by the ſide of foot-paths in many parts of Britain, ſo is ſeldom admitted into gardens, where it would prove a troubleſome weed, as it ſpreads very faſt by its creeping roots. It flowers in June, at which time the plant is ready for uſe. 2. The dracunculus, or tarragon, which is frequently uſed in ſallads, eſpecially by the French. It is a very hardy plant, and ſpreads greatly by its creeping roots. 3. The abrotanum, or ſouthernwood, which is kept in gardens for the ſake of its agreeable ſcent. It is a low ſhrub, ſeldom riſing more than three or four feet high, ſending out lateral ſhrubby branches, growing erect, garniſhed with five briſtly leaves, having an agreeable ſcent when bruiſed: the flowers are produced in ſpikes from the extremity of the branches; but unleſs the autumn proves warm, they ſeldom open in England. 4. The ſantonicum, which produces the ſemen ſantonicum, which is much uſed for worms in children. It grows naturally in Perſia, from whence the ſeeds are brought to Europe. It hath the appearance of our wild mugwort; the branches are ſlender, erect, and garniſhed with linear winged leaves, and terminated by recurved ſlender ſpikes of flowers which have naked receptacles. 5. The artemiſia maritima, or ſea-wormwood, grows naturally on the ſea-coaſts in moſt parts of Britain, where there are ſeveral varieties, if not diſtinct ſpecies, to be found. Theſe are low under ſhrubs, moſt of which creep at the root, by which they multiply greatly in their natural ſituation, but when tranſplanted into gardens ſeldom thrive ſo well. 6. The pontica, or pontic wormwood, commonly called *Roman wormwood*, is a low herbaceous plant, whoſe ſtalks die in autumn, and new ones appear in the ſpring. Theſe are garniſhed with finely divided leaves, whoſe under-ſides are woolly; and the upper part of the ſtalks are furniſhed with globular flowers which nod on one ſide, having naked receptacles. Theſe appear in Auguſt, but are rarely ſucceeded by ſeeds in Britain. 7. The abſinthium, or common wormwood, grows naturally in lanes and uncultivated places, and is too well known to require any particular deſcription. 8. The arboreſcens, or tree-wormwood, grows naturally in Italy and the Levant near the ſea. It riſes, with a woody ſtalk, ſix or ſeven feet high, ſending out many ligneous branches, garniſhed with leaves ſomewhat like thoſe of the common wormwood, but more finely divided, and much whiter. The branches are terminated by ſpikes of globular flowers in the autumn, which are ſeldom ſucceeded by ſeeds in this country.

Culture. The ſouthernwood is propagated by ſlips or cuttings planted in a ſhady border about the beginning of April, obſerving to water them duly in dry weather. In this border they may remain till the following autumn, when they ſhould be tranſplanted, either into pots, or thoſe parts of the garden where they are to remain. The ſantonicum is likewiſe propagated by ſlips; but the plants ſhould be placed in a dry ſoil and ſheltered ſituation, where they will endure the cold of our ordinary winters pretty well; but it will be proper to have a plant or two in pots, which may be ſheltered under a common hot-bed frame in winter, to preſerve the ſpecies. The true wormwood is eaſily propagated in the ſame manner. The cuttings muſt be planted in a ſhady border, and duly watered during the ſummer ſeaſon, in which caſe they will take root freely. In autumn, ſome of the young plants ſhould be potted, that they may be ſheltered in winter; the others may be planted in a warm border, where they will live, provided the winter proves favourable. The other ſorts ſpread by their creeping roots; and require no culture, as they are very hardy, and will thrive any where.

Medicinal Uſes. The moxa, ſo famous in the eaſtern countries for curing the gout by burning it on the part affected, is the lanugo or down growing on the under ſide of the leaves of a ſpecies of mugwort, ſuppoſed to be the ſame with our common ſort. From ſome dried ſamples of this plant, which have been brought over to this country, Mr Miller reckons them to be the ſame, differing only in ſize; in which the Eaſt Indian kind is inferior to ours. He ſuppoſes that the lanugo of our mugwort would be equally efficacious. The ſeeds of the ſantonicum are ſmall, light, chaffy, compoſed as it were of a number of thin membranous coats, of a yellowiſh colour, an unpleaſant ſmell, and a very bitter taſte. Theſe ſeeds are celebrated for anthelmintic virtues (which they have in common with other bitters), and are ſometimes taken in this intention, either along with melaſſes, or candied with ſugar. They are not very often met with genuine in the ſhops. The leaves of the ſea, common, and Roman wormwoods are uſed as ſtomachics, but are all very diſagreeable: the Roman is the leaſt ſo, and therefore is to be preſerved; but the other two kinds are generally ſubſtituted in its place. The diſtilled oil of wormwood is ſometimes made uſe of to rub on the belly as a cure for worms.

ARTEMISIUM, either a promontory, (Harpocration), or a part of the ſea-coaſt, on the north-eaſt of Eubœa, (Plutarch); called *Leon*, and *Cale Acte*, (Ptolemy); memorable for the firſt ſea-engagement between the Greeks and Xerxes.—Another promontory of Caria, (Strabo).—A third in Spain, now called *Cape Martin*, in Valencia: in the meridian of London, and Lat. 38. 50.

ARTEMISIUM, a town of Oenotria, (Stephanus): now *S. Agatha*, in the Hither Calabria, on the river Piſaurus, or la Foglia, diſtant eight miles from the Tuſcan Sea.—Another of the Conteſtani, in Spain, (Strabo); otherwiſe called *Dianium*: now *Denia*, on the ſea-coaſt of Valencia. W. Long. 20. Lat. 39.

ARTERIOTOMY, the opening an artery, with deſign to procure an evacuation of blood.

ARTERY, in anatomy, a conical tube or canal which conveys the blood from the heart to all parts of the body. See ANATOMY, n° 381,—389.

ARTHRITIS, in medicine, the GOUT. See the *Index* ſubjoined to MEDICINE.

ARTHRODIA, in natural hiſtory, a genus of imperfect cryſtals, found always in complex maſſes, and forming long ſingle pyramids, with very ſhort and ſlender columns.

ARTRHODIA, in anatomy, a ſpecies of articulation, wherein the flat head of one bone is received into a ſhallow ſocket in the other. The humerus and ſcapula are joined by this ſpecies of articulation.

ARTHUR, king of the Britons, of whom ſcarcely any thing can be certainly affirmed. He is ſaid to have been the ſon of Uther Pendragon king of Britain, and to have been born in 501. His life is a continued ſcene of wonders. It is ſaid that he killed four hundred and ſeventy Saxons with his own hand in one battle; and after having ſubdued many mighty nations, and inſtituted the order of the Knights of the Round Table, died A. D. 542.

ARTICHOAK, in botany. See CINARA.

ARTICLE, a clauſe or condition of a contract, treaty, &c. It is alſo a ſmall part or diviſion of a diſcourſe, book, or writing, &c.

ARTICLE *of Death*, the laſt pangs or agony of one juſt expiring.

ARTICLE, in grammar. See there n° 61.

ARTICLES *of Religion*, in the church of England. In the beginnings of Chriſtianity, the declaration that was required of a Chriſtian's faith was conceived in very general terms; but, as hereſies ſprung up, it was found neceſſary to guard againſt them, by enlarging the creeds or confeſſions of faith. It was in imitation of this procedure that the reformers were ſo copious in ſtating the doctrines of the church of England in that work which is intituled, "Articles whereupon it was agreed by Archbiſhops and Biſhops of both provinces, and the whole Clergie, in the convocation holden at London, in the yeare of our Lorde God 1562, according to the computation of the Church of Englande, for the avoiding of the diverſities of opinions, and for the ſtabliſhing of conſent touching true religion." There were two particular circumſtances in that time which made this ſeem to be the more neceſſary: the one was, that there ſprung up, together with the reformation, many impious and extravagant ſects; the other, that, having but juſt got rid of Popery, it was abſolutely neceſſary to take the utmoſt precautions againſt it for the future. Theſe articles were prepared, as is moſt probable, by the biſhops Cranmer and Ridley, and were publiſhed by royal authority. The moſt authentic manuſcript of them is in the library of Corpus Chriſti college in Cambridge. It belonged to Archbiſhop Parker, and was left by him to that college.

The ſubſcription to theſe articles is enjoined by ſtatute, which eſtabliſhes them, and requires every clergyman to declare his aſſent, and ſubſcribe them in the preſence of his ordinary. The form of the ſubſcription is not preſcribed by the ſtatute; but by the canon it is expreſsly required, that he acknowledge them, and every one of them, to be agreeable to the word of God. There is a clauſe in the ſtatute, which ſubjects every miniſter, who maintains any doctrine repugnant to theſe articles, to deprivation.

ARTICULATE SOUNDS are ſuch ſounds as expreſs the letters, ſyllables, or words, of any alphabet or language: ſuch are formed by the human voice, and by ſome few birds, as parrots, &c.

ARTICULATION, or JOINTING, is the joining of bones together; and is of two kinds, viz. *articulation* and *connection*. ARTICULATION is of two kinds, 1. *Diarthroſis*, which is capable of motion. 2. *Synarthroſis*, which is not capable of motion. There is a ſpecies compoſed of theſe two, which ſome call *amphiarthroſis*. CONNECTION, or *ſymphyſis*, is of three kinds: 1. By ligament, called *ſyneuroſis*, or *ſyndeſmoſis*. 2. By cartilages, called *ſynchondroſis*. 3. By muſcles paſſing from one bone to another, called *ſyſſarcoſis*.

ARTICULATION, in botany, is the connection of parts that conſiſt of joints or knees, ſuch as the pods of French honey-ſuckles, which when ripe divide into ſo many parts as there are knees or joints; alſo thoſe parts of plants which ſwell into nodes or joints, and which uſually ſend forth branches.

ARTIFICER, a perſon whoſe employment it is to manufacture any kind of commodity, as in iron, braſs, wool, &c. ſuch are ſmiths, braziers, weavers, &c. By the law of England, if artificers or workmen conſpire not to work under certain prices, they are liable to certain penalties by ſtatute 2 and 3 Edw. VI. c. 15. A ſtranger, *artificer* in London, is not allowed to keep above two ſtrangers ſervants, but he may have as many Engliſh ſervants and apprentices as he can get, (ſtatute 81 Henry VIII. c. 16.) And, to prevent the deſtruction of our home manufactures, by tranſporting and ſeducing our artiſts to ſettle abroad, it is provided by ſtatute 5 Geo. I. c. 27. that ſuch as ſo entice or ſeduce them ſhall be fined 100l. and be impriſoned three months; and for the ſecond offence ſhall be fined at diſcretion, and be impriſoned a year: and the artificers, ſo going into foreign countries, and not returning within ſix months after warning given them by the Britiſh ambaſſador where they reſide, ſhall be deemed aliens, ſhall forfeit all their lands and goods, and ſhall be incapable of any legacy or gift. By ſtatute 23 Geo. II. c. 13. the ſeducers incur, for the firſt offence, a forfeiture of 500l. for each artificer contracted with to be ſent abroad, and impriſonment for twelve months; and for the ſecond, 1000l. and are liable to two years impriſonment.

ARTIFICIAL, in a general ſenſe, denotes ſomething made, faſhioned, or produced by art, in contradiſtinction from the productions of nature.

ARTIGI, indeclinable, (Pliny); *Artigis*, (Ptolemy); a town of the Turduli, in Bætica. Now *Alhama*. See ALHAMA.

ARTILLERY, in its moſt limited ſenſe, ſignifies fire-arms, mounted on their carriages and ready for action, with their balls, their bombs, their grenades, &c.

If we take the term in a more extenſive meaning, it includes the powder, the matches, inſtruments for fireworks, the utenſils of ordnance, the machines which facilitate their motion and tranſport them, the vehicles over which they traverſe rivers, every thing neceſſary to them, and all that enters into the form of a train of artillery.

The ſame word, ſtill farther extended in its meaning, likewiſe comprehends the men deſtined for the ſervice of the *artillery;* the people who provide the artillery with materials and implements when engaged, the cannoniers, the bombardiers, the officers of every rank, and engineers of every kind.

By *artillery* is likewiſe underſtood the ſcience which the officers of artillery ought to poſſeſs. This ſcience teaches to know the nature of all the materials and ingredients which enter into the compoſition and the ſtructure of every thing relative to the artillery: ſuch as, nitre, ſulphur, charcoal; the properties of air and fire; the compoſition and preparation of gun-powder; the materials for fire-works; the conſtruction, proportions, &c. of the different warlike machines; the arrangement, movement, and whole management, of cannon, &c. in the field or in ſieges, in ſuch a manner, that each of them, according to the length of its tube and the diameter of its bore, may be ſituated in the beſt place and at the propereſt diſtance for execution, and that the whole train taken together may reciprocally aſſiſt and ſupport each other with the greateſt advantage.

Artillery, taken in its moſt limited acceptation, has undergone many changes from its origin to the preſent time. The artillery of the ancients were the catapulta, the baliſtæ, the different kinds of ſlings, &c. The chevalier Folard was extremely attached to theſe ancient machines, and ſeemed even to prefer them to our fire-arms: an opinion which muſt appear not a little extraordinary, from ſuch a perſon. Father Daniel might well be miſtaken in the compariſon which he made between the effects of ancient and modern artillery, and in his concluſion that the latter was of little uſe: the ſituation of this good father removed him from the ſcenes of war, and the opportunities of military experience. But it is aſtoniſhing, that one ſo learned in the military art as the commentator of Polybius, who had ocular demonſtration of the ſucceſs of modern artillery, ſhould have declared ſo violently againſt it. Whatever be the caſe with theſe authors and their maxims, it may be aſſerted, that cannon is one of the moſt ſingular diſcoveries which have been made amongſt men; and by little and little it has changed the whole art of war, and of conſequence influenced the whole ſyſtem of policy, in Europe. The æra of artillery is dated from the battle of Creſſy in 1346, becauſe it is only from that day that cannons were mentioned in battle. Edward III. of England ſucceſsfully employed ſome pieces of artillery placed in the front of his army. The invention of artillery was then known in France as well as in England; but probably Philip

lip VI. marched with ſo much hurry and precipitation to attack his enemy, that he left his cannon as uſeleſs incumbrances behind him. The ignorance of that age in mechanical arts conſiderably retarded the progreſs of artillery; and that of which they were then poſſeſſed was ſo unweildy and imperfect, that they could not poſſibly diſcern its importance and efficacy in practice. Even to the preſent period, they never have ceaſed, nor ever will ceaſe, to labour for the improvement of theſe ignivomous machines that mock the thunder, which, though they ſeem to be invented for the deſtruction of the human race, and the ſubverſion of empires, have yet by their effects rendered war leſs ſavage and leſs ſanguine; political alliances have been more ſucceſsfully conciliated among all nations, conqueſts are become leſs frequent and leſs rapid, and ſucceſſes in war have been more eaſily reduced to calculation.

Figuerra, in his embaſſy in 1518, relates, that the Perſians would neither make uſe of infantry, nor of artillery, becauſe by them the impetuoſity of attack and the facility of retreat were equally incumbered and retarded: in theſe expedients alone their addreſs and their glory conſiſted. This method of advancing and recalling is widely different from the preſent conduct of war, as the artillery in armies is now prodigiouſly multiplied, and muſt be tranſported to every place where any body of troops whatever is deſtined to operate.

The length and diameter of cannon has been much diminiſhed, which muſt likewiſe proportionably diminiſh their weight. It is by long practice and experience that they have diſcovered how much might be deduced from their magnitude in both theſe reſpects with propriety, without hurting the grand effects which, on ſome occaſions, it is neceſſary they ſhould produce, by rendering them more eaſy to be weilded, which was the advantage purſued by leſſening their ſize *.

Artillery-*Park*, the place in the rear of both lines in the army, for encamping the artillery, which is drawn up in lines, of which one is formed by the guns; the ammunition-waggons make two or three lines, 60 paces behind the guns, and 30 diſtant from one another; the pontoons and tumbrils make the laſt line. The whole is ſurrounded with a rope which forms the park: the gunners and matroſſes encamp on the the flanks; and the bombardeers, pontoon-men, and artificers, in the rear.

Artillery-*Train*, a certain number of pieces of ordnance mounted on carriages, with all their furniture fit for marching.

Artillery-*Company*, a band of infantry, conſiſting of 600 men, making part of the militia or city-guard of London.

ARTIST, in a general ſenſe, a perſon ſkilled in ſome art; or, to give Mr Harris's definition, an artiſt is "A perſon poſſeſſing an habitual power of becoming "the cauſe of ſome effect, according to a ſyſtem of various and well-approved precepts." See Art.

We are told * of a privilege granted at Vicenza to artiſts, like that of *clergy* in England: in virtue thereof, criminals adjudged to death ſave their lives if they can prove themſelves the moſt excellent and conſummate workmen in any uſeful art. This benefit is allowed them *in favorem artis*, for the firſt offence, except in ſome particular crimes, of which coining is one; for here the greater the artiſt, the more dangerous the perſon.

Artist, (*Artiſta*), in an academical ſenſe, denotes a philoſopher or proficient in the faculty of arts.

In the early ages of univerſities, the ſeven liberal arts completed the whole courſe of ſtudy, or philoſophy, as it was called: whence the maſters of this faculty were denominated *Artiſts*. What they underſtood by the liberal arts uſed to be ſummed up in the following Latin verſe:

Lingua, Tropus, Ratio, Numerus, Tonus. Angulus, Aſtra.

Artist is more peculiarly uſed, by Paracelſus and other adepts, for a chemiſt or alchemiſt.—We find frequent mention, in authors of this claſs, of Elias Artiſta, or Elias the artiſt, who is to come ſome time before the diſſolution of the world, and reſtore and make perfect all arts and ſciences, but eſpecially the gold making art; and uſher in a truly golden age, or millennium. The lower and meaner things in this ſublime art, Paracelſus obſerves, God has permitted to be already diſcovered; but for the greater and more important matters, as the tranſmutation of other metals into gold, they are reſerved to the coming of Elias the artiſt.

ARTOBRIGA, a town of Vindelicia, (Ptolemy); now *Altzburg*, in Bavaria, on the Danube, below Ingolſtadt, (Aventinus); but Cluverius ſuppoſes it to be *Lebenau*, on the Saltzbach, below Lauſſen, in the archbiſhoprick of Saltzburg.

ARTOIS, a province of France, and one of the fineſt and moſt fertile in the whole kingdom; formerly it was one of the 17 provinces of the Netherlands, but now belongs entirely to France. The names of Artois, and Arras, its capital, are derived from the Atrebates, a people of Gallia Belgica, mentioned by Julius Cæſar. Its greateſt length from north to ſouth is about 24 leagues, and its breadth about 12, being bounded to the ſouth and weſt by Picardy, to the eaſt by Hainault, and to the north by Flanders. A conſiderable trade is carried on in the province in grain, flax, hops, wool, and linen cloth. The ſtates, who meet regularly once a year, conſiſt of the clergy, nobility, and commoners; and ſit generally a fortnight at Arras: their chief buſineſs is to deliberate on the ways and means to raiſe the money which the king demands of them, and which uſually amounts to about 400,000 livres, excluſive of forage-money. The moſt conſiderable places in Artois are, Arras the capital, Bapaume, Bethune, St Venant, and St Omer. See theſe articles.

ARTOTYRITES, a Chriſtian ſect, in the primitive church, who celebrated the euchariſt with bread and cheeſe, ſaying, that the firſt oblations of men were of the fruits of the earth, and of ſheep. The word is derived from αρτος, *bread*, and τυρον, *cheeſe*.

The Artotyrites admitted women to the prieſthood and eſpiſcopacy; and Epiphanius tells us, it was a common thing to ſee ſeven girls at once enter into their church, robed in white, and holding a torch in their hand; where they wept, and bewailed the wretchedneſs of human nature, and the miſeries of this life.

ARVALES fratres, in Roman antiquity, a college of 12 prieſts, inſtituted by Romulus, and choſen out of the moſt noble families, himſelf being one of that body: they aſſiſted in the ſacrifices of the ambervalia, annually offered to Ceres and Bacchus, for the pro-

* See further the articles *Gunnery* and *Projectiles*.

* *Evel.* Diſcourſe of Medals, p. 237, &c.

proſperity of the fruits of the earth; when they wore on their heads crowns made of ears of corn.—The original of this inſtitution was as follows: Acca Laurentia, Romulus's nurſe, was accuſtomed once a-year to make a ſolemn ſacrifice for a bleſſing on the fields, her 12 ſons always aſſiſting her in the ſolemnity; but at laſt loſing one of her ſons, Romulus offered himſelf to ſupply his place, and gave this ſmall ſociety the name of *Arvales fratres*. This order was in great repute at Rome: they held the dignity for life, and never loſt it upon account of impriſonment, baniſhment, or any other accident.

ARUBA, a ſmall iſland on the coaſt of Terra Firma, ſubject to the Dutch, and ſituated in W. Long. 69. 30. N. Lat. 12. 30.

ARUCCI, a town of Bætica, in the Conventus Hiſpalenſis, (Pliny); now *Moron*, in Andaluſia, from an ancient inſcription; five leagues to the weſt of Oſſuna. W. Long. 5. 20. Lat. 37°.

ARVERNI, an appellation early uſed for the capital of the Arverni, according to the cuſtom of the latter ages of naming towns from the people; it was formerly called *Nemoſſus*, (Strabo). The *Arverni*, a brave and ancient people, and one of the moſt powerful nations of Gaul, claimed affinity with the Romans, as deſcendants from Antenor, (Lucan): and after their conqueſt by the Romans, their ancient liberty was preſerved to them, on account of their bravery, (Pliny). Above 1000 years ago the town was called *Clarus Mons*, from its ſituation, (Valeſius). Now *Clermont*, in Auvergne. E. Long. 3. 20. N. Lat. 45. 42.

ARVIL-SUPPER, a feaſt or entertainment made at funerals, in the north part of England. Arvil-bread is the bread delivered to the poor at funeral ſolemnities: and *arvil*, *arval*, *arſal*, are uſed for the burial or funeral rites; as,

> Come, bring my jerkin, Tibb, I'll to the *arvil*,
> Yon man's dea ſcuy ſcoun, it makes me marvil.
>
> *Yorkſh. Dial. p.* 58.

ARVIRAGUS, an ancient Britiſh king who flouriſhed in the time of the emperor Domitian. He gained a complete victory over Claudius: but being ſoon after beſieged in the city of Wincheſter, he made a treaty with the Romans, and married the emperor's daughter Genuiſſa. This monarch lived to a good old age: he confirmed the ancient laws, enacted new ones, and liberally rewarded perſons of merit.

ARUM, WAKEROBIN, OR CUCKOW-PINT; a genus of the polyandria order, belonging to the gynandria claſs of plants.

Species. Of this genus there art 22 ſpecies, of which the moſt remarkable are the following. 1. The maculatum, or common wakerobin, grows naturally in woods and on ſhady banks in moſt parts of Britain. The leaves are halberd-ſhaped, very entire, and ſpotted; the berries numerous, growing in a naked cluſter. The flowers appear in April; and their wonderful ſtructure hath given riſe to many diſputes among the botaniſts. The receptacle is long, in the ſhape of a club, with the ſeed-buds ſurrounding its baſe. The chives are fixed to the receptacle amongſt the ſeed-buds, ſo that there is no occaſion for the tips to be ſupported upon threads, and therefore they have none; but they are fixed to the fruit-ſtalk, and placed between two rows of tendrils: the point in diſpute is, what is the uſe of thoſe tendrils. 2. The proboſcidium. 3. The ariſarum. 4. The tenuifolium. Theſe three ſpecies have uſually been ſeparated from this genus, and diſtinguiſhed by the general name of *ariſarum*, or *friar's cowl*, on account of the reſemblance of their flowers to the ſhape of the cowls worn by friars. The flowers appear in April. 5. The italicum, is a native of Italy, Spain, and Portugal. The leaves riſe a foot and an half high, terminating in a point; they are very large, and finely veined with white, interſperſed with black ſpots, which, together with the fine ſhining green, make a pretty variety. The flowers grow near a foot high; and have very long upright ſpathas, which are of a pale green. They appear in the end of April, or beginning of May. 6. The dracunculus, or common dragon, grows naturally in moſt of the ſouthern parts of Europe. It hath a ſtraight ſtalk three or four feet high, which is ſpotted like the belly of a ſnake: at the top it is ſpread out into leaves, which are cut into ſeveral narrow ſegments almoſt to the bottom, and are ſpread open like a hand; at the top of the ſtalk the flower is produced, which is in ſhape like the common arum, having a long ſpatha of a dark purple colour, ſtanding erect, with a large piſtil of the ſame colour, ſo that when it is in flower it makes no unpleaſing appearance; but the flower hath ſo ſtrong a ſcent of carrion, that few people can endure it, for which reaſon it hath been baniſhed moſt gardens. 7. The trilobatum, or arum of Ceylon, is a native of that iſland and ſome other parts of India; ſo is very impatient of cold. It is a low plant; the flower riſes immediately from the root, ſtanding on a very ſhort footſtalk: the ſpatha is long, erect, and of a fine ſcarlet colour, as is alſo the piſtil. 8. The colocaſia. 9. The divaricatum, with ſpear-ſhaped leaves. 10. The perogrinum, or elder. 11. The eſculentum, or eatable arum. 12. The ſagittifolium, or greateſt Egyptian arum. All theſe ſpecies have mild roots, which are eaten by the inhabitants of the hot countries, where they grow naturally; and ſome of them are cultivated by the inhabitants of the ſugar colonies, where their roots are conſtantly eaten, as alſo the leaves of ſome of them, particularly thoſe of the eſculentum, which they call *Indian kale;* and which, in thoſe countries where many of the eſculent vegetables of England are with difficulty produced, proves a good ſuccedaneum. 13. The arboreſcens, or dumb cane, is a native of the ſugar iſlands, and warm parts of America, where it grows chiefly on low grounds. All the parts of it abound with an acrid juice; ſo that, if a leaf or part of the ſtalk is broken, and applied to the tip of the tongue, it occaſions a very painful ſenſation, and great defluxion of ſaliva. The ſtalks of this plant are ſometimes applied to the mouths of the negroes by way of puniſhment.

Culture. All the ſpecies of this plant are hardy, except that of Ceylon, and the arboreſcens. The Ceylon arum muſt be kept conſtantly in a ſtove, and the laſt in a moderate hot-bed. The arboreſcens is propagated by cutting off the ſtalks into lengths of three or four joints, which muſt be left to dry ſix weeks or two months; for if the wounded part is not perfectly healed over before the cuttings are planted, they will rot and decay. They are then to be planted in ſmall pots filled with light ſandy earth, and plunged in a moderate hot-bed of tan, obſerving to let them have little

Arunda, Arundel.

water till they have taken good root.

Medicinal Uſes. The roots of the maculatum and dracunculus are uſed in medicine, and differ in nothing but that the latter is ſomewhat ſtronger than the former. All the parts of the arum, particularly the root, have an extremely pungent, acrimonious taſte; if the root be but lightly chewed, it continues to burn and vellicate the tongue for ſome hours, occaſioning at the ſame time a conſiderable thirſt: theſe ſymptoms are alleviated by butter, milk, or oily liquors. Dried and kept for ſome time, it loſes much of its acrimony, and becomes at length an almoſt inſipid farinaceous ſubſtance.

This root is a powerful ſtimulant and attenuant. It is reckoned a medicine of great efficacy in ſome cachectic and chlorotic caſes, in weakneſs of the ſtomach occaſioned by a load of viſcid phlegm, and in ſuch diſorders in general as proceed from a cold ſluggiſh indiſpoſition of the ſolids and lentor of the fluids.

ARUNDA, a town of Hiſpania Bætica, on the Annas, or Guadiana, (Ptolemy, Pliny): Now ſaid to be *Ronda*, in the province of Granada, on the confines of Andaluſia. W. Long. 5. 40. Lat. 36. 26.

ARUNDEL (Thomas), archbiſhop of Canterbury in the reigns of Richard II. Henry IV. and Henry V. He was the ſecond ſon of Robert earl of Arundel and Warren, and brother of Richard earl of Arundel who was beheaded. At 22 years of age, from being archdeacon of Taunton he was raiſed to the biſhopric of Ely, the 6th of April, 1375, in the reign of Edward III. He was a great benefactor to the church and palace of this ſee; among other donations he gave a curious table of maſſy gold, adorned with precious ſtones, which had been given to prince Edward by the king of Spain, and ſold by the latter to biſhop Arundel. In 1386, he was appointed lord chancellor of England; two years after, he was tranſlated to the ſee of York; and, in 1396, was advanced to the archiepiſcopal ſee of Canterbury, when he reſigned the chancellorſhip. This was the firſt inſtance of the tranſlation of an archbiſhop of York to the ſee of Canterbury. Scarce was he fixed in this ſee, when he had a conteſt with the univerſity of Oxford, about the right of viſitation. The affair was referred to king Richard, who determined it in favour of the archbiſhop. At his viſitation in London, he revived an old conſtitution, by which the inhabitants of the reſpective pariſhes were obliged to pay to their rector one halfpenny in the pound out of the rent of their houſes. In the ſecond year of his tranſlation, a parliament being held at London, the commons with the king's leave impeached the archbiſhop, together with his brother the earl of Arundel, and the duke of Gloceſter, of high treaſon. The archbiſhop was ſentenced to be baniſhed, and within forty days to depart the kingdom on pain of death. He retired firſt to France; and then to the court of Rome, where pope Boniface IX. gave him a kind reception. About this time, the duke of Lancaſter (afterwards Henry IV). was in France, having been baniſhed by king Richard. The nobility and others, tired with the oppreſſions of Richard, ſolicited the duke to take the crown; this their requeſt they drew up in a letter, and ſent it over by faithful meſſengers to archbiſhop Arundel, deſiring him to be their advocate on this occaſion with the duke. The archbiſhop, being a fellow-ſufferer, gladly accepted the office; and went with the meſſengers to the duke at Paris, where they delivered the letters from the nobles and commons of England, and the archbiſhop ſeconded them with the beſt arguments he could invent. The inviting offer, after ſome objections which were eaſily obviated, the duke accepted; and upon his acceſſion to the throne, Arundel, who had returned with him to England, was reſtored to his ſee. In the firſt year of this prince's reign, Arundel ſummoned a ſynod which ſat at St Paul's. The next year the commons moved that the revenues of the church might be applied to the ſervice of the public; but Arundel oppoſed the motion with ſuch vigour, that it was thrown aſide. In the year 1408, Arundel began to exert himſelf againſt the Lollards, or Wickliffites; and his zeal for ſuppreſſing that ſect carried him to ſeveral unjuſtifiable ſeverities againſt the heads of it, particularly againſt Sir John Oldcaſtle and Lord Cobham. He alſo procured a ſynodical conſtitution, which forbad the tranſlation of the Scriptures into the vulgar tongue. This prelate died at Canterbury, Feb. 20th, 1413, of an inflammation in his throat, with which he was ſeized (as it is pretended) whilſt he was pronouncing ſentence upon Lord Cobham. The Lollards aſſerted this to be a judgement from God; and indeed biſhop Goodwin ſpeaks in the ſame manner, ſaying, "He who had with-held from the people the word of God, the food of the ſoul, by the juſt judgement of God had his throat ſo cloſed, that he could not ſpeak a ſingle word, nor ſwallow meat or drink, and was ſo ſtarved to death." He was buried in the cathedral church of Canterbury, near the weſt end, under a monument erected by himſelf in his lifetime. To this church he was a conſiderable benefactor: for he built the lantern-tower and great part of the nave; gave a ring of five bells, called from him *Arundel's ring*; ſeveral rich veſtments, a mitre enchaſed with jewels, a ſilver gilt croſier, and two golden chalices.

Arundel.

Arundel (Thomas), earl of Arundel and Surry, lord marſhal of England, who ſent William Petty into Aſia, to ſearch for ſome curious monuments of antiquity, where he bought thoſe which we call the *Arundel marbles*, of a Turk, who had taken them from a learned man ſent by the famous Pieresq into Greece and Aſia upon the ſame deſign. Theſe curious marbles were placed in the earl's houſe and gardens, upon the banks of the Thames, and afterwards entruſted to the care of the univerſity of Oxford, where they now are. This chronology, engraved 264 years before the Chriſtian æra, ſerves to rectify the dates of a great many events of the ancient hiſtory of Greece. The great Selden wrote a book of their contents, 1629. They have ſince been publiſhed by Dr Prideaux, 1676, at Oxford; and again, at London, 1732, with commentaries, and an index, by Maittaire. The reader will meet with a correct Latin and Engliſh tranſlation of theſe marbles, in *The Chronological tables of univerſal hiſtory*, by the learned abbe Lenglet Dufrenoy, lately tranſlated into Engliſh.

Arundel, a borough and market town in Suſſex, ſeated on the north-weſt ſide of the river Arun, over which there is a bridge. It had a harbour, wherein a ſhip of 100 tun burthen might ride; but the ſea had ruined it ſo far, that, in 1733, an act paſſed for repairing it, and for erecting new piers, locks, &c. The caſtle, which gives the title of earl to its poſſeſſors, is ſeated on the eaſt of the Tame, and is reputed to be a mile in compaſs. It ſends two members to parliament; and is 55 miles ſouth-weſt by ſouth of London, and ten miles eaſt of Chicheſter. W. Long. 0. 25. N. Lat. 50. 45.

ARUNDO, the REED; a genus of the digynia order, belonging to the triandria claſs of plants.

Species. Of this genus there are ſix ſpecies. 1. The phragmitis, or common marſh-reed, which grows by the ſides of rivers and in ſtanding waters. 2. The denax, or manured reed. This is a native of warm countries, but will bear the cold of our moderate winters in the open air. It dies to the ſurface in autumn, but appears again in the ſpring, and, if kept ſupplied with water, will grow 10 or 12 feet high in one ſummer. The ſtalks of this are brought from Spain and Portugal; and are uſed by the weavers, as alſo for making fiſhing-rods. 3. The verſicolor, or Indian variegated reed, is ſuppoſed to be a variety of the ſecond, differing from it only in having variegated leaves. 4. The bamboa, or bamboo *, is a native of the Eaſt Indies and ſome parts of America. Some of theſe plants, when kept in ſtoves, in this country ariſe to the height of 20 feet; and, were the ſtoves high enough to admit them, they would in appearance riſe to double that height. Some of theſe ſtems are as large as a man's wriſt; but in general are as big as walking-ſticks, for which purpoſe they are as fit as thoſe that are imported from India *. 5. The arborea, with a tree-like ſtalk, differs from the former only in having narrower leaves. 6. The orientalis is what the Turks uſe as writing-pens; it grows in a valley near mount Athos, as alſo on the banks of the river Jordan. None of theſe plants are at preſent to be found in Britain.

Culture. As all theſe plants grow naturally in low marſhy lands, they muſt be ſupplied with plenty of water. The ſecond kind requires little care; the third is more delicate, and requires to be kept in pots. The fourth, fifth, and ſixth ſorts muſt be preſerved in ſtoves. They are to be planted in tubs filled with rich earth, and plentifully ſupplied with water. When the tubs decay, they may be ſuffered to grow into the tan, which will encourage them to grow to a larger ſize: but care muſt be taken, when the bed is refreſhed with new tan, to leave a ſufficient quantity of old tan about the roots of the plants; for if they are too much bared and the new tan laid near them, when that heats, it will ſcorch their roots, ſo that the plants are ſometimes deſtroyed by it.

ARUNDO SACCHARIFERA, or *Sugar-cane.* See SACCHARUM.

ARUSINI CAMPI, plains in Lucania, famous for the laſt battle fought between the Romans and Pyrrhus, and the total defeat of the latter, (Florus, Frontinus).

ARUSPICES, or HARUSPICES, in Roman antiquity, an order of prieſts who pretended to fortel future events by inſpecting the entrails of victims killed in ſacrifice; they were alſo conſulted on occaſion of portents and prodigies. The haruſpices were always choſen from the beſt families; and as their employment was of the ſame nature as that of the augurs, they were as much honoured. Their college, as well as thoſe of the other religious orders, had its particular regiſters and records.

ARX BRITANNICA, a citadel of Batavia, whoſe foundation is ſeen at low water, near the old mouth of the middle Rhine: ſome imagine it the Pharos, or high tower of Caligula, as Suetonius calls it; a monument of Caligula's ſham conqueſt of Britain. Others, that it was built by Druſus, with an altar afterwards by Claudius, on his expedition into Britain. But the uſual paſſage was from Geſſoriacum; and Suetonius expreſsly ſays, Claudius paſſed over thence. The ancient name of this citadel, now covered by the ſea, is no where expreſſed: now commonly called *'t Huis Britten*, or *Brittenburg;* that is, *Arx Britannica;* but from what authority does not appear.

ARYTÆNOIDES, in anatomy, the name of two cartilages which, together with others, conſtitute the head of the larynx. It is alſo applied to ſome muſcles of the larynx.

ARYTHMUS, in medicine, the want of a juſt modulation in the pulſe. It is oppoſed to *eurythmus*, a pulſe modulated agreeably to nature.

ARZERUM, or ERZERUM. See THEODOSIOPOLIS.

ARZILLA, a very ancient maritime town of Africa, in the kingdom of Fez. Alphonſo king of Portugal took it by aſſault, and brought away the preſumptive heir of the crown. After that prince came to the throne, he beſieged it, in 1508, with 100,000 men; but was obliged to abandon the undertaking. However, at length the Portugueſe forſook it of their own accord. W. Long. 5. 30. N. Lat. 35. 30.

AS, in antiquity, a particular weight, conſiſting of 12 ounces; being the ſame with *libra*, or the Roman pound. The word is derived from the Greek αις, which in the Doric dialect is uſed for εις, *one*, q. d. an entire thing; though others will have it named *as* quaſi *æs*, becauſe made of braſs.

As was alſo the name of a Roman coin, which was of different weights and different matter in different ages of the commonwealth.—Under Numa Pompilius, according to Euſebius, the Roman money was either of wood, leather, or ſhells. In the time of Tullus Hoſtilius, it was of braſs; and called *as*, *libra*, *libella*, or *pondo*, becauſe actually weighing a pound or 12 ounces. Four hundred and twenty years after, the firſt Punic war having exhauſted the treaſury, they reduced the *as* to two ounces. In the ſecond Punic war, Hannibal preſſing very hard upon them, they reduced the *as* to half its weight, *viz.* to one ounce. And laſtly, by the Papirian law, they took away half an ounce more, and conſequently reduced the *as* to the diminutive weight of half an ounce: and it is generally thought that it continued the ſame during the commonwealth, and even till the reign of Veſpaſian. The *as* therefore was of four different weights in the commonwealth. Its original ſtamp was that of a ſheep, ox, or ſow: but from the time of the emperors, it had on one ſide a Janus with two faces, and on the reverſe the roſtrum or prow of a ſhip.

As was alſo uſed to denote any integer or whole. Whence the Engliſh word *ace.*—Thus *as* ſignified the whole inheritance; whence *hæres ex aſſe*, the heir to the whole eſtate.

ASA, king of Judah, ſucceeded his father Abijam. He pulled down the altars erected to idols, reſtored the worſhip of the true God, and, with the aſſiſtance of Benhadad king of Syria, took ſeveral towns from the king of Iſrael. He died 917 years before the Chriſtian æra, and was ſucceeded by Jehoſhaphat.

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* See *Bamboo.*

* See *Cane.*

ASA, or **ASSA**, in the materia medica, a name given to two very different ſubſtances, called *aſa-dulcis*, and *aſa-fœtida*.

ASA-*Dulcis* is the ſame with Benzoin *.

* See Benzoin.

ASA-*Fœtida* is the concrete juice of a large umbelliferous plant growing in Perſia. This juice exſudes from wounds made in the root of the plant, liquid and white like milk. When expoſed to the air, it turns of a browniſh colour, and gradually acquires different degrees of conſiſtence. It is brought to us in large irregular maſſes, compoſed of various little ſhining grains, which are partly whitiſh, partly reddiſh, and partly of a violet colour. Thoſe maſſes are accounted the beſt which are clear, of a pale reddiſh colour, and variegated with a great number of elegant white tears. This drug has a ſtrong fetid ſmell, like garlic; and a bitter, acrid, biting taſte. It is frequently uſed in hyſteric and nervous complaints, flatulent colics, and as a promoter of the menſes. See MATERIA MEDICA, nº 129.

ASAPH (St), a city in Flintſhire, with a biſhop's ſee; on which account only it is taken notice of; for it is ſo poor a place, it would not otherwiſe be worth mentioning. W. Long. 3. 25. N. Lat. 53. 18.

ASAPPES, or **AZAPES**, in the Turkiſh armies, a name given to the auxiliary troops which they raiſe among the Chriſtians under their dominion, and expoſe to the firſt ſhock of the enemy.

ASAR-ADDON, or **ESAR-HADDON**, the ſon of Sennacherib, ſucceeded his father about 712 years before the Chriſtian æra, and united the kingdoms of Nineveh and Babylon. He rendered himſelf maſter of Syria; ſent a colony to Samaria; and his generals took king Maneſſes, and carried him loaded with chains to Babylon. Aſar-Addon died after a reign of 12 years.

ASARINA. See CHELONE.

ASARUM, ASARABACCA; a genus of the monogynia order, belonging to the dodecandria claſs of plants.

Species. Of this genus there are three ſpecies; the Europeum, the Canadenſe, and Virginicum. The firſt ſpecies grows naturally in ſome parts of England. It hath thick fleſhy jointed roots; the leaves grow ſingly upon ſhort foot-ſtalks, which ariſe immediately from the root: the flowers grow upon very ſhort foot-ſtalks cloſe to the ground, ſo are hid under the leaves. They have a bell-ſhaped empalement, of a worn-out purple colour, which is cut in three at the top, where it turns backward. It delights in a moiſt ſhady place, and may be propagated by parting the roots in autumn. The two other ſpecies have no remarkable properties.

Medicinal Uſes. The dried roots of this plant have been generally brought from the Levant; thoſe of our own growth being ſuppoſed weaker.

Both the roots and leaves have a nauſeous, bitter, acrimonious, hot taſte; their ſmell is ſtrong, and not very diſagreeable. Given in ſubſtance from half a dram to a dram, they evacuate powerfully both upwards and downwards. It is ſaid, that tinctures made in ſpirituous menſtrua, poſſeſs both the emetic and cathartic virtues of the plant; that the extract obtained by inſpiſſating theſe tinctures, acts only by vomit, and with great mildneſs; that an infuſion in water proves cathartic, rarely emetic; that aqueous decoctions made by long boiling, and the watery extract, have no purgative or emetic quality, but prove notable diaphoretics, diuretics, and emmenagogues.

The principal uſe of this plant among us is as a ſternutatory. The root of aſarum is perhaps the ſtrongeſt of all the vegetable errhines, white hellebore itſelf not excepted. Snuffed up the noſe, in the quantity of a grain or two, it occaſions a large evacuation of mucus, and raiſes a plentiful ſpitting. The leaves are conſiderably milder, and may be uſed to the quantity of three, four, or five grains. Geoffroy relates, that after ſnuffing up a doſe of this errhine at night, he has frequently obſerved the diſcharge from the noſe to continue for three days together; and that he has known a paralyſis of the mouth and tongue cured by one doſe. He recommends this medicine in ſtubborn diſorders of the head proceeding from viſcid tenacious matter, in palſies, and in ſoporific diſtempers *.

* See *Materia Medica*, nº 130.

ASBESTOS, a ſort of native foſſile ſtone, which may be ſplit into threads and filaments, from one inch to ten inches in length, very fine, brittle, yet ſomewhat tractable, ſilky, and of a greyiſh colour, not unlike talc of Venice. It is almoſt inſipid to the taſte, indiſſoluble in water, and endued with the wonderful property of remaining unconſumed in the fire, which only whitens it. There are ſome ſorts of aſbeſtos whoſe filaments are rigid and brittle; others more flexible. The firſt are not at all to be ſpun or formed into cloth, and the latter very difficultly. This manufacture appears to have been known among the ancients, who, according to Pliny, wrapt the corpſes of the dead in aſbeſtine clothes to preſerve their aſhes ſeparate from thoſe of the funeral pile; an uſe to which they are ſtill ſaid to be applied among the princes of Tartary. The method of preparation, as deſcribed by Ciampini in the Philoſophical Tranſactions, nº 273, is as follows. The ſtone is laid to ſoak in warm water, then opened and divided by the hands, that the earthy matter may be waſhed out. This earth is white like chalk, and renders the water thick and milky. The ablution being ſeveral times repeated, the flax-like filaments are collected and dried: they are moſt commodiouſly ſpun with an addition of flax. Two or three filaments of the aſbeſtos are eaſily twiſted along with the flaxen thread, if the operator's fingers are kept oiled. The cloth alſo when woven is beſt preſerved by oil from breaking or waſting. On expoſure to the fire, the flax and oil burn out, and the cloth comes out pure and white. Probably from the diſſipation of ſome extraneous matter of this kind proceeded the diminution of weight which an aſbeſtine napkin ſuffered in the fire, in an experiment made before the Royal Society; for pure aſbeſtos loſes nothing.—The ſhorter filaments, which ſeparate in waſhing the ſtone, may be made into paper in the common manner. This ſtone is found in many places of Aſia and Europe; particularly in the iſland of Angleſey in Wales, and in Aberdeenſhire in Scotland.

ASBAMEA, a fountain of Cappadocia, near Tyana, ſacred to Jupiter, and to an oath. Tho' this fountain bubbled up, as in a ſtate of boiling, yet its water was cold; and never ran over, but fell back again, (Philoſtratus, Ammian).

ASCALON, an ancient city, and one of the five ſatrapies or principalities of the Philiſtines; ſituated on the Mediterranean, 43 miles to the ſouth-weſt of Jeruſalem, (Antonine), between Azotus to the north, and Gaza to the ſouth. The birth-place of Herod the Great, thence ſurnamed *Aſcalonita*, (Stephanus). Famous for its ſcallions, which take name from this town, (Strabo, Pliny). Now *Scalona*. E. Long. 34. 30. Lat. 31. 30.

ASCANIUS, the ſon of Æneas and Creuſa, ſucceeded his father in the kingdom of the Latins, and defeated Mezentius king of the Tuſcans, who had refuſed to conclude a peace with him. At length he founded Alba Longa; and died about 1139 years before the Chriſtian æra, after a reign of 38 years.

ASCARIS, in zoology, a genus of inſects belonging to the order of vermes inteſtina. The body of the aſcaris is cylindrical, filiform, and tapers at both ends. The ſpecies are two, *viz.* 1. The vermicularis, with faint annular rugæ, and the mouth tranſverſe, is about a quarter of an inch long, and thicker at one end than the other. It is found in boggy places, in the roots of putrid plants, and very frequently in the rectum of children and horſes. It emaciates children greatly, and is ſometimes vomited up. 2. The lumbricoides is about the ſame length with the lumbricus terreſtris, or common earth-worm; but it wants the protuberant ring towards the middle of the body, the only mark by which they can properly be diſtinguiſhed. The body of the lumbricoides is cylindrical, and ſubulated at each extremity; but the tail is ſomewhat triangular. The lumbricoides is the worm which is moſt commonly found in the human inteſtines. It is viviparous, and produces vaſt numbers. For the method of expelling theſe two kinds of inſects, ſee the *Index* ſubjoined to MEDICINE.

ASCENDANTS, in law, are oppoſed to deſcendants in ſucceſſion; *i. e.* when a father ſucceeds his ſon, or an uncle his nephew, *&c.* heritage is ſaid to aſcend, or go to aſcendants.

ASCENDING, in aſtronomy, is ſaid of ſuch ſtars as are riſing above the horizon in any parallel of the equator.

ASCENDING *Latitude*, is the latitude of a planet when going towards the north pole.

ASCENDING *Node*, is that point of a planet's orbit, wherein it paſſes the ecliptic, to proceed northward. This is otherwiſe called the *northern node*, and repreſented by this character ☊.

ASCENDING *Veſſels*, in anatomy, thoſe which carry the blood upwards; as the aörta aſcendens *.

* See *Aorta*.

ASCENSION, in aſtronomy, is either right or oblique. Right aſcenſion of the ſun, or a ſtar, is that degree of the equinoctial, counted from the beginning of aries, which riſes with the ſun or ſtar in a right ſphere. Oblique aſcenſion is an arch of the equator intercepted between the firſt point of aries, and that point of the equator which riſes together with a ſtar in an oblique ſphere.

ASCENSION *Day*, a feſtival of the Chriſtian church, held ten days before Whitſuntide, in memory of our Saviour's aſcenſion into heaven after his reſurrection.

ASCENSION *Iſland*, a barren iſland on the coaſt of Africa, lying in W. Long. 17. 20. S. Lat. 7. 5. The following account is given of it by Mr Forſter. "This iſland was firſt diſcovered in 1501, by Joaõ de Nova Galego, a Portugueſe navigator, who named it *Ilha de Noſſa Senhora de Conceiçao*. The ſame admiral, on his return to Portugal in 1502, diſcovered the iſland of St Helena, which obtained that name from the day of the diſcovery. Aſcenſion was ſeen a ſecond time by Alfonſo d'Albuquerque on his voyage to India in 1503, and then received the name it now bears; but was already at that time in the ſame deſolate condition as at preſent. We ſent ſeveral parties on ſhore, who paſſed the night on the watch for turtles, which came to lay their eggs on the ſandy ſhores. The drearineſs of this iſland ſurpaſſed all the horrors of Eaſter Iſland and Tierra del Puego, even without the aſſiſtance of ſnow. It was a ruinous heap of rocks, many of which, as far as we could diſcern from the ſhip, ſeemed to be totally changed by the fire of a volcano. Nearly in the centre of the iſland riſes a broad white mountain of great height, on which we diſcerned ſome verdure by the help of our glaſſes, from whence it has obtained the name of *Green Mountain*.

"We landed early in the morning among ſome rocks, the ſurf being always immenſely high on the great beach; which conſiſts of minute ſhell-ſand, chiefly of a ſnowy white, very deep, dry, and intolerable to the eyes when the ſun ſhines. We aſcended among heaps of black cavernous ſtone, which perfectly reſembles the moſt common lavas of Veſuvius and Iceland, and of which the broken pieces looked as if they had been accumulated by art. The lava currents cooling very ſuddenly, may eaſily be imagined to produce ſuch an effect. Having aſcended about 12 or 15 yards perpendicular, we found ourſelves on a great level plain, of ſix or eight miles in circuit; in the different corners of which, we obſerved a large hill of an exact conical ſhape, and of a reddiſh colour, ſtanding perfectly inſulated. Part of the plain between theſe conic hills was covered with great numbers of ſmaller hillocks, conſiſting of the ſame wild and ragged lava as that near the ſea, and ringing like glaſs when two pieces are knocked together. The ground between the heaps of lava was covered with a black earth, on which we walked very firmly; but when theſe heaps did not appear, the whole was a red earth, which was ſo looſe, and in ſuch dry minute particles, that the wind raiſed clouds of duſt upon it. The conic hills conſiſted of a very different ſort of lava, which was red, ſoft, and crumbling into earth. One of theſe hills ſtands directly in front of the bay, and has a wooden croſs on its ſummit, from whence the bay is ſaid to take its name. Its ſides are very ſteep, but a path near three quarters of a mile long winds round it to the ſummit. After examining this remarkable country a little longer, we concluded, with a great degree of probability on our ſide, That the plain on which we ſtood was once the crater or ſeat of a volcano, by the accumulation of whoſe cinders and pumice-ſtones the conic hills had been gradually formed: that the currents of lava which we now ſaw divided into many heaps, had perhaps been gradually buried in freſh cinders and aſhes; and the waters coming down from the interior mountain in the rainy ſeaſon had ſmoothened every thing in their way, and filled up by degrees the cavity of the crater. The rocky black lava was the reſidence of numberleſs men-of-war birds and boobies, which ſat on their eggs, and ſuffered us to come cloſe to them.

“ About eight in the evening, it being then quite dark, a ſmall veſſel came into the bay, and anchored directly within us. Captain Cook having hailed her repeatedly, received in anſwer, that ſhe was the Lucretia, a New-York ſloop, which had been at Sierra Leon, and was now come to catch turtles, in order to ſell them at the windward iſlands of the Weſt Indies. A lieutenant was ſent on board, who learned from the maſter, that he had taken our ſhip to be a French Indiaman, and was very deſirous of trading with Engliſh India-ſhips, in which he was diſappointed by the company's regulations. He dined with our officers the next day, but on the 31st at day-break left the iſland. On the 30th in the morning, we landed a ſecond time; and, croſſing the plain, arrived at a prodigious lava-current, interſected by many channels from ſix to eight yards deep, which bore ſtrong marks of being worn by vaſt torrents of water, but were at preſent perfectly dry, the ſun being in the northern hemiſphere. In theſe gullies we found a ſmall quantity of ſoil conſiſting of a black volcanic earth, mixed with ſome whitiſh particles gritty to the touch. Here we ſaw ſome ſmall bunches of purſlane, and a ſpecies of graſs (*panicum ſanguineum*) which found ſufficient nutriment in the dry ſoil. Having at laſt, with great fatigue, climbed over this extenſive and tremendous current of lava, which was much more ſolid than the heaps nearer to the ſea, we came to the foot of the Green Mountain, which even from the ſhips place in the bay we had plainly diſtinguiſhed to be of a different nature from all the reſt of the country. Thoſe parts of the lava which ſurrounded it were covered with a prodigious quantity of purſlane, and a kind of new fern (*lonchites Adſcenſionis*), where ſeveral flocks of wild goats were feeding. The great mountain is divided in its extremities, by various clefts, into ſeveral bodies; but in the centre they all run together, and form one broad maſs of great height. The whole appears to conſiſt of a gritty tophaceous lime-ſtone, which has never been attacked by the volcano, but probably exiſted prior to its eruption; its ſides are covered with a kind of graſs, peculiar to the iſland, which Linnæus has named *ariſtida Adſcenſionis*. We likewiſe obſerved ſeveral flocks of goats feeding on it; but they were all exceſſively ſhy, and ran with ſurpriſing velocity along tremendous precipices, where it was impoſſible to follow them. The maſter of the New-York ſloop acquainted us, that there is a ſpring of water on one part of this mountain, which falls down a great precipice, and is afterwards abſorbed in the ſand. I am almoſt perſuaded, that, with a little trouble, Aſcenſion might ſhortly be made fit for the reſidence of men. The introduction of furze (*ulex Europæus*), and of a few other plants which thrive beſt in a parched ſoil, and are not likely to be attacked by rats or goats, would ſoon have the ſame effect as at St Helena. The moiſture attracted from the atmoſphere by the high mountains in the centre of the iſland, would then no longer be evaporated by the violent action of the ſun, but collect into rivulets, and gradually ſupply the whole iſland. A ſod of graſſes would every where cover the ſurface of the ground, and annually increaſe the ſtratum of mould, till it could be planted with more uſeful vegetables.

“ We returned gradually to Croſs Bay, in the heat of noon, over the plain; having a ſpace of more than five miles to traverſe, where the ſun burnt and bliſtered our faces and necks, and heated the ſoil to ſuch a degree, that our feet were likewiſe extremely ſore. About three o'clock we arrived at the water's ſide; and after bathing in a ſmall cove among a few rocks, we made the ſignal for a boat, and were taken on board. The next forenoon we made another ſmall excurſion, in company with captain Cook, towards the Green Mountain; but we were all of us ſo much fatigued, that we could not reach it. We made no new obſervations in the courſe of this day, the nature of the iſland being dreary beyond deſcription in its outſkirts.”

ASCENSIONAL DIFFERENCE, the difference between the right and oblique aſcenſion of the ſame point to the ſurface of the ſphere.

ASCENT, in a general ſenſe, implies the motion of a body upwards, or the continual receſs of a body from the earth. The Peripatetics attribute the ſpontaneous *aſcent* of bodies to a principle of levity inherent in them. The moderns deny any ſuch thing as ſpontaneous levity; and ſhew, that whatever *aſcends*, does it in virtue of ſome external impulſe or extruſion. Thus it is that ſmoke and other rare bodies *aſcend* in the atmoſphere; and oil, light woods, *&c.* in water; not by any external principle of levity, but by the ſuperior gravity or tendency downwards of the parts of the medium wherein they are. The *aſcent* of light bodies in heavy mediums is produced after the ſame manner as the *aſcent* of the lighter ſcale of a balance. It is not that ſuch ſcale has an internal principle whereby it immediately tends upwards; but it is impelled upwards by the preponderancy of the other ſcale; the exceſs of the weight of the one having the ſame effect, by augmenting its impetus downwards, as ſo much real levity in the other; by reaſon the tendencies mutually oppoſe each other, and that action and reaction are always equal.

ASCENT *of Bodies on Inclined Planes*, the reader will find explained under MECHANICS; ASCENT *of Fluids*, under HYDROSTATICS; and ASCENT *of Vapours*, under the article EVAPORATION.

ASCESIS, properly denotes exerciſe of the body. It is formed from the verb ασκειν, uſed by the ancients in ſpeaking of the ſports and combats of the athletæ.

ASCESIS is alſo uſed by philoſophers, to denote an exerciſe conducive to virtue, or to the acquiring a greater degree of virtue. This is particularly denominated the *philoſophical aſceſis*, becauſe practiſed chiefly by philoſophers, who make a more peculiar profeſſion of improving themſelves in virtue; on the model whereof, the ancient Chriſtians introduced a religious Aſceſis.

ASCETERIUM, in eccleſiaſtical writers, is frequently uſed for a monaſtery, or place ſet apart for the exerciſes of virtue and religion. The word is formed from *aſceſis*, exerciſe; or *aſcetra*, one who performs exerciſe. Originally it ſignified a place where the athletæ or gladiators performed their exerciſes.

ASCETICS, in church-hiſtory, ſuch Chriſtians in the primitive church as enured themſelves to great degrees of abſtinence and faſting, in order to ſubdue their paſſions.

ASCHAFENBURG, a town of Germany, ſeated on the river Maine, in the circle of the lower Rhine, and territory of the elector of Mentz, who has a palace there. It is memorable for being the place where the king of Great Britain took up his quarters the night before the battle of Dettingen. E. Long. 9. 35. N. Lat. 50. 14.

ASCHAM (Roger) was born at Kirby-Wiſke, near North-Allerton in Yorkſhire, in the year 1516. His father was ſteward to the noble family of Scroop. Our author Roger was educated in the family of Sir Anthony Wingfield, who, about the year 1530, ſent him to St. John's College, Cambridge, where he was ſoon diſtinguiſhed for his application and abilities. He took his degree of bachelor of arts at the age of eighteen, was ſoon after elected fellow of his college, and in 1536 proceeded maſter of arts. In 1544, he was choſen univerſity orator; and, in 1548, was ſent for to court, to inſtruct the lady Elizabeth (afterwards queen) in the learned languages. In the year 1550, he attended Sir Richard Moryſine, as ſecretary, on his embaſſy to the emperor Charles V. at whoſe court he continued three years, and in the mean time was appointed Latin ſecretary to king Edw. VI. But, upon the death of that prince, he loſt his preferment and all his hopes, being profeſſedly of the reformed religion; yet, contrary to his expectations, he was ſoon after, by the intereſt of his friend lord Paget, made Latin ſecretary to the king and queen. In June 1554, he married Mrs Maragret How, a lady of a good family, with whom he had a conſiderable fortune. It is very remarkable of Mr Aſcham, that, tho' he was known to be a Proteſtant, he continued in favour not only with the miniſtry of thoſe times, but with queen Mary herſelf. Upon the acceſſion of queen Elizabeth, he was not only confirmed in his poſt of Latin ſecretary, but was conſtantly employed as preceptor to her majeſty in the Greek and Latin languages. He died in the year 1568, much regretted, eſpecially by the queen, who ſaid ſhe had rather loſt ten thouſand pounds. Camden and ſome other writers tell us, that he had a great propenſity to dice and cock-fighting. He certainly died poor.—He wrote,

1. Toxophilus. The ſchole or partitions of ſhooting, contayned in two bookes, written by Roger Aſcham, 1544, and now newly peruſed. Pleaſaunt for all gentlemen and yeomen of England, &c. Lond. 1571. Whilſt at the univerſity he was fond of archery by way of exerciſe and amuſement, for which he was cenſured; and on that account he ſat down to write this book, which was dedicated to Hen. VIII. who ſettled a penſion of 10l. per annum on the author. It is rather whimſical; but is admirably well written, and full of learning. 2. A report and diſcourſe, written by Roger Aſcham, of the affairs and ſtate of Germany, and the emperor Charles his court, &c. 4to. A valuable curioſity. 3. The ſchoolmaſter. Firſt printed in 1573, 4to. Mr Upton publiſhed an edition with notes in 1711. It has uncommon merit; abounding in great good ſenſe, as well as knowledge of ancient and modern hiſtory: it is alſo expreſſive of the great humanity of the author, who was for making the paths of knowledge as level and pleaſant as poſſible, and for trying every gentle method of enlarging the mind and winning the heart. 4. Latin epiſtles. Firſt publiſhed by Mr Grant in 1576; have ſince paſſed many editions: the beſt is that of Oxford in 1703. Much admired on account of the ſtyle, and eſteemed almoſt the only claſſical work of that kind written by an Engliſhman. 5. Apologia contra miſſam. 1577, 8vo.

ASCIDIA, a genus of animals belonging to the order of vermes molluſca. The body is cylindrical, and fixed to a ſhell, rock, &c. It has two apertures; one on the ſummit, the other lower, forming a ſheath. There are ſix ſpecies of this animal, *viz.* the papilloſum, gelatinoſum, inteſtinalis, quadridentata, ruſtica, and echinata; only one of which, viz. the ruſtica *, is found in the Britiſh ſeas. Animals of this genus have the faculty of ſquirting out the water they take in. Plate XLII. fig. 2.

ASCII, among geographers, an appellation given to thoſe inhabitants of the earth who, at certain ſeaſons of the year, have no ſhadow: ſuch are all the inhabitants of the torrid zone, when the ſun is vertical to them.

ASCITÆ, (from ασκος, a *bag* or *bottle*), in antiquity a ſect or branch of Montaniſts, who appeared in the ſecond century. They were ſo called, becauſe they introduced a kind of Bacchanals into their aſſemblies, who danced round a bag or ſkin blowed up; ſaying, They were thoſe new bottles filled with new wine, whereof our Saviour makes mention, Matth. ix. 17. —They are ſometimes alſo called *Aſcodrogitæ*.

ASCITES, in medicine, the dropſy.

ASCLEPIA, a feſtival of Eſculapius the god of phyſic, obſerved particularly at Epidaurus, where it was attended with a conteſt between the poets and muſicians, whence it was likewiſe called Ιερος Αγων, *the ſacred contention.*

ASCLEPIAD, in ancient poetry, a verſe compoſed of four feet, the firſt of which is a ſpondee, the ſecond a choriambus, and the two laſt dactyls; or of four feet and a cæſura, the firſt a ſpondee, the ſecond a dactyl, after which comes the cæſura, then the two dactyls; as, *Mæcenas atavis edite regibus.*

ASCLEPIADES, one of the moſt celebrated phyſicians among the ancients, was a native of Pruſa, in Bithynia; and practiſed phyſic at Rome, under Pompey, ninety-ſix years before the Chriſtian æra. He was the head of a new ſect; and, by making uſe of wine and cold water in the cure of the ſick, acquired a very great reputation. He wrote ſeveral books, which are frequently mentioned by Galen, Celſus and Pliny; but they are now loſt.

ASCLEPIADES, a famous phyſician under Hadrian, of the ſame city with the former: he wrote ſeveral books concerning the compoſition of medicines, both internal and external.

ASCLEPIAS, SWALLOW-WORT; a genus of the digynia order, belonging to the pentandria claſs of plants.

Species. Of this genus there are 19 ſpecies enumerated by botanical writers; but the following are the moſt remarkable. 1. The alba, or common ſwallow-wort. The root is compoſed of many ſtrong fibres connected at top like thoſe of aſparagus, from whence ariſe many ſtalks, in number proportional to the ſize of the roots, which grow two feet high, and are very ſlender at the top: the leaves are placed oppoſite by pairs; the flowers are white, growing in umbels near the top of the ſtalk, from whence are ſent out ſmaller umbels. After the flower is paſt, the two germens become long pointed pods, incloſing many compreſſed ſeeds lying imbricatim, which are crowned with a ſoft white down. It flowers in June, and the ſeeds ripen in September. It is a native of the ſouth of France, Spain, and Italy. 2. The Syriaca, or greater Syrian dogsbane, is a perennial plant, which ſends up ſeveral upright ſtalks in the ſpring, about two feet high, garniſhed with oval leaves growing oppoſite; at the top of the ſtalks the umbels of flowers are produced, which are of a bright purple colour, making a pretty appearance, but are not ſucceeded by pods in England. 3. The curraſſavica, or baſtard ipecacuanha, is a native of the warm parts of America. It riſes to the height of five or ſix feet, with upright ſtems, and ſmooth oblong leaves placed oppoſite. Toward the top of the branches the umbels of flowers come out, which ſtand erect: the petals of the flowers are of a ſcarlet colour, and the horny nectariums in the middle are of a bright ſaffron colour, which make a pretty appearance; and there is a ſucceſſion of flowers on the ſame plant from June to October. The flowers are ſucceeded by long taper pods, filled with ſeeds crowned with a ſoft down, which ripen late in autumn. The firſt two ſpecies are hardy; but the laſt one is tender, and therefore muſt be preſerved in a ſtove.

Medicinal Uſes, &c. The root of the firſt ſpecies is uſed in medicine. It is reckoned by botaniſts a ſpecies of apocynum, or dogſbane; from all the poiſonous ſorts of which it may be diſtinguiſhed, by yielding a limpid juice, whilſt that of the others is milky. The root has a ſtrong ſmell, eſpecially when freſh, approaching to that of valerian, or nard; the taſte is at firſt ſweetiſh and aromatic, but ſoon becomes bitteriſh, ſubacrid, and nauſeous. This root is eſteemed ſudorific, diuretic, and emmenagogue: it is alſo frequently employed by the French and German phyſicians as an alexipharmic, and ſometimes as a ſuccedaneum to contrayerva, whence it has received the name of *contrayerva Germanorum*. Among us it is very rarely made uſe of: it appears from its ſenſible qualities to be a medicine of much the ſame kind with valerian, which is indiſputably preferable to it.

The root of the third ſpecies has been ſometimes ſent over from America inſtead of that of ipecacuanha, and miſchievous effects have been produced by it. Thoſe who cultivate this plant ought to be careful that none of its milky juice mix with any thing which is taken inwardly.

ASCODRUTÆ, in antiquity, a ſect of heretics, in the ſecond century, who rejected all uſe of ſymbols and ſacraments, on this principle, That incorporeal things cannot be communicated by things corporeal, nor divine myſteries by any thing viſible.

ASCOLI, formerly *Aſculum Apulum*, a pretty large and populous town of Italy, in the marche of Ancona, and territory of the church; it is a biſhop's ſee, and ſeated on a mountain, at the bottom of which runs the river Fronto. E. Long. 15. 20. N. Lat. 42. 47.

Ascoli de Satriano, formerly *Aſculum Picenum*, an epiſcopal city of Italy, in the kingdom of Naples; ſeated on a mountain. E. Long. 15. 5. N. Lat. 42. 8.

ASCOLIA, in Grecian antiquity, a feſtival celebrated by the Athenian huſbandmen in honour of Bacchus, to whom they ſacrificed a he-goat, becauſe it deſtroys the vines (Ovid. Faſt. i. 357.); and, to ſhew the greater indignity to an animal hated by Bacchus, the peaſants, after having killed him, made a foot-ball of his ſkin. Virgil has beautifully deſcribed the occaſion of the ſacrifice, and manner of celebrating the feſtival, Georg. ii. 380.

ASCYRUM, PETERS-WORT; a genus of the polyandria order, belonging to the polydelphia claſs of plants. Of this genus there are three ſpecies; but they have no property worthy of notice, and therefore are never cultivated but in botanic gardens for the ſake of variety.

ASDRUBAL, the name of ſeveral Carthaginian generals. See Carthage.

ASELLUS, in zoology, the trivial name of a ſpecies of oniſcus. See Oniscus.

ASGILL (John), a late humourous writer, was bred to the law, and practiſed in Ireland with great ſucceſs. He was there elected a member of the houſe of commons, but was expelled for writing a treatiſe on the poſſibility of avoiding death; and being afterwards choſen a member for the borough of Bramber, in Suſſex, he was alſo on the ſame account expelled the parliament of England. After this, he continued thirty years a priſoner in the mint, fleet, and king's-bench; during which time he publiſhed a multitude of ſmall political pamphlets, ſeveral of which were in defence of the ſucceſſion of the houſe of Hanover, and againſt the pretender. He died in the rules of the king's-bench, in the year 1738, when he was upwards of fourſcore.

ASH, in botany. See Fraxinus.

Ash-*Hole*, among chemiſts, is the loweſt part of a furnace; and is intended to receive the aſhes falling from the fire, and to give a paſſage to the air which is to be introduced into the furnace, to keep up the combuſtion.

Ash-*Wedneſday*, the firſt day of Lent; ſuppoſed to have been ſo called from a cuſtom in the church, of ſprinkling aſhes that day on the heads of penitents then admitted to penance. See Lent.

ASHBORN, a town in Derbyſhire, ſeated between the rivers Dove and Compton, over which there is a ſtone bridge, in a rich ſoil. It is a pretty large town, though not ſo flouriſhing as formerly. W. Long. 1. 35. N. Lat. 53. 0.

ASHBURTON, a town in Devonſhire. It ſends two members to parliament, and is one of the four ſtannery towns. It is ſeated among the hills, which are remarkable for tin and copper; and has a very handſome church; as alſo a chapel, which is turned into a ſchool. W. Long. 3. 10. N. Lat. 50. 30.

ASHBY de la Zouch, a market town in Leiceſterſhire, ſituated in W. Long. 1. 20. N. Lat. 52. 40. It had a caſtle which was long in the poſſeſſion of the family of de la Zouch. It afterwards fell into the hands of Edward IV. who granted it to Sir Edward Haſtings, created baron Haſtings, with licence to make a caſtle of the manor houſe, to which he adjoined a very high tower. It was demoliſhed in 1648; but a great part of the tower is ſtill ſtanding. It now belongs to the earl of Huntingdon.

ASHES, the earthy particles of combuſtible ſubſtances after they have been burnt.

If the aſhes are produced from vegetable bodies, they contain a conſiderable quantity of fixed ſalt, blended with the terrene particles: and from theſe aſhes the fixed alkaline ſalts called *pot-aſh*, *pearl-aſh*, &c. are extracted.

The aſhes of all vegetables are vitreſiable, and found to contain iron.—They are alſo an excellent manure for cold and wet grounds. See Agriculture, n° 21.

ASHFORD, a market-town of Kent, ſituated about 12 miles ſouth-weſt of Canterbury, in E. Long. 45. and N. Lat. 51. 15.

ASHMOLE (Elias), a great antiquary and herald, Aſhmole.

founder of the Aſhmolean muſæum at Oxford, was born at Litchfield in Staffordſhire, 1617. In the early part of his life, he practiſed in the law; and in the civil war had a captain's commiſſion under the king, and was alſo comptroller of the ordnance. He married the lady Mainwaring in 1649, and ſettled at London; where his houſe was frequented by all the learned and ingenious men of the time. Mr Aſhmole was a diligent and curious collector of manuſcripts. In the year 1650, he publiſhed a treatiſe written by Dr Arthur Dee, relating to the philoſopher's ſtone; together with another tract on the ſame ſubject, by an unknown author. About the ſame time, he was buſied in preparing for the preſs a complete collection of the works of ſuch Engliſh chemiſts as had till then remained in manuſcript. This undertaking coſt him great labour and expence; and at length the work appeared, towards the cloſe of the year 1652. He propoſed at firſt to have carried it on to ſeveral volumes; but he afterwards dropped this deſign, and ſeemed to take a different turn in his ſtudies. He now applied himſelf to the ſtudy of antiquity and records: he was at great pains to trace the Roman road, which in Antoninus's Itinerary is called *Bennevanna*, from Weedon to Litchfield, of which he gave Mr Dugdale an account in a letter. In 1658, he began to collect materials for his hiſtory of the order of the garter, which he lived to finiſh, and thereby did no leſs honour to the order than to himſelf. In September following, he made a journey to Oxford, where he ſet about giving a full and particular deſcription of the coins preſented to the public library by archbiſhop Laud.

Upon the reſtoration of king Charles II. Mr. Aſhmole was introduced to his majeſty, who received him very graciouſly; and on the 18th of June 1660, beſtowed on him the place of Windſor herald. A few days after, he appointed him to give a deſcription of his medals, which were accordingly delivered into his poſſeſſion, and king Henry VIII's cloſet was aſſigned for his uſe. On the 15th of February, Mr Aſhmole was admitted a fellow of the royal ſociety; and, on the 9th of February following, the king appointed him ſecretary of Surinam, in the Weſt Indies. On the 19th of July 1699, the univerſity of Oxford, in conſideration of the many favours they had received from Mr Aſhmole, created him doctor of phyſic by diploma, which was preſented to him by Dr Yates, principal of Brazen Noſe college. On the 8th of May 1672, he preſented his "Inſtitution, laws, and ceremonies of the moſt noble order of the garter," to the king; who received it very graciouſly, and, as a mark of his approbation, granted him a privy ſeal for 400 *l.* out of the cuſtom of paper. On the 26th January 1679, a fire broke out in the Middle Temple, in the next chamber to Mr Aſhmole's, by which he loſt a noble library, with a collection of 9000 coins, ancient and modern, and a vaſt repoſitory of ſeals, charters, and other antiquities and curioſities; but his manuſcripts and his moſt valuable gold medals were luckily at his houſe at Lambeth. In 1683, the univerſity of Oxford having finiſhed a magnificent repoſitory near the theatre, Mr Aſhmole ſent thither his curious collection of rarities; which benefaction was conſiderably augmented by the addition of his manuſcripts and library at his death, which happened at Lambeth, the 18th of May, in the 76th year of his age. He was interred in the church of Great-Lambeth, in Surry, on the 26th of May 1692, and a black marble ſtone laid over his grave, with a Latin inſcription.

Beſides the works which we have mentioned, Mr Aſhmole left ſeveral which were publiſhed ſince his death, and ſome which remain ſtill in manuſcript.

Aſia.

ASIA, is one of the three general parts of our continent, and one of the four of the whole earth. It is ſeparated from Europe by the Mediterranean ſea, the Archipelago, the Black Sea, the Palus Meotis, the Don, and the Dwina, which fall into the White Sea; and from Africa, by the Arabic Gulph or Red Sea, and the Iſthmus of Suez. All the other parts are ſurrounded by the ocean. The late diſcoveries ſhew that it does not join to America, though it extends very near it. It is ſituated between 44 and 196 degrees of eaſt longitude, and 1 and 74 degrees of north latitude. From the Dardanelles to the moſt eaſtern ſhore of Tartary, it is 4740 miles in length; and from the moſt ſouthern point of Malacca to the moſt northern point of Nova Zembla, it is 4380 miles in breadth. It may be divided into the following parts: Turky in Aſia, Arabia, Perſia, the Mogul's Empire, with the two peninſulas of the Indies; Tibet, China, and Korea; Great and Little Buckaria, with Koraſin; Tartary, Siberia, and the iſlands. The principal governments are generally monarchial. Turky, Perſia, the Mogul's Empire, and China, are ſubject to ſingle monarchs; the reſt are divided among ſeveral ſovereigns. Siberia is ſubject to the Ruſſians; Little Tartary to the Tartars of the Crim; Great Tartary, partly to the Ruſſians, partly to its own monarch, and partly to China. Great Buckaria is ſubject to the Perſians; and Little Buckaria, partly to the Tartars, and partly to the emperor of China. As to the number of the potentates, there are ſeven emperors, thirty kings, beſides petty princes, and the rajahs of India. The emperors are, the grand ſignior, the great mogul, the emperor of Japan, the khan of the Eluth Tartars, the emperor of Ruſſia, the emperor of China, and the ſhah of Perſia. The principal kings are, the ſheriffs of Mecca and Medina; the ſollars of Yamen, or Arabia the Happy; the grand lama of Tibet; the kings of Viſipone, Ava, Siam, Tonquin, Cochinchina, Korea, Ceylon, Borneo, *&c.*

The principal religions of Aſia are, the Chriſtian, the Mahomedan, the Pagan, and that of Confucius. The Chriſtian religion is profeſſed in ſome parts of Aſiatic Turky, part of Little Tartary, the north-weſt part of Perſia, and by the Ruſſians in Siberia. The Mahomedan is eſtabliſhed in Arabia, Perſia, Little Tartary, Buckaria, and the Mogul's empire. It likewiſe begins to ſpread along the coaſt of India, and in the iſlands. The Pagan religion, by which we underſtand that wherein images are uſed, or wherein the worſhip of the Deity is mixed with that of idols, is profeſſed by the bulk of the inhabitants of the Mogul's empire, in both the peninſulas of India, in China and Siberia, in the iſlands of Aſia, in all Weſtern Tartary, in Tibet, and in all the countries between India and China. The religion of Confucius is eſtabliſhed in China. Formerly the religion profeſſed in Tartary was downright Deiſm, as appears from the hiſtory of Jenghiz Khan; but the inhabitants of that country are now ſunk in the groſſeſt ſuperſtitions.

The languages of Aſia are ſo many, that we cannot pretend to enumerate them all, and therefore we ſhall only mention the chief. The principal of Turky in Europe, are the Grecian and Turkiſh; the Armenian is ſpoken in part of Turky in Aſia and Perſia; the Arabic is the only tongue in Arabia, and is ſpread over part of Turky in Aſia, as a learned language. The Perſian is uſed in Perſia, and the court of the great mogul. The Indian is ſpoken in India, by the ancient inhabitants of that country. The Malayan language is common on the coaſt of India, and in ſome of the iſlands; the Siameſe in Siam; the Tibetran in Tibet; the Manchew in China and eaſtern Tartary; and the Tartarian in Great Tartary. Beſides theſe, there are ſeveral diſtinct languages in Siberia and the iſlands of Aſia. The characters they make uſe of in writing are almoſt as different as the languages, having each characters of their own, except the Chineſe, which are uſed in Japan as well as China, as alſo in Tonking and Cochinchina.

The chief rivers of Aſia are, the Euphrates and Tigris, in Turky; the Indus and Ganges, in India; the Kiang and Hoang-ho, in China; the Sir Amu and Wolga, in Weſtern Tartary; the Saghalia Ula or Amur, in Eaſtern Tartary; the Irtiſh, Oby, Jeniſea, and Lena, in Siberia. The lakes are, that prodigious one called the *Caſpian Sea;* and near that another very large one, but lately known to us, called *Aral*, or the lake of eagles. The Baykal is in Siberia, the Kokonor near Tibet, and the Tong Ping in China. The chief mountains are, the Taurus in Turky and Perſia; the Imaus, between India and Tibet; and the Altay, in Tartary.

The Aſian iſlands are very numerous, inſomuch that ſome reckon 150,000; but of this there is no certainty. However, they may be divided into thoſe of the eaſt, weſt, ſouth, and ſouth-eaſt. Thoſe that lie on the eaſt of Aſia are, the iſlands of Jeſſo or Yedſo, and Japan, with ſeveral ſmall ones on the coaſt of Korea, the iſland of Formoſa, and the Philippines. Thoſe on the weſt, are the iſland of Cyprus, in the Mediterranean; Scanderoon, off Natolia, and the iſle of Rhodes, off Phiſchio, on the ſame coaſt. Thoſe on the ſouth are, the iſles of the Maldives, in the Indian Sea; the iſle of Ceylon, off cape Komorin; with a great many ſmall ones in the gulph of Bengal. Thoſe on the ſouth-eaſt are, the iſles of Sandi, as Sumatra, the iſles of Java, Borneo, &c. the Moluccas, the iſles of Kumbava, Timor, &c. See all theſe articles in their proper places.

Asia *Minor*, or *Leſſer Aſia*; the ſame with Natolia. See Natolia.

ASIARCHÆ, (termed by St Paul, *Chief of Aſia*, Acts xix. 31.) were the Pagan Pontifs of Aſia, choſen to ſuperintend and have the care of the public games; which they did at their own expence; for which reaſon they were always the richeſt and moſt conſiderable men of the towns.

ASIDE, in the drama, ſomething ſaid by an actor, which ſome, or even all the other actors preſent, are ſuppoſed not to hear; a circumſtance juſtly condemned as being unnatural and improbable.

ASIITO, a town of Italy, in Perugia, and in the Pope's territories. E. Long. 23. 40. N. Lat. 43. 0.

ASILUS, or hornet-fly, a genus of inſects belonging to the order of inſecta diptera. It has two wings; and a horny, ſtrait, two-valved beak. There are 17 ſpecies of this inſect. Many of them wound in a very painful manner; others of them are quite harmleſs.

ASINARA, an iſland of Italy, on the weſtern coaſt of Sardinia. E. Long. 8. 30. N. Lat. 41. 0.

ASINIUS (Pollio), conſul and Roman orator, diſtinguiſhed himſelf under Auguſtus by his exploits and his literary works. He is frequently mentioned with praiſes by Horace and Virgil, and is ſaid to have collected the firſt library at Rome. He died at Freſcati, at 80 years of age.

ASISIO, or Asitio, a city of the Pope's territories in Italy, ſituated about 16 miles eaſt of Perugia. E. Long. 13. 35. N. Lat. 43.

ASKRIG, a town in the N. Riding of Yorkſhire. W. Long. 0. 5. N. Lat. 53. 50.

ASLANI, in commerce, a ſilver coin, worth from 115 to 120 aſpers. See Asper.

ASMONEUS, or Assamoneus, the father of Simon, and chief of the Aſmoneans, a family that reigned over the Jews during 126 years.

ASNA, or Esna, a town in Upper Egypt, ſeated upon the Nile, believed by ſome authors to be the ancient Syena, though others ſay the ruins of it are ſtill to be ſeen near Aſſuan. It is ſo near the cataracts of the Nile, that they may be heard from thence. It contains ſeveral monuments of antiquity; and among the reſt an ancient Egyptian temple, pretty entire, all painted throughout, except in ſome places that are effaced by time. The columns are full of hieroglyphic figures. This ſuperb ſtructure is now made uſe of for a ſtable, wherein they put oxen, camels, and goats. A little way from thence are the ruins of an ancient nunnery, ſaid to be built by St Helena, ſurrounded with tombs.—Aſna is the principal town in theſe parts, and the inhabitants are rich in corn and cattle. They drive a conſiderable trade into Lower Egypt and Nubia, by means of the Nile, and alſo by the caravans that paſs over the Deſart. The inhabitants are all Arabs, except about 200 Copts, the ancient inhabitants, and a ſort of Chriſtians. They are under the government of the Turks, who have a cadi, and the Arabs have two ſheriffs of their own nation. E. Long. 31. 40. N. Lat. 38. 15.

ASOLA, a town of the Breſſan in Italy, belonging to the republic of Venice. E. Long. 14. 18. N. Lat. 45. 15.

ASOLO, a town of Italy, in the Treviſan, ſeated on a mountain 17 miles north-weſt of Treviſan, and 10 north-eaſt of Baſſano. E. Long. 12. 2. N. Lat. 45. 49.

ASOPH, a town of Coban Tartary, in Aſia, ſeated on the river Don, near its mouth, a little to the eaſt of the Palus Mœotis, or Sea of Azoph. It has been ſeveral times taken and retaken of late years; but in 1739, the contending powers agreed that the fortifications ſhould be demoliſhed, and the town remain under the dominion of Ruſſia. E. Long. 41. 30. N. Lat. 47. 18.

ASOPUS, a river of Phrygia Major, which, together with the Lycus, waſhes Laodicea, (Pliny).—Another of Bœotia, which running from mount Cithæron, and watering the territory of Thebes, ſeparates it from the territory of Platæa, and falls with an eaſt courſe into the Euripus, at Tanagra. On this river Adraſtus king of Sicyon built a temple to Nemeſis, thence called *Adraſtcia*. From this river Thebae came to be ſurnamed *Aſopides*, (Strabo). It is now called *Aſopo*. A third Aſopus, a river of Peloponneſus, which runs by Sicyon, (Strabo); and with a north-weſt courſe falls into the Sinus Corinthiacus, to the weſt of Corinth.—A fourth, a ſmall river of the Locri Epicnemidii, on the borders of Theſſaly, (Pliny); riſing in Mount Oeta, and falling into the Sinus Maliacus.

Asopus, a town of Laconica, (Pauſanius); on the Sinus Laconicus, with a port in a peninſula, between Boæ to the eaſt, and the mouth of the Eurotas to the weſt. The citadel only remains ſtanding, now called by the ſailors *Caſtel Rampano*.

ASOW, a celebrated and important fortreſs of Ruſſia, once a place of conſiderable trade, but now demoliſhed. It was ſituated in the diſtrict of Bachmut, near the place where the Greeks many centuries ago built the city of Tanais, which was very famous for its trade, and underwent many viciſſitudes. The Genoeſe, who ſettled a trade with Ruſſia ſoon after the diſcovery of Archangel by Captain Chancellor, became maſters of this place, and gave it the name of *Tana*, or *Catana:* but the Tartars, who were very powerful in theſe parts, ſeem to have been in poſſeſſion of it long before; for, as Buſching informs us, there are Aſow coins yet extant, on which is the name of *Taktamyſs-Kan*. From the Genoeſe it fell into the hands of the Turks, loſt its trade, and became an inconſiderable town. In 1637, it was taken by the Coſſacks, who defended it againſt the Turks in 1641, and next year ſet fire to it, and blew it up. The Turks rebuilt it with ſtrong fortifications. The Ruſſians laid claim to it in 1672, and took it in 1696; but, by the treaty of Pruth in 1711, it was reſtored to the Turks. In 1736, the Ruſſians became maſters of Aſow; but by the treaty of Belgrade they were obliged to relinquiſh it, and entirely deſtroy the place.

ASP, in natural hiſtory, a ſmall poiſonous kind of ſerpent, whoſe bite gives a ſpeedy but eaſy death. It is ſaid to be thus denominated from the Greek ασπις, *ſhield*, in regard to the manner of its lying convolved in a circle, in the centre of which is the head, which it exerts, or raiſes, like the umbo or umbilicus of a buckler. This ſpecies of ſerpent is very frequently mentioned by authors; but ſo careleſsly deſcribed, that it is not eaſy to determine which, if any of the ſpecies known at preſent, may properly be called by this name. It is ſaid to be common in Africa, and about the banks of the Nile; and Bellonius mentions a ſmall ſpecies of ſerpent which he had met with in Italy, and which had a ſort of callous excreſcence on the forehead, which he takes to have been the aſpis of the ancients. It is with the aſp that Cleopatra is ſaid to have diſpatched herſelf, and prevented the deſigns of Auguſtus, who intended to have carried her captive to adorn his triumphal entry into Rome. But the fact is conteſted: Brown places it among his vulgar errors. The indications of that queen's having uſed the miniſtry of the aſp, were only two almoſt inſenſible pricks found in her arm. In reality, Plutarch ſays, it is unknown what death ſhe died of.

Lord Bacon makes the aſp the leaſt painful of all the inſtruments of death: he ſuppoſes it to have an affinity to opium, but to be leſs diſagreeable in its operation: Which, however, does not ſo well agree with the deſcription of the ſymptoms given by Dioſcorides and others; who inform us, that the bite is followed by a ſtupor of the whole body, paleneſs, coldneſs of the forehead, continual yawning, nictitation of the eyelids, inclination of the neck, heavineſs of the head, ſinking into a profound ſleep, and laſtly convulſions.

The ancients had a plaſter called δι Ασπιδων, made of this terrible animal, of great efficacy as a diſcutient of ſtrumæ, and other indurations, and uſed likewiſe againſt pains of the gout. The fleſh and ſkin, or exuviæ, of the creature, had alſo their ſhare in the ancient materia medica.

ASPA, a town of Parthia, (Ptolemy); now *Iſpahan* *, (Holſtenius) In Ptolemy the latitude ſeems to agree, being 33°; but whether the longitude does, is a queſtion. E. Long. 51°, Lat. 32. 30.

ASPALATHUS, african broom; a genus of the decandria order, belonging to the diadelphia claſs of plants. Of this genus there are 19 ſpecies; all of which are natives of warm climates, and muſt be preſerved in ſtoves by thoſe who would cultivate them here. They have no great beauty, nor other remarkable property; which renders a particular deſcription of them needleſs.

ASPARAGUS, sparagus, sperage, or sparrow-grass; a genus of the monogynia order, belonging to the hexandria claſs of plants.

Species. Of this genus there are ten ſpecies; but the only one cultivated in the gardens is that with an upright herbaceous ſtalk, briſtly leaves, and equal ſtipula, or the common aſparagus. The other ſpecies are kept only in the gardens of the curious for the ſake of variety.

Culture. The garden aſparagus is with great care cultivated for the uſe of the table. The propagation of this uſeful plant is from ſeed; and as much of the ſucceſs depends upon the goodneſs of the ſeed, it is much better to ſave it than to buy it at the ſhops. The manner of ſaving it is this: Mark with a ſtick ſome of the faireſt buds; and when they are run to berry, and the ſtalks begin to dry and wither, cut them up; rub off the berries into a tub, and, pouring water upon them, rub them about with your hands; the huſks will break and let out the ſeed, and will ſwim away with the water in pouring it off; ſo that in repeating this two or three times, the ſeeds will be clean waſhed, and found at the bottom of the tub. Theſe muſt be ſpread on a mat to dry, and in the beginning of February muſt be ſown on a bed of rich earth. They muſt not be ſown too thick, and muſt be trod into the ground, and the earth raked over them ſmooth: the bed is to be kept clear of weeds all the ſummer; and in October, when the ſtalks are withered and dry, a little rotten dung muſt be ſpread half an inch thick over the whole ſurface of the bed. The ſpring following, the plants will be fit to plant out for good; the ground muſt therefore be prepared for them by trenching it well, and burying a large quantity of rotten dung in the trenches, ſo that it may lie at leaſt ſix inches below the ſurface of the ground: when this is done, level the whole plot exactly, taking out all the looſe ſtones. This is to be done juſt at the time when the aſparagus is to be planted out; which muſt be in the beginning of March, if the ſoil is dry, and the ſeaſon forward; but in a wet ſoil, it is better to wait till the beginning of April, which is about the ſeaſon that the plants are begin-

* See *Iſpahan*.

ning to ſhoot. The ſeaſon being now come, the roots muſt be carefully taken up with a narrow-pronged dung-fork, ſhaking them out of the earth, ſeparating them from each other, and obſerving to lay all their heads even, for the more convenient planting them, which muſt be done in this manner. Lines muſt be drawn, at a foot diſtance each, ſtraight acroſs the bed; theſe muſt be dug into ſmall trenches of ſix inches deep, into which the roots muſt be laid, placing them againſt the ſides of the trench with their buds in a right poſition upwards, and ſo that, when the earth is raked over them, they may be two inches under the ſurface of the ground. Between every four rows a ſpace of two feet and a half ſhould be left for walking in, to cut the aſparagus. When the aſparagus is thus planted, a crop of onions may be ſown on the ground, which will not at all hurt it. A month after this, the aſparagus will come up, when the crop of onions muſt be thinned, and the weeds carefully cleared away. About Auguſt the onions will be fit to pull up. In October following, cut off the ſhoots of the aſparagus within two inches of the ground, clear well all weeds away, and throw up the earth upon the beds, ſo as to leave them five inches above the level of the alleys. A row of colworts may be planted in the middle of the alleys, but nothing muſt be now ſown on the beds. In the ſpring the weeds muſt be hoed up, and all the ſummer the beds kept clear of weeds. In October they muſt be turned up, and earthed again, as the preceding ſeaſon. The ſecond ſpring after planting, ſome of the young aſparagus may be cut for the table. The larger ſhoots ſhould only be taken, and theſe ſhould be cut at two inches under ground, and the beds every year managed as in the ſecond year. But as ſome people are very fond of early aſparagus, the following directions are given by which it may be obtained any time in winter: Plant ſome good roots at one year old in a moiſt rich ſoil, about eight inches apart; the ſecond and third years after planting, they will be ready to take up for the hot-beds; theſe ſhould be made pretty ſtrong, about three feet thick, with new ſtable-dung that has fermented a week or more; the beds muſt be covered with earth ſix inches thick; then againſt a ridge made at one end, begin to lay in your plants, without trimming or cutting the fibres, and between every row lay a little ridge of fine earth, and proceed thus till the bed is planted; then cover the bed two inches thick with earth, and encompaſs it with a ſtraw-band, and in a week, or as the bed is in the temper, put on the frames and glaſſes, and lay on three inches thick of freſh earth over the beds, and give them air and add freſh heat to them as it requires. Theſe beds may be made from November till March, which will laſt till the natural graſs comes in.

Medicinal Uſes. The roots have a bitteriſh mucilaginous taſte, inclining to ſweetneſs; the fruit has much the ſame kind of taſte; the young ſhoots are more agreeable than either. Aſparagus promotes appetite, but affords little nouriſhment. It gives a ſtrong ill ſmell to the urine in a little time after eating it, and for this reaſon chiefly is ſuppoſed to be diuretic: it is likewiſe eſteemed aperient and deobſtruent; the root is one of the five called *opening roots*. Some ſuppoſe the ſhoots to be moſt efficacious; others the root; and others the bark of the root. Stahl is of opinion that none of them have any great ſhare of the virtues uſually aſcribed to them. Aſparagus appears from experience to contribute very little either to the exciting of urine when ſuppreſſed, or increaſing its diſcharge; and in caſes where aperient medicines generally do ſervice, this has little or no effect.

ASPECT, in aſtronomy, denotes the ſituation of the planets and ſtars with reſpect to each other.

There are five different aſpects. 1. Sextile aſpect is when the planets or ſtars are 60° diſtant, and marked thus ✶. 2. The quartile, or quadrate, when they are 90° diſtant, marked □. 3. Trine, when 120° diſtant, marked △. 4. Oppoſition, when 180° diſtant, marked ☍. And, 5. Conjunction, when both in the ſame degree, marked ☌.

Kepler, who added eight new ones, defines aſpect to be the angle formed by the rays of two ſtars meeting on the earth, whereby their good or bad influence is meaſured: for it is to be obſerved, that theſe aſpects being firſt introduced by aſtrologers, were diſtinguiſhed into benign, malignant, and indifferent; the quartile and oppoſition being accounted malign; the trine and ſextile, benign or friendly; and the conjunction, indifferent.

ASPEN-tree, in botany. See Populus.

ASPER, in grammar, an accent peculiar to the Greek language, marked thus (ʿ); and importing, that the letters over which it is placed ought to be ſtrongly aſpirated, or pronounced as if an *h* were joined with them.

Asper, or *Aſpre*, in commerce, a Turkiſh coin, three of which make a medine. See Medine.

ASPERA arteria, in anatomy, the ſame with the windpipe or trachea. See Anatomy, n° 380.

ASPERIFOLIATE, or asperifolious, among botaniſts, ſuch plants as are rough-leaved, having their leaves placed alternately on their ſtalks, and a monopetalous flower divided into five parts.—They conſtitute an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which are theſe genera, *viz.* tournefortia, cerinthe, ſymphytum, pulmonaria, anchuſa, lithoſpermum, myoſotis, heliotropium, cynogloſſum, aſperugo, lycopſis, echium, borrago: *magis minuſve oleraceæ, mucilaginoſæ, & glutinoſæ ſunt.* Lin. In the preſent ſyſtem, theſe are among the pentandria monogynia.

ASPERITY, the inequality of the ſurface of any body, which hinders the hand from paſſing over it freely.—From the teſtimony of ſome blind perſons, it has been ſuppoſed that every colour hath its particular degree of aſperity: though this has been denied by others. See the article Blind.

ASPEROSA, a town of Turky, in Europe; it is a biſhop's ſee, ſituated on the coaſt of the Archipelago. E. Long. 25. 20. N. Lat. 40. 58.

ASPERUGO, small wild bugloss, in botany; a genus of the pentandria monogynia claſs. There are two ſpecies, *viz.* the procumbens, or wild buglos, a native of Britain; and the Ægyptiaca, a native of Egypt. Horſes, goats, ſheep and ſwine eat the firſt ſpecies; cows are not fond of it.

ASPERULA, woodroof; a genus of the monogynia order, belonging to the hexandria claſs of plants, of which there are two ſpecies, the cynanchica and the odorata. Both of them grow wild in Britain, ſo are ſeldom admitted into gardens. The firſt is found on chalky hills. The latter is a low umbelliferous plant, growing wild in woods and copſes, and flowering in May. It has an exceeding pleaſant ſmell, which is improved by moderate exſiccation; the taſte is ſubſaline, and ſomewhat auſtere. It imparts its flavour to vinous liquors. Aſperula is ſuppoſed to attenuate viſcid humours, and ſtrengthen the tone of the bowels; it is recommended in obſtructions of the liver and biliary ducts, and by ſome in epilepſies and palſies; modern practice has nevertheleſs rejected it. The ſmell of it is ſaid to drive away ticks and other inſects. The roots of the firſt are uſed in Sweden to dye red.

ASPHALTITES, ſo called from the great quantity of bitumen it produces; called alſo the *dead ſea;* and from its ſituation, the *eaſt ſea;* the *ſalt ſea*, the ſea of *Sodom*, the ſea of the *deſart*, and ſea of the *plain*, by the ſacred writings: A lake of Judea. Many things have been ſaid and written of this famed, or, if they were indeed true, rather infamous lake; ſuch as that it aroſe from the ſubmerſion of the vale of Siddim, where once ſtood, as is commonly reported, the three cities which periſhed in the miraculous conflagration, with thoſe of Sodom and Gomorrah, for their unnatural and deteſtable wickedneſs: on which account this lake has been looked upon as a laſting monument of the juſt judgement of God, to deter mankind from ſuch abominations. Hence it is added, that the waters of the lake are ſo impregnated with ſalt, ſulphur, and other bituminous ſtuff, that nothing will ſink or live in it; and that it caſts ſuch ſtench and ſmoke, that the very birds die in attempting to fly over it. The deſcription likewiſe of the apples that grew about it, fair without, and only aſhes and bitterneſs within, were looked upon as a farther monument of God's anger. So likewiſe the deſcription which many travellers give not only of the lake, but of all the country round about, of the whole appearing dreadful to behold, all ſulphureous, bituminous, ſtinking, and ſuffocating; and laſtly, what hath been farther affirmed of the ruins of the five cities being ſtill to be ſeen in clear weather, and having been actually ſeen in theſe later times; all theſe ſurpriſing things, and ill-grounded notions, though commonly, and ſo long, received among Chriſtians, have been of late ſo much exploded, not only by the teſtimony of very credible witneſſes, but even by arguments drawn from ſcripture, that we muſt give them up as inventions, unleſs we will ſuppoſe the face and nature of all theſe things to have been entirely changed. Thoſe, in particular, of bodies not ſinking in the water, and of birds being ſtifled by the exhalations of it, appear now falſe in fact. 'Tis true, the quantity of ſalt, alum, and ſulphur, with which it is impregnated, render it ſo much ſpecifically heavier (Dr Pococke ſays one-fifth) than freſh water, that bodies will not ſo eaſily ſink; yet that author, and others, aſſure us, they have ſwam and dived in it; and, as to the birds, we are told likewiſe, that they will fly over it without any harm. To reconcile theſe things with the experiments which Pliny † tells us had been made by Veſpaſian, is impoſſible, without ſuppoſing that thoſe ingredients have been ſince much exhauſted, which is not at all improbable; ſuch quantities of them, that is, of the bitumen and ſalt, having been all along, and being ſtill taken off, and ſuch ſtreams of freſh water continually pouring into it, as may reaſonably be ſuppoſed to have conſiderably diminiſhed its gravity and denſeneſs. For, with reſpect to its ſalt, we are told, the Arabs made quantities of it from that lake, in large pits about the ſhore, which they fill with that water, and leave to be cryſtallized by the ſun. This ſalt is in ſome caſes much commended by Galen, as very wholeſome, and a ſtrengthener of the ſtomach, &c. on account of its unpleaſant bitterneſs.

What likewiſe relates to the conſtant ſmoke aſcending from the lake, its changing the colour of its water three times a-day, ſo confidently affirmed by Joſephus † and other ancients, and confirmed by prince Radziville and other moderns, who pretend to have been eye-witneſſes of it, is all now in the ſame manner exploded by others of more modern date, and of at leaſt equal candor. The unhealthineſs of the air about the lake was affirmed by Joſephus and Pliny, eſpecially on the weſt: the monks that live in the neighbourhood confirm the ſame, and would have diſſuaded Dr Pococke from going to it on that account; and, as he ventured to go and bathe in it, and was, two days after, ſeized with a dizzineſs, and violent pain in the ſtomach which laſted near three weeks, they made no doubt but it was occaſioned by it; and he doth not ſeem to contradict them. As to the water, it is, though clear, ſo impregnated with ſalt, that thoſe who dive into it, come out covered with a kind of ſaline matter. There is one remarkable thing relating to this lake, generally agreed on by all travellers and geographers; *viz.* that it receives the waters of Jordan, a conſiderable river, the brooks of Jabok, Kiſhon, Arnon, and other ſprings which flow into it from the adjacent mountains, and yet never overflows, tho' there is no viſible way to be found by which it diſcharges that great influx. The common opinion is, that it hath ſome ſubterraneous vent, either into the Mediterranean, or the Red ſea; but Dr Shaw hath endeavoured to account for it in the ſame ingenious way as Dr Halley had done by the Mediterranean, that is, by exhalation, without having recourſe to any other ſolution. It is incloſed on the eaſt and weſt with exceeding high mountains, many of them craggy, and dreadful to behold; on the north it has the plain of Jericho; or, if we take in both ſides of the Jordan, it has the Great Plain, properly ſo called, on the ſouth; which is open, and extends beyond the reach of the eye. Joſephus gives this lake 580 furlongs in length, from the mouth of the Jordan to the town of Segor, on the oppoſite end; that is, about 22 leagues; and about 150 furlongs, or five leagues, in its largeſt breadth: but our modern accounts commonly give it 24 leagues in length, and ſix or ſeven in breadth. On the weſt ſide of it is a kind of promontory, where they pretend to ſhow the remains of Lot's metamorphoſed wife. Joſephus ſays it was ſtill ſtanding in his time; but when prince Radziville inquired after it, they told him there was no ſuch ſalt pillar or ſtatue to be found in all that part. However, they have found means, about a century after him, to recover, as they pretended to aſſure Mr Maundrell, a block or ſtump of it, which may in time grow up, with a little art, into its ancient bulk.

It is to be obſerved here, that the name of *Dead ſea* is not to be found in the ſacred writings, but hath been given to this lake becauſe no creature will live in it, on account of its exceſſive ſaltneſs, or rather bituminous quality; for the Hebrews rank ſulphur, nitre, and bitumen, under the general name of ſalt. However, ſome late travellers have found cauſe to ſuſpect the common report of its breeding no living creature; one of them having obſerved, on the ſhore, two or three ſhells of fiſh like thoſe of an oyſter, and which he ſuppoſes to have been thrown up by the waves, at two hours diſtance from the mouth of the Jordan, which he there takes notice of, leſt they ſhould be ſuſpected to have been brought into the lake by that way. And Dr Pococke, tho' he neither ſaw fiſh nor ſhells, tells us, on the authority of a monk, that ſome ſort of fiſh had been caught in it; and gives us his opinion, that as ſo many ſorts live in ſalt-water, ſome kind may be ſo formed as to live in a bituminous one.

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† *Nat. Hiſt.* lib. v. cap. 15.

† *Bel. Jud.* lib. v. cap. 5.

It is on account of this bitumen that it hath had the name of *Aſphaltite Lake*, it being reported to have thrown up great quantities of that drug, which was much in uſe among the Egyptians, and other nations, for embalming of dead bodies. Joſephus aſſures us, that in his days it roſe in lumps as big as an ox without its head, and ſome even larger. But, whatever it may have formerly done, we are aſſured by Mr Maundrell and others, that it is now to be found but in ſmall quantities along the ſhore, though in much greater near the mountains on both ſides the lake. But the contrary is ſince affirmed by two or more late[*] travellers, the one of whom tells us, that it is obſerved to float on the ſurface of the water, and to come on the ſhore, after windy weather, where the Arabians gather it, and put it to all the uſes that common pitch is uſed for, even in the compoſitions of ſome medicines: and another [†] tells us, he was there informed, that it was raiſed at certain times from the bottom, in large hemiſpheres, which, as ſoon as they touch the ſurface, and are acted upon by the external air, burſt at once, with great noiſe and ſmoke, like the *pulvis fulminans* of the chemiſts, diſperſing themſelves about in a thouſand pieces. From both theſe judicious authors we may conclude the reaſon of Mr Maundrell's miſtake, both as to the lake's throwing it up only on certain ſeaſons (that reverend gentleman might chance to be there at the wrong time); and likewiſe as to his not obſerving it about the ſhores, ſeeing the Arabs are there ready to gather it as ſoon as thrown up: all of them deſcribe it as reſembling our black pitch, ſo as not to be diſtinguiſhed from it but by its ſulphureous ſmoke and ſtench when ſet on fire; and it hath been commonly thought to be the ſame with that which our druggiſts ſell under the name of *bitumen Judaicum*, or *Jewiſh pitch*, though we have reaſon to think that this laſt is factitious, and that there is now none of the right aſphaltum brought from Judea.

It hath, moreover, been confounded with a ſort of blackiſh combuſtible ſtone thrown on the ſhore, and called by ſome *Moſes*'s *ſtone*, which, being held in the flame of a candle, will ſoon burn, and caſt a ſmoke and intolerable ſtench; but with this extraordinary property, that though it loſes much of its weight and colour, it becoming in a manner white, yet it diminiſhes nothing of its bulk. But theſe, Dr Pococke tells us, are found about two or three leagues from the ſhore. He concludes, however, from it, that a *ſtratum* of that ſtone under the lake is probably one part of the matter that feeds the ſubterraneous fire, and cauſes the bitumen to boil up out of it.

ASPHALTUM, BITUMEN JUDAICUM, or JEWS PITCH, is a light ſolid bitumen, of a duſky colour on the outſide, and a deep ſhining black within; of very little taſte; and having ſcarcely any ſmell, unleſs heated, when it emits a ſtrong pitchy one. It is found in a ſoft or liquid ſtate on the ſurface of the Dead ſea, and by age grows dry and hard. The ſame kind of bitumen is met with likewiſe in the earth, in other parts of the world, in China, America, and in ſome places of Europe, as the Carpathian hills, France, Neufchatel, &c. There are ſeveral kinds of Jews pitch in the ſhops, but none of them are the genuine ſort, and have little other title to their name than their being artificially compounded by Jews; and as they are a medley of we know not what ingredients, their medicinal uſe begins to be deſervedly laid aſide, notwithſtanding the diſcutient, reſolvent, pectoral, and other virtues, attributed to this bitumen by the ancients. The true aſphaltum was formerly uſed in embalming the bodies of the dead. The thick and ſolid aſphalta are at preſent employed in Egypt, Arabia, and Perſia, as pitch for ſhips; as the fluid ones, for burning in lamps, and for varniſhes. Some writers relate, that the walls of Babylon, and the temple of Jeruſalem, were cemented with bitumen inſtead of mortar. Thus much is certain, that a true natural bitumen, that for inſtance which is found in the diſtrict of Neufchatel, proves an excellent cement for walls, pavements, and other purpoſes, uncommonly firm, very durable in the air, and not penetrable by water. The watch and clock makers uſe a compoſition of aſphaltum, fine lamp-black, and oil of ſpike or turpentine, for drawing the black figures on dial-plates: this compoſition is prepared chiefly by certain perſons at Augſburg and Nurenberg. See the preceding article.

ASPHODELUS, ASPHODEL, or KING'S SPEAR; a genus of the monogynia order, belonging to the hexandria claſs of plants.

Species. Of this genus botanical writers enumerate five ſpecies. 1. The luteus, or common yellow aſphodel, hath roots compoſed of many thick fleſhy fibres, which are yellow, and joined into a head at the top; from whence ariſe ſtrong round ſingle ſtalks near three feet high, garniſhed on the upper part with yellow ſtar-ſhaped flowers, which appear in June, and the ſeeds ripen in autumn. 2. The ramoſus, or branching aſphodel, hath roots compoſed of fleſhy fibres, to each of which is faſtened an oblong bulb as large as a ſmall potato; the leaves are long and flexible, having ſharp edges; between theſe come out the flower-ſtalks, which ariſe more than three feet high, ſending forth many lateral branches. The upper parts of theſe are adorned with many white ſtar-ſhaped flowers, which grow in long ſpikes flowering gradually upward. They come out in the beginning of June, and the ſeeds ripen in autumn. 3. The ramoſus, or unbranched aſphodel, hath roots like the ſecond, but the leaves are longer and narrower; the ſtalks are ſingle, never putting out any ſide-branches. The flowers appear at the ſame time with the former, are of a purer white, and grow in longer ſpikes. 4. The albus, with keel-ſhaped leaves, hath roots compoſed of ſmaller fibres than the two laſt, nor are the knobs at bottom half ſo large; the leaves are long, almoſt triangular, and hollow

[*] *Pococke's Travels*, p. 56.

[†] *Shaw's Travels*, p. 374.

like the keel of a boat; the ſtalks ſeldom riſe above two feet high, and divide into ſeveral ſpreading branches; theſe are terminated by looſe ſpikes of white flowers ſmaller than thoſe of the former. 5. The ſtuloſus, or annual branching ſpiderwort, hath roots compoſed of many yellow fleſhy fibres: the leaves are ſpread out from the crown of the root, cloſe to the ground, in a large cluſter; theſe are convex on their under ſide, but plain above. The flower-ſtalks riſe immediately from the root, and grow about two feet high, dividing into three or four branches upward, which are adorned with white ſtarry flowers, with purple lines on the outſide. Theſe flower in July and Auguſt, and their ſeeds ripen in October.

Culture. The way to increaſe theſe plants is by parting their roots in Auguſt, before they ſhoot up their freſh green leaves. They may alſo be raiſed from ſeeds ſown in Auguſt; and the Auguſt following the plants produced from theſe may be tranſplanted into beds, and will produce flowers the ſecond year. They muſt not be planted in ſmall borders, among tender flowers; for they will draw away all the nouriſhment, and ſtarve every thing elſe.

ASPHURELATA, in natural hiſtory, are ſemimetallic foſſils, fuſible by fire, and not malleable in their pureſt ſtate, being in their native ſtate intimately mixed with ſulphur and other adventitious matter, and reduced to what are called *ores*.

Of this ſeries of foſſils there are only five bodies, each of which makes a diſtinct genus; *viz.* antimony, biſmuth, cobalt, zinc, or quickſilver.

ASPICUETA (Martin de), commonly called the *Doctor of Navarre*, or *Doctor Navarrus;* was deſcended of a noble family, and born the 13th of December 1491, at Varaſayn, a ſmall city of Navarre, not far from Pampeluna. He entered very young into the monaſtery of Regular canons at Roncevaux, where he took the habit, which he continued to wear after he left the convent. He ſtudied claſſical learning, natural and moral philoſophy, and divinity, at Alcala, in New Caſtile, adopting chiefly the ſyſtem of Petrus Lombardus, commonly called the *Maſter of the Sentences*. He applied to the ſtudy of the law at Ferrara, and taught it with applauſe at Toulouſe and Cahors. After being firſt profeſſor of canon law at Salamanca for 14 years, he quitted that place to be profeſſor of law at Coimbra, with a larger ſalary. The duties of this office he diſcharged for the ſpace of 20 years, and then reſigned it to retire into his own country, where he took care of his nieces, the daughters of his deceaſed brothers. Having made a journey to Rome, to plead the cauſe of Bartholomeo de Caranza archbiſhop of Toledo, who had been accuſed of hereſy before the tribunal of the inquiſition in Spain, and whoſe cauſe was, by the Pope's order, to be tried in that city, Aſpicueta's writings, which were well known, procured him a moſt honourable reception. Pope Pius V. made him aſſiſtant to cardinal Francis Aciat, his vice-penitentiary; and Gregory XIII. never paſſed by his door without calling for him, and ſtopped ſometimes a whole hour to talk with him in the ſtreet. His name became ſo famous, that even in his lifetime the higheſt encomium on a learned man was to call him *a Navarrus*. He was conſulted as an oracle. By temperance he prolonged his life to a great length. His œconomy enabled him to give ſubſtantial proofs of his charity. Being very old, he uſed to ride on a mule through the city, and relieved all the poor he met; to which his mule was ſo well accuſtomed, that it ſtopped of its own accord at the ſight of every poor man, till its maſter had relieved him. He refuſed ſeveral honourable poſts in church and ſtate, that he might have leiſure to correct and improve the works he had already written, and compoſe others. He died at the age of 94, on the 21st of June 1586. He wrote a vaſt number of treatiſes, all which are either on morality or canon law.

ASPIRATE, in grammar, denotes words marked with the ſpiritus aſper. See ASPER.

ASPIRATION, among grammarians, is uſed to denote the pronouncing a ſyllable with ſome vehemence.

ASPLENIUM, CETERACH; a genus of the order of filices, belonging to the cryptogamia claſs of plants; of which there are ſeven ſpecies, but only two are natives of Britain. They grow upon old walls or moiſt rocks; one is called *ſcolopendrium*, or *hart's tongue;* the other is properly *ceterach*, alſo called *ſpleenwort.* It has an herbaceous, ſomewhat mucilaginous, roughiſh taſte: it is recommended as a pectoral, and for promoting urine in nephritic caſes. The virtue which it has been moſt celebrated for is that which it has the leaſt title to, *viz.* diminiſhing the ſpleen.

ASS, in zoology, is ranked as a ſpecies of equus, or horſe. See EQUUS.

Coronation of the ASS, in antiquity, was a part of the ceremony of the feaſt of Veſta, wherein the bakers put bread crowns on the heads of theſe quadrupeds; *Ecce coronatis panis dependet aſellis* *. Hence, in an ancient calendar, the ides of June are thus denoted; *Feſtum eſt Veſtæ. Aſinus coronatur!*—This honour, it ſeems, was done the beaſt, becauſe, by its braying, it had ſaved Veſta from being raviſhed by the Lampſacan god. Hence the formula, *Veſtæ delicium eſt aſinus.*

ASSAI, in muſic, ſignifies quick; and, according to others, that the motion of the piece be kept in a middle degree of quickneſs or ſlowneſs. As, *aſſai allegro, aſſai preſto.* See ALLEGRO and PRESTO.

ASSANCALA, a ſtrong town in Armenia, near the river Arras, in the road between Erzerum and Erivan, and noted for its hot baths. It ſtands on a high hill; the walls are built in a ſpiral line all round the rock, and ſtrengthened with ſquare towers. The ditches are about two fathoms over, cut out of hard rock. E. Long. 41. 30. N. Lat. 39. 46.

ASSANCHIF, a town of Aſia, in Diarbekir, ſeated on the river Tigris. E. Long. 42. 30. N. Lat. 37. 20.

ASSARIUM, in antiquity, denotes a ſmall copper coin, being a part or diminutive of the *as*. The word ασσαϱιον is uſed by Suidas indifferently with οβολος and νομισμα to denote a ſmall piece of money; in which he is followed by Cujacius, who defines ασσαϱιον by *Minimus æris nummus*. We find mention of the aſſarion in the goſpel of St Matthew, chap. x. verſe 29.

ASSARON, or OMER, a meaſure of capacity, in uſe among the Hebrews, containing five pints. It was the meaſure of manna which God appointed for every Iſraelite.

ASSASSIN, a perſon who kills another by attacking him at ſome diſadvantage. It is alſo meant of one who hires himſelf to murder a perſon, in order to revenge the quarrel of another.

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* Ovid *Faſt.* vi. 311.

ASSASSINS, a tribe or clan in Syria, called alſo *Iſmaelians* and *Bataniſts*. Theſe people probably owed their origin to the Karmatians, a famous heretical ſect among the Mahometans, who ſettled in Perſia about the year 1090, whence, in proceſs of time, they ſent a colony into Syria, where they became poſſeſſed of a conſiderable tract of land among the mountains of Lebanon, extending itſelf from the neighbourhood of Antioch to Damaſcus.

The firſt chief and legiſlator of this remarkable tribe appears to have been Haſſan Sabah, a ſubtle impoſtor, who by his artifices made fanatical and implicit ſlaves of his ſubjects. Their religion was compounded of that of the Magi, the Jews, the Chriſtians, and the Mahometans: but the capital article of their creed was to believe that the Holy Ghoſt reſided in their chief; that his orders proceeded from God himſelf, and were real declarations of his divine pleaſure. To this monarch the orientals gave the name of *Scheik*: but he is better known in Europe by the name of the *Old Man of the Mountain*. His dignity, inſtead of being hereditary, was confirmed by election; where merit, that is, a ſuperior multiplicity and enormity of crimes, was the moſt effectual recommendation to a majority of ſuffrages.

This chief, from his exalted reſidence on the ſummit of mount Lebanon, like a vindictive deity, with the thunderbolt in his hand, ſent inevitable death to all quarters of the world; ſo that from one end of the earth to the other, Khalifs, Emperors, Sultans, Kings, Princes, Chriſtians, Mahometans, and Jews, every nation and people, execrated and dreaded his ſanguinary power, from the ſtrokes of which there was no ſecurity. At the leaſt ſuggeſtion or whiſper that he had threatened the death of any potentate, all immediately doubled their guards, and took every other precaution in their power. It is known that Philip Auguſtus king of France, on a premature advice that the Scheik intended to have him aſſaſſinated, inſtituted a new body-guard of men diſtinguiſhed for their activity and courage, called *ſergens d'Armes*, with braſs clubs, bows and arrows; and he himſelf never appeared without a club, fortified either with iron or gold. Moſt ſovereigns paid ſecretly a penſion to the Scheik, however ſcandalous and derogatory it might be to the luſtre of majeſty, for the ſafety of their perſons. The Knights Templars alone dared to defy his ſecret machinations and open force. Indeed they were a permanent diſperſed body, not to be cut off by maſſacres or aſſaſſinations.

This barbarous prince was furniſhed with reſources unknown to all other monarchs, even to the moſt abſolute deſpotic tyrant. His ſubjects would proſtrate themſelves at the foot of his throne, requeſting to die by his hand or order, as a favour by which they were ſure of paſſing into paradiſe. On them if danger made any impreſſion, it was an emulation to preſs forward; and if taken in any enterpriſe, they went to the place of execution with a magnanimity unknown to others. Henry count of Champaigne, who married Iſabella daughter of Amaury king of Jeruſalem, paſſing over part of the territory of the Aſſaſſins in his way to Syria, and talking highly of his power, their chief came to meet him, "Are your ſubjects (ſaid the old man of the mountain) as ready in their ſubmiſſion as mine?" and, without ſtaying for an anſwer, made a ſign with his hand, when ten young men in white, who were ſtanding on an adjacent tower, inſtantly threw themſelves down. On another occaſion, Sultan Malek-Shah ſummoning the Scheik to ſubmit himſelf to his government, and threatening him with the power of his arms, ſhould he heſitate to comply; the latter, very compoſedly turning himſelf towards his guards, ſaid to one of them, "Draw your dagger, and plunge it into your breaſt;" and to another, "Throw yourſelf headlong from yonder rock." His orders were no ſooner uttered, than they were joyfully obeyed: and all the anſwer he deigned to give the ſultan's envoy was, "Away to thy maſter, and let him know I have many thouſand ſubjects of the ſame diſpoſition." Men ſo ready to deſtroy themſelves were equally alert and reſolute in being the miniſters of death to others. At the command of their ſovereign, they made no difficulty of ſtabbing any prince, even on his throne; and being well verſed in the different dialects, they conformed to the dreſs and even the external religion of the country, that they might with leſs difficulty ſtrike the fatal blow required by their chief. With the Saracens they were Mahometans; with the Franks, Chriſtians; in one place they joined with the Mamaluks; in another, with the eccleſiaſtics or religious; and under this diſguiſe, ſeized the firſt opportunity of executing their ſanguinary commiſſion. Of this we meet with an inſtance in the hiſtory of Saladin, while he was beſieging Manbedge, the celebrated Hieropolis of antiquity. Being one day, with a few attendants, and they at ſome diſtance, reconnoitring the place for the better diſpoſition of the attack, a man ruſhed on him with a dagger in his hand, and wounded him in the head; but the ſultan, as he was endeavouring to repeat his ſtroke, wreſted the dagger from him, and, after receiving ſeveral wounds, laid him dead at his feet. Before the ſultan had well recovered himſelf, a ſecond encountered him to finiſh the treachery of the former; but he met with the ſame fate: he was ſucceeded with equal fury by a third, who alſo fell by the hand of that magnanimous prince whom he was ſent to aſſaſſinate. And it was obſerved, that theſe wretches dealt about their fruitleſs blows as they lay in the agonies of death. With ſuch rapidity was this tranſacted, that it was over before Saladin's guards could come to his aſſiſtance. He retired to his tent, and in great perturbation throwing himſelf on his ſopha ordered his ſervants to take a ſtrict view of his houſehold, and to caſhier all ſuſpected perſons; at the ſame time aſking with great earneſtneſs, "Of whom have I deſerved ſuch treacherous uſage?" but it afterwards appeared, that theſe villains had been ſent by the old man of the mountain; of whom the vizir Kamſchlegin had purchaſed the murder of Saladin, to free himſelf from ſo great a warrior whom he could not meet in the field. To animate them in their frantic obedience, the Scheik, before their departure on ſuch attempts, uſed to give them a ſmall foretaſte of ſome of the delights which he aſſured them would be their recompenſe in paradiſe. Delicious ſoporific drinks were given them; and while they lay aſleep, they were carried into beautiful gardens, where every allurement invited their ſenſes to the moſt exquiſite gratifications. From theſe ſeats of voluptuouſneſs, inflamed with liquor and enthuſiaſtic views of perpetual enjoyments, they ſallied forth to perform aſſaſſinations of the blackeſt dye.

This people once had, or at leaſt they feigned to have, an intention of embracing the Chriſtian religion. They reigned a long time in Perſia, and on mount Lebanon. Hulaku, a khan of the mogul Tartars, in the year 655 of the Hegira, or 1254 of the Chriſtian æra, entered their country and diſpoſſeſſed them of ſeveral places; but it was not till the year 1272 that they were totally conquered. This atchievement was owing to the conduct and intrepidity of the Egyptian forces ſent againſt them by the ſultan Bibaris. It has, however, been thought that the Druſes, who ſtill reſide among the eminences of mount Lebanon, and whoſe religion and cuſtoms are ſo little known, are a remnant of thoſe barbarians.

ASSAULT, in law, is an attempt or offer to beat another, without touching him: as if one lifts up his cane or his fiſt in a threatening manner at another; or ſtrikes at him, but miſſes him; this is an aſſault, *inſultus*, which Finch deſcribes to be "an unlawful ſetting upon one's perſon." This alſo is an inchoate violence, amounting conſiderably higher than bare threats; and therefore, though no actual ſuffering is proved, yet the party injured may have redreſs by action of *treſpaſs vi et armis*, wherein he ſhall recover damages as a compenſation for the injury.

Assault, in the military art, a furious effort made to carry a fortified poſt, camp, or fortreſs, wherein the aſſailants do not ſcreen themſelves by any works: while the aſſault continues, the batteries ceaſe, for fear of killing their own men.—The *enfans perdus* march firſt to the aſſault. See Enfans *Perdus*.

ASSAY, or essay, in metallurgy. See Essay.

Assay-*Maſter*, an officer appointed by certain corporations to make a juſt eſſay of all gold and ſilver brought to him, and to make a true report thereof.

ASSAYING, or essaying, *of Ores*. See Metallurgy.

ASSELYN (John), a famous Dutch painter, was born in Holland, and became the diſciple of Iſaiah Vandevelde, the battle-painter. He diſtinguiſhed himſelf in hiſtory-paintings, battles, landſcapes, animals, and particularly horſes. He travelled into France and Italy; and was ſo pleaſed with the manner of Bambochio, that he always followed it. He painted many pictures at Lyons, where he married the daughter of a merchant of Antwerp, and returned with her to Holland. Here he firſt diſcovered to his countrymen a freſh and clear manner of painting landſcapes, like Claude Lorraine; upon which, all the painters imitated his ſtyle, and reformed the dark brown they had hitherto followed. Aſſelyn's pictures were ſo much admired at Amſterdam, that they ſold there at a high price. He died in that city, in 1660. Twenty-four pieces of landſcapes and ruins, which he painted in Italy, have been engraved by Perelle.

ASSEMBLAGE, the uniting or joining of things together; or the things themſelves ſo united or joined. It is alſo uſed, in a more general ſenſe, for a collection of various things ſo diſpoſed and diverſified, that the whole produces ſome agreeable effect.

ASSEMBLY, the meeting of ſeveral perſons, in the ſame place, upon the ſame deſign.

Assembly, in the beau monde, an appointed meeting of faſhionable perſons of both ſexes, for the ſake of play, gallantry, converſation, &c.

Assembly, in the military art, the ſecond beating of a drum before a march; at which the ſoldiers ſtrike their tents, roll them up, and ſtand to arms.

Assemblies of the clergy are called *convocations, ſynods, councils*; the annual meeting of the church of Scotland is called a *general aſſembly*.

Assemblies of the Roman people were called *comitia*.

ASSENS, a ſea-port town of Denmark, in the iſland of Funen. It is the common paſſage from the duchy of Sleſwick to Copenhagen. E. Long. 10. 30. N. Lat. 55. 15.

ASSENT, in a general ſenſe, implies an agreement to ſomething propoſed or affirmed by another.

Royal Assent, the approbation given by the king to a bill in parliament, after which it becomes a law.

ASSER, John, (or Asserius Menevensis, that is, *Aſſer of St David's*), biſhop of Shirburn in the reign of Alfred the Great. He was born in Pembrokeſhire, in South Wales; and educated in the monaſtery of St David's by the archbiſhop Aſſerius, who, according to Leland, was his kinſman. In this monaſtery he became a monk, and by his aſſiduous application ſoon acquired univerſal fame as a perſon of profound learning and great abilities. Alfred, the munificent patron of genius, about the year 880, ſent for him to court. The king was then at Dean in Wiltſhire. He was ſo charmed with Aſſer, that he made him his preceptor and companion. As a reward for his ſervices, he appointed him abbot of two or three different monaſteries; and at laſt promoted him to the epiſcopal ſee of Shirburn, where he died, and was buried, in the year 910. He was, ſays Pits, a man of a happy genius, wonderful modeſty, extenſive learning, and great integrity of life. He is ſaid to have been principally inſtrumental in perſuading the king to reſtore the univerſity of Oxford to its priſtine dignity and luſtre.—He wrote, *De vita et rebus geſtis Alfredi*, &c. Lond. 1574, publiſhed by archbiſhop Parker, in the old Saxon character, at the end of *Walſinghami hiſt.*——Francf. 1602, fol. Oxf. 1722, 8vo. Many other works are aſcribed to this author by Gale, Bale, and Pits; but all doubtful.

ASSERTION, in the language of the ſchools, a propoſition advanced by the aſſertor, who avows the truth of it, and is ready to defend it.

ASSESSOR, an inferior officer of juſtice, appointed chiefly to aſſiſt the ordinary judge with his opinion and advice.

Assessor is alſo one who aſſeſſes, or ſettles taxes and other public dues.

ASSEVERATION, a poſitive and vehement affirmation of ſomething.

ASSHETON (William), doctor of divinity, and rector of Beckenham, in Kent, was born in the year 1641, and was educated at Brazen-noſe college, Oxford. After entering into orders, he became chaplain to the duke of Ormond, and was admitted doctor of divinity in 1673. Soon after, he was nominated to a prebend in the church of York, preſented to the living of St Antholin, London, and to the rectory of Beckenham in Kent. He was the firſt projector of the ſcheme for providing for clergymens widows, and others, by a jointure payable out of the mercers company. He wrote ſeveral pieces againſt the Papiſts and

Diſſenters, and ſome devotional tracts. He died at Beckenham, in September 1711, in the 70th year of his age.

ASSIDEANS (or CHASIDÆANS, from the Hebrew "*chaſidim*," *merciful, pious*;) thoſe Jews who reſorted to Mattathias to fight for the law of God and the liberties of their country. They were men of great valour and zeal, having voluntarily devoted themſelves to a more ſtrict obſervation of the law than other men. For, after the return of the Jews from the Babyloniſh captivity, there were two ſorts of men in their church; thoſe who contented themſelves with that obedience only which was preſcribed by the law of Moſes, and who were called *Zadikim*, i. e. the *righteous*; and thoſe who, over and above the law, ſuperadded the conſtitutions and traditions of the elders, and other rigorous obſervances: theſe latter were called *Chaſidim*, i. e. the *pious*. From the former ſprung the Samaritans, Sadducees, and Caraites; from the latter, the Phariſees and the Eſſenes.

ASSIDENT SIGNS, in medicine, are ſymptoms which uſually attend a diſeaſe, but not always; hence differing from *pathognomic* ſigns, which are inſeparable from the diſeaſe: *e. gr.* In the pleuriſy, a pungent pain in the ſide; in an acute fever, difficulty of breathing, &c. collectively taken, are pathognomic ſigns; but that the pain extends to the hypochondrium or clavicle, or that the patient lies with more eaſe on one ſide than on the other, are *aſſident* ſigns.

ASSIENTO, a Spaniſh word ſignifying a *farm*, in commerce, is uſed for a bargain between the king of Spain and other powers, for importing negroes into the Spaniſh dominions in America, and particularly to Buenos Ayres. The firſt aſſiento was made with the French Guinea-company; and, by the treaty of Utrecht, transferred to the Engliſh, who were to furniſh 4800 negroes annually.

ASSIGN, in common law, a perſon to whom a thing is aſſigned or made over.

ASSIGNEE, in law, a perſon appointed by another to do an act, tranſact ſome buſineſs, or enjoy a particular commodity.

ASSIGNING, in a general ſenſe, implies the making over the right of one perſon to another. In a particular ſenſe, it ſignifies the pointing out of ſomething; as, an error, falſe judgment, or waſte.

ASSIGNMENT, the transferring the intereſt one has in a leaſe, or other thing, to another perſon.

ASSIMILATION, in phyſics, is that motion by which bodies convert other bodies related to them, or at leaſt ſuch as are prepared to be converted, into their own ſubſtance and nature. Thus, flame multiplies itſelf upon oily bodies, and generates new flame; air upon water, and produces new air; and all the parts, as well ſimilar as organical, in vegetables and animals, firſt attract with ſome election or choice, nearly the ſame common or not very different juices for aliment, and afterwards aſſimilate or convert them to their own nature.

ASSISE, in old Engliſh law-books, is defined to be an aſſembly of knights and other ſubſtantial men, together with the juſtice, in a certain place, and at a certain time: but the word, in its preſent acceptation, implies a court, place, or time, when and where the writs and proceſſes, whether civil or criminal, are decided by judge and jury.

All the counties of England are divided into ſix circuits; and two judges are aſſigned by the king's commiſſion, who hold their aſſiſes twice a-year in every county (except London and Middleſex, where courts of *niſi prius* are holden in and after every term, before the chief or other judge of the ſeveral ſuperior courts; and except the four northern counties, where the aſſiſes are taken only once a-year) to try by a jury of the reſpective counties the truth of ſuch matters of fact as are then under diſpute in the courts of Weſtminſter-hall. Theſe judges of aſſiſe came into uſe in the room of the ancient juſtices in eyre, *juſticiarii in itinere*; who were regularly eſtabliſhed, if not firſt appointed, by the parliament of Northampton, *A. D.* 1176, 22 Hen. II. with a delegated power from the king's great court or *aula regia*, being looked upon as members thereof: and they afterwards made their circuit round the kingdom once in ſeven years for the purpoſe of trying cauſes. They were afterwards directed by *magna charta*, c. 12. to be ſent into every county once a-year to take or try certain actions then called *recognitions* or *aſſiſes*; the moſt difficult of which they are directed to adjourn into the court of common pleas to be there determined. The itinerant juſtices were ſometimes mere juſtices of aſſiſe, or of dower, or of gaol-delivery, and the like; and they had ſometimes a more general commiſſion, to determine all manner of cauſes, *juſticiarii ad omnia placita*: but the preſent juſtices of aſſiſe and *niſi prius* are more immediately derived from the ſtatute Weſtm. 2. 13 Edw. I. c. 30. explained by ſeveral other acts, particularly the ſtatute 14 Edw. III. c. 16. and muſt be two of the king's juſtices of the one bench or the other, or the chief baron of the exchequer, or the king's ſerjeants ſworn. They uſually make their circuits in the reſpective vacations after Hilary and Trinity terms; aſſiſes being allowed to be taken in the holy time of Lent by conſent of the biſhops at the king's requeſt, as expreſſed in ſtatute Weſtm. 1. 3 Edw. I. c. 51. And it was alſo uſual, during the times of Popery, for the prelates to grant annual licences to the juſtices of aſſiſe to adminiſter oaths in holy times: for oaths being of a ſacred nature, the logic of thoſe deluded ages concluded that they muſt be of eccleſiaſtical cognizance. The prudent jealouſy of our anceſtors ordained that no man of law ſhould be judge of aſſiſe in his own country: and a ſimilar prohibition is found in the civil law, which has carried this principle ſo far, that it is equivalent to the crime of ſacrilege, for a man to be governor of the province in which he was born, or has any civil connection.

The judges upon their circuits now ſit by virtue of five ſeveral authorities. 1. The commiſſion of the *peace*, in every county of the circuits; and all juſtices of the peace of the county are bound to be preſent at the aſſiſes; and ſheriffs are alſo to give their attendance on the judges, or they ſhall be fined. 2. A commiſſion of *oyer* and *terminer*, directed to them and many other gentlemen of the county, by which they are empowered to try treaſons, felonies, *&c.* and this is the largeſt commiſſion they have. 3. A commiſſion of general *gaol-delivery*, directed to the judges and the clerk of aſſiſe aſſociate, which gives them power to try every priſoner in the gaol committed for any offence whatſoever,

ſoever, but none but priſoners in the goal; ſo that one way or other they rid the goal of all the priſoners in it. 4. A commiſſion of *aſſiſe*, directed to the judges and clerk of aſſiſe, to take aſſiſes; that is, to take the verdict of a peculiar ſpecies of jury called *an aſſiſe*, and ſummoned for the trial of *landed* diſputes. The other authority is, 5. That of *niſi prius*, which is a conſequence of the commiſſion of *aſſiſe*, being annexed to the office of thoſe juſtices by the ſtatute of Weſtm. 2. 13 Edw. I. c. 30. And it empowers them to try all queſtions of fact iſſuing out of the courts at Weſtminſter, that are then ripe for trial by jury. The original of the name is this: all cauſes commenced in the courts of Weſtminſter-hall are by the courſe of the courts appointed to be there tried, on a day fixed in ſome Eaſter or Michaelmas term, by a jury returned from the county wherein the cauſe of action ariſes; but with this proviſo, *niſi prius juſtitiarii ad aſſiſas capiendas venerint; unleſs before* the day prefixed the judges of aſſiſe come into the county in queſtion. This they are ſure to do in the vacations preceding each Eaſter and Michaelmas term, and there diſpoſe of the cauſe; which ſaves much expenſe and trouble, both to the parties, the jury, and the witneſſes.

The word *aſſiſe* (from the French *aſſis*, ſeated, ſettled, or eſtabliſhed, and formed of the Latin verb *aſſideo*, I ſit by) is uſed in ſeveral different ſenſes. It is ſometimes taken for the ſittings of a court; ſometimes for its regulations or ordinances, eſpecially thoſe that fix the ſtandard of weights and meaſures; and ſometimes it ſignifies a jury, either becauſe juries conſiſted of a fixed determinate number, or becauſe they continued ſitting till they pronounced their verdict. In Scots law, an aſſiſe or jury conſiſts of fifteen ſworn men (*juratores*) picked out by the court from a greater number, not exceeding 45, who have been ſummoned for that purpoſe by the ſheriff, and given in liſt to the defender, at ſerving him with a copy of his libel.

ASSISIO, an epiſcopal town of Italy, in the duchy of Spoleto, built on the ſide of a very high mountain. The cathedral of St Francis is very magnificent, and compoſed of three churches one above another. E. Long. 13. 35. N. Lat. 43. 4.

ASSITHMENT, a wiregeld, or compenſation, by a pecuniary mulct; from the prepoſition *ad*, and the Sax. *ſithe, vice: quod vice ſupplicii ad expiandum delictum ſolvitur*.

ASSOCIATION, the act of aſſociating, or conſtituting a ſociety, or partnerſhip, in order to carry on ſome ſcheme or affair with more advantage.—The word is Latin, *aſſociatio*; and compounded of *ad*, to, and *ſocio*, to join.

ASSOCIATION *of Ideas*, is where two or more ideas conſtantly and immediately follow one another, ſo that the one ſhall almoſt infallibly produce the other *.

ASSOILZIE, in law, to abſolve, or free.

ASSONANCE, in rhetoric and poetry, a term uſed where the words of a phraſe, or a verſe, have the ſame ſound or termination, and yet make no proper rhyme. Theſe are uſually accounted vicious in Engliſh; though the Romans ſometimes uſed them with elegancy: as, *Militem comparavit, exercitum ordinavit, aciem luſtravit*.

ASSONANT RHYMES, is a term particularly applied to a kind of verſes common among the Spaniards, where a reſemblance of ſound ſerves inſtead of a natural rhyme. Thus, *ligera, cubierta, tierra, meſa*, may anſwer each other in a kind of *aſſonant* rhyme, having each an *e* in the penult ſyllable, and an *a* in the laſt.

ASSUMPSIT, in the law of England, a voluntary or verbal promiſe, whereby a perſon aſſumes, or takes upon him to perform or pay any thing to another.

A promiſe is in the nature of a verbal covenant, and wants nothing but the ſolemnity of writing and ſealing to make it abſolutely the ſame. If therefore it be to do any explicit act, it is an expreſs contract, as much as any covenant: and the breach of it is an equal injury. The remedy indeed is not exactly the ſame: ſince, inſtead of an action of covenant, there only lies an action upon the caſe, for what is called an *aſſumpſit* or undertaking of the defendant; the failure of performing which is the wrong or injury done to the plaintiff, the damages whereof a jury are to eſtimate and ſettle. As, if a builder promiſes, undertakes, or aſſumes to Caius, that he will build and cover his houſe within a time limited, and fails to do it; Caius has an action on the caſe againſt the builder for this breach of his expreſs promiſe, undertaking, or aſſumpſit; and ſhall recover a pecuniary ſatisfaction for the injury ſuſtained by ſuch delay. So alſo in the caſe of a debt by ſimple contract, if the debtor promiſes to pay it and does not, this breach of promiſe entitles the creditor to his action on the caſe, inſtead of being driven to an action of debt. Thus likewiſe a promiſſory note, or note of hand not under ſeal, to pay money at a day certain, is an expreſs aſſumpſit; and the payee at common law, or by cuſtom and act of parliament the indorſee, may recover the value of the note in damages, if it remains unpaid. Some agreements indeed, though never ſo expreſly made, are deemed of ſo important a nature, that they ought not to reſt in verbal promiſe only, which cannot be proved but by the memory (which ſometimes will induce the perjury) of witneſſes. To prevent which, the ſtatute of frauds and perjuries, 29 Car. II. c. 3. enacts, that in the five following caſes no verbal promiſe ſhall be ſufficient to ground an action upon, but at the leaſt ſome note or memorandum of it ſhall be made in writing, and ſigned by the party to be charged therewith: 1. Where an executor or adminiſtrator promiſes to anſwer damages out of his own eſtate. 2. Where a man undertakes to anſwer for the debt, default, or miſcarriage, of another. 3. Where any agreement is made upon conſideration of marriage. 4. Where any contract or ſale is made of lands, tenements, or hereditaments, or any intereſt therein. 5. And laſtly, where there is any agreement that is not to be performed within a year from the making thereof. In all theſe caſes, a mere verbal aſſumpſit is void.

From theſe expreſs contracts the tranſition is eaſy to thoſe that are only implied by law. Which are ſuch as reaſon and juſtice dictate, and which therefore the law preſumes that every man has contracted to perform; and, upon this preſumption, makes him anſwerable to ſuch perſons as ſuffer by his non-performance.

Thus, 1. If I employ a perſon to tranſact any buſineſs for me, or perform any work, the law implies that I undertook, or aſſumed to pay him ſo much as his labour deſerved: and if I neglect to make him amends, he has a remedy for this injury by bringing his action

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* See Metaphyſics, ſect. xxviii.

on the caſe upon this implied aſſumpſit; wherein he is at liberty to ſuggeſt that I promiſed to pay him ſo much as he reaſonably deſerved, and then to aver that his trouble was really worth ſuch a particular ſum, which the defendant has omitted to pay. But this valuation of his trouble is ſubmitted to the determination of a jury; who will aſſeſs ſuch a ſum in damages as they think he really merited. This is called an *aſſumpſit* on a *quantum meruit*.

2. There is alſo an implied aſſumpſit on a *quantum valebat*, which is very ſimilar to the former; being only where one takes up goods or wares of a tradeſman, without expreſsly agreeing for the price. There the law concludes, that both parties did intentionally agree that the real value of the goods ſhould be paid; and an action on the caſe may be brought accordingly, if the vendee refuſes to pay that value.

3. A third ſpecies of implied aſſumpſit is when one has had and received money belonging to another without any valuable conſideration given on the receiver's part: for the law conſtrues this to be money had and received for the uſe of the owner only; and implies that the perſon ſo receiving, promiſed and undertook to account for it to the true proprietor. And, if he unjuſtly detains it, an action on the caſe lies againſt him for the breach of ſuch implied promiſe and undertaking; and he will be made to repair the owner in damages, equivalent to what he has detained in ſuch violation of his promiſe. This is a very extenſive and beneficial remedy, applicable to almoſt every caſe where the defendant has received money which *ex æquo et bono* he ought to refund. It lies for money paid by miſtake, or on a conſideration which happens to fail, or through impoſition, extortion, or oppreſſion, or where undue advantage is taken of the plaintiff's ſituation.

4. Where a perſon has laid out and expended his own money for the uſe of another at his requeſt, the law implies a promiſe of repayment, and an action will lie on this aſſumpſit.

5. Likewiſe, fifthly, upon a ſtated account between two merchants, or other perſons, the law implies that he againſt whom the balance appears has engaged to pay it to the other; though there be not any actual promiſe. And from this implication it is frequent for actions on the caſe to be brought, declaring that the plaintiff and defendant had ſettled their accounts together, *inſimul computaſſent*, (which gives name to this ſpecies of aſſumpſit); and that the defendant engaged to pay the plaintiff the balance, but has ſince neglected to do it. But if no account has been made up, then the legal remedy is by bringing a writ of *account de computo;* commanding the defendant to render a juſt account to the plaintiff, or ſhew the court good cauſe to the contrary. In this action, if the plaintiff ſucceeds, there are two judgements; the firſt is, that the defendant do account *(quod computet)* before auditors appointed by the court; and when ſuch account is finiſhed, then the ſecond judgment is, that he do pay the plaintiff ſo much as he is found in arrear.

6. The laſt claſs of contracts, implied by reaſon and conſtruction of law, ariſes upon this ſuppoſition, that every one who undertakes any office, employment, truſt, or duty, contracts with thoſe who employ or entruſt him, to perform it with integrity, diligence, and ſkill: and, if by his want of either of thoſe qualities any injury accrues to individuals, they have therefore their remedy in damages, by a ſpecial action on the caſe. A few inſtances will fully illuſtrate this matter. If an officer of the public is guilty of neglect of duty, or a palpable breach of it, of non-feaſance or of miſ-feaſance; as, if the ſheriff does not execute a writ ſent to him, or if he wilfully makes a falſe return thereof; in both theſe caſes, the party aggrieved ſhall have an action *on the caſe*, for damages to be aſſeſſed by a jury. If a ſheriff or gaoler ſuffers a priſoner who is taken upon meſne proceſs (that is, during the pendency of a ſuit) to eſcape, he is liable to an action *on the caſe*. But if, after judgment, a gaoler or a ſheriff permits a debtor to eſcape, who is charged in execution for a certain ſum; the debt immediately becomes his own, and he is compellable by action of *debt*, being for a ſum liquidated and aſcertained, to ſatiſfy the creditor in his whole demand. An advocate or attorney that betray the cauſe of their client, or, being retained, neglect to appear at the trial, by which the cauſe miſcarries, are liable to an action on the caſe, for a reparation to their injured client. There is alſo in law always an implied contract with a common inn-keeper, to ſecure his gueſt's goods in his inn; with a common carrier or barge-maſter, to be anſwerable for the goods he carries; with a common farrier, that he ſhoes a horſe well, without laming him; with a common taylor, or other workman, that he performs his buſineſs in a workmanlike manner: in which if they fail, an action on the caſe lies to recover damages for ſuch breach of their general undertaking. Alſo if an inn-keeper, or other victualler, hangs out a ſign and opens his houſe for travellers, it is an implied engagement to entertain all perſons who travel that way; and upon this univerſal *aſſumpſit* an action on the caſe will lie againſt him for damages, if he without good reaſon refuſes to admit a traveller. In contracts likewiſe for ſales, if the ſeller doth upon the ſale warrant it to be good, the law annexes a tacit contract to this warranty, that if it be not ſo, he ſhall make compenſation to the buyer: elſe it is an injury to good faith, for which an action on the caſe will lie to recover damages.

ASSUMPTION, a feſtival in the Romiſh church, in honour of the miraculous aſcent of the Virgin Mary into heaven: the Greek church, who alſo obſerve this feſtival, celebrate it on the 15th of Auguſt with great ceremony.

Assumption, in logic, is the minor or ſecond propoſition in a categorical ſyllogiſm.

Assumption is alſo uſed for a conſequence drawn from the propoſitions whereof an argument is compoſed.

Assumption, an iſland of North America, in the gulph of St Laurence, at the mouth of the great river of the ſame name. It is covered with trees. W. Long. 60. 40. N. Lat. 49. 30.

Assumption, a large and handſome town, of Proper Paraguay, on the river of the ſame name in South America. It is a biſhop's ſee, is well peopled, and ſeated in a country fruitful in corn and fruits, whoſe trees are always green. There is likewiſe a quantity of paſture, and the air is temperate and ſalutary. W. Lon. 60. 40. S. Lat. 34. 10.

ASSUMPTIVE arms, in heraldry, are ſuch as a perſon has a right to aſſume, with the approbation of his ſovereign, and of the heralds: thus, if a perſon, who has no right by blood, and has no coat of arms, ſhall captivate, in any lawful war, any gentleman, nobleman, or prince, he is, in that caſe, intitled to bear the ſhield of that priſoner, and enjoy it to him and his heirs for ever.

ASSURANCE, or insurance, in commerce. See Insurance.

ASSUROR, a merchant, or other perſon, who makes out a policy of aſſurance, and thereby inſures a ſhip, houſe, or the like.

ASSUS, *i*, feminine, (Strabo); *Aſſum*, or *Aſſon*, *i*, neuter, (Ptolemy); a town of Troas (though by others ſuppoſed to be of Myſia), and the ſame with Apollonia, (Pliny); but different from the Apollonia on the river Rhyndacus. Ptolemy places it on the ſea-coaſt, but Strabo more inland; if he does not mean the head of an inland bay, as appears from Diodorus Siculus. It was a town of the Leleges, the country of Cleanthes the ſtoic philoſopher, who ſucceeded Zeno; and is ſtill called *Aſſos*. E. Long. 27. 30. N. Lat. 38. 30.

ASSYRIA. See Babylonia.

ASSYTHMENT. See Assithment.

ASTA, an inland town of Liguria, a colony, (Ptolemy); on the river Tanarus: now *Aſti*. E. Long. 8. 15. Lat. 44. 40.

Asta *Regia*, a town of Bætica, (Pliny); ſituated at that mouth of the Bætis, which was choaked up with mud, to the north of Cadiz; 16 miles diſtant from the port of Cadiz, (Antonine). Its ruins ſhew its former greatneſs. Its name is Phœnician, denoting a *frith*, or arm of the ſea, on which it ſtood. It is ſaid to be the ſame with Xera; which ſee.

ASTABAT, a town of Armenia, in Aſia, ſituated near the river Aras, 12 miles ſouth of Nakſhivan. The land about it is excellent, and produces very good wine. There is a root peculiar to this country called *ronas*; which runs in the ground like liquorice, and ſerves for dying red. It is very much uſed all over the Indies, and for it they have a great trade. E. Long. 46. 30. N. Lat. 39. 0.

ASTAROTH, or Ashtaroth, in antiquity, a goddeſs of the Sidonians.—The word is Syriac, and ſignifies *ſheep*, eſpecially when their udders are turgid with milk. From the fecundity of thoſe animals, which in Syria continue to breed a long time, they formed the notion of a deity, whom they called *Aſtaroth*, or *Aſtarte*. See Astarte.

Astaroth, the royal reſidence of Og king of Baſhan; whether the ſame with Aſtaroth Carnaim, is matter of doubt: if one and the ſame, it follows from Euſebius's account, that it lay in Baſhan, and to the eaſt of Jordan, becauſe in the confines of Arabia.

ASTARTE, in Pagan mythology, (the ſingular of Aſtaroth), a Phœnician goddeſs *, called in Scripture the *queen of heaven*, and the *goddeſs of the Sidonians*.—Solomon, in compliment to one of his queens, erected an altar to her. In the reign of Ahab, Jezebel cauſed her worſhip be performed with much pomp and ceremony: ſhe had 400 prieſts; the women were employed in weaving hangings or tabernacles for her; and Jeremiah obſerves, that "the children gathered the "wood, the fathers kindled the fire, and the women "kneaded the dough, to make cakes for the queen of "heaven."

Astarte, a city on the other ſide Jordan; one of the names of Rabbath Ammon, in Arabia Petræa, (Stephanus).

ASTEISM, in rhetoric, a genteel irony, or handſome way of deriding another. Such, *e. gr.* is that of Virgil: *Qui Bavium non odit, amet tua carmina, Mævi*, &c. Diomed places the characteriſtic of this figure, or ſpecies of irony, in that it is not groſs and ruſtic, but ingenious and polite.

ASTELL (Mary), the great ornament of her ſex, and country, was the daughter of —— Aſtell, an opulent merchant at Newcaſtle upon Tyne, where ſhe was born about the year 1668. She was educated in a manner ſuitable to her ſtation; and, amongſt other accompliſhments, was miſtreſs of the French, and had ſome knowledge of the Latin tongue. Her uncle, a clergyman, obſerving in her ſome marks of a promiſing genius, took her under his tuition, and taught her mathematics, logic, and philoſophy. She left the place of her nativity when ſhe was about 20 years of age, and ſpent the remaining part of her life at London, and at Chelſea. Here ſhe purſued her ſtudies with great aſſiduity, made great proficiency in the above-mentioned ſciences, and acquired a more complete knowledge of many claſſic authors. Among theſe Seneca, Epictetus, Hierocles, Antoninus, Tully, Plato, and Xenophon, were her principal favourites.

Her life was ſpent in writing for the advancement of learning, religion, and virtue; and in the practice of thoſe religious duties which ſhe ſo zealouſly and pathetically recommended to others, and in which perhaps no one was ever more ſincere and devout. Her ſentiments of piety, charity, humility, friendſhip, and other Chriſtian graces, were uncommonly refined and ſublime; and religion ſat gracefully upon her, unattended with any forbidding airs of ſourneſs or of gloom. Her mind was generally calm and ſerene; and her converſation was innocently facetious, and highly entertaining. She would ſay, "The good Chriſtian only hath reaſon, and he always ought, to be cheerful;" and, "That dejected looks and melancholy airs were very unſeemly in a Chriſtian." But theſe ſubjects ſhe hath treated at large in ſome of her excellent writings.

She was remarkably abſtemious; and ſeemed to enjoy an uninterrupted ſtate of health, till a few years before her death; when, having one of her breaſts cut off, it ſo much impaired her conſtitution, that ſhe did not long ſurvive it. This painful operation ſhe underwent without diſcovering the leaſt timidity, or ſo much as uttering a groan; and ſhewed the ſame reſolution and reſignation during her whole illneſs. When ſhe was confined to her bed by a gradual decay, and the time of her diſſolution drew near, ſhe ordered her ſhroud and coffin to be made, and brought to her bed-ſide; and there to remain in her view, as a conſtant memento of her approaching fate, and to keep her mind fixed on proper contemplation. She died in the year 1731, in the 63d year of her age, and was buried at Chelſea. She wrote, 1. A ſerious Propoſal to the Ladies. 2. An Eſſay in Defence of the Female Sex. 3. Letters concerning the Love of God. 4. Reflections upon Marriage. 5. Moderation truly ſtated. 6. The Chriſtian Religion, as profeſſed by a Daughter of the Church of England; and ſome other works.

ASTER, starwort; a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants;

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* See Phœnicia.

3 MA 55

Plate XLII.

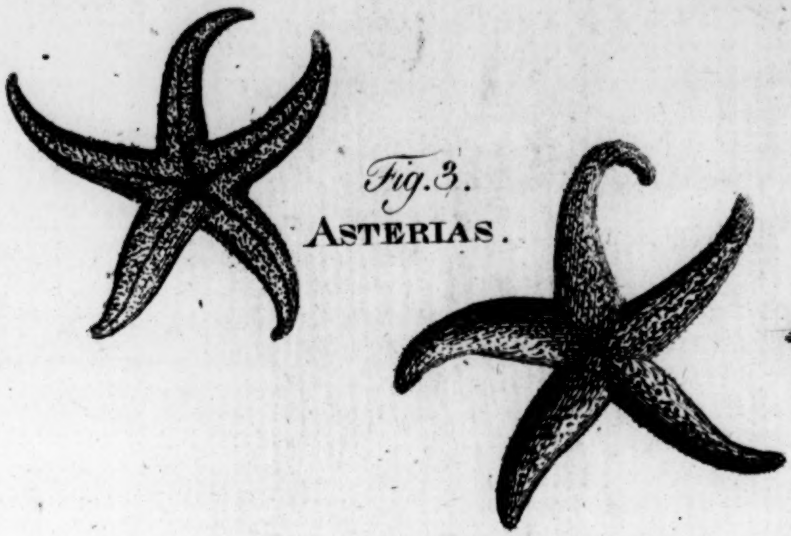


Fig.3. ASTERIAS.

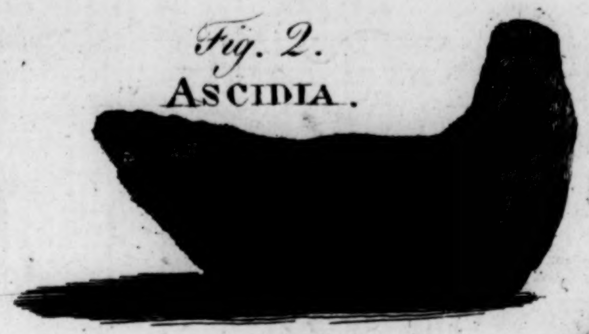


Fig. 2. ASCIDIA.

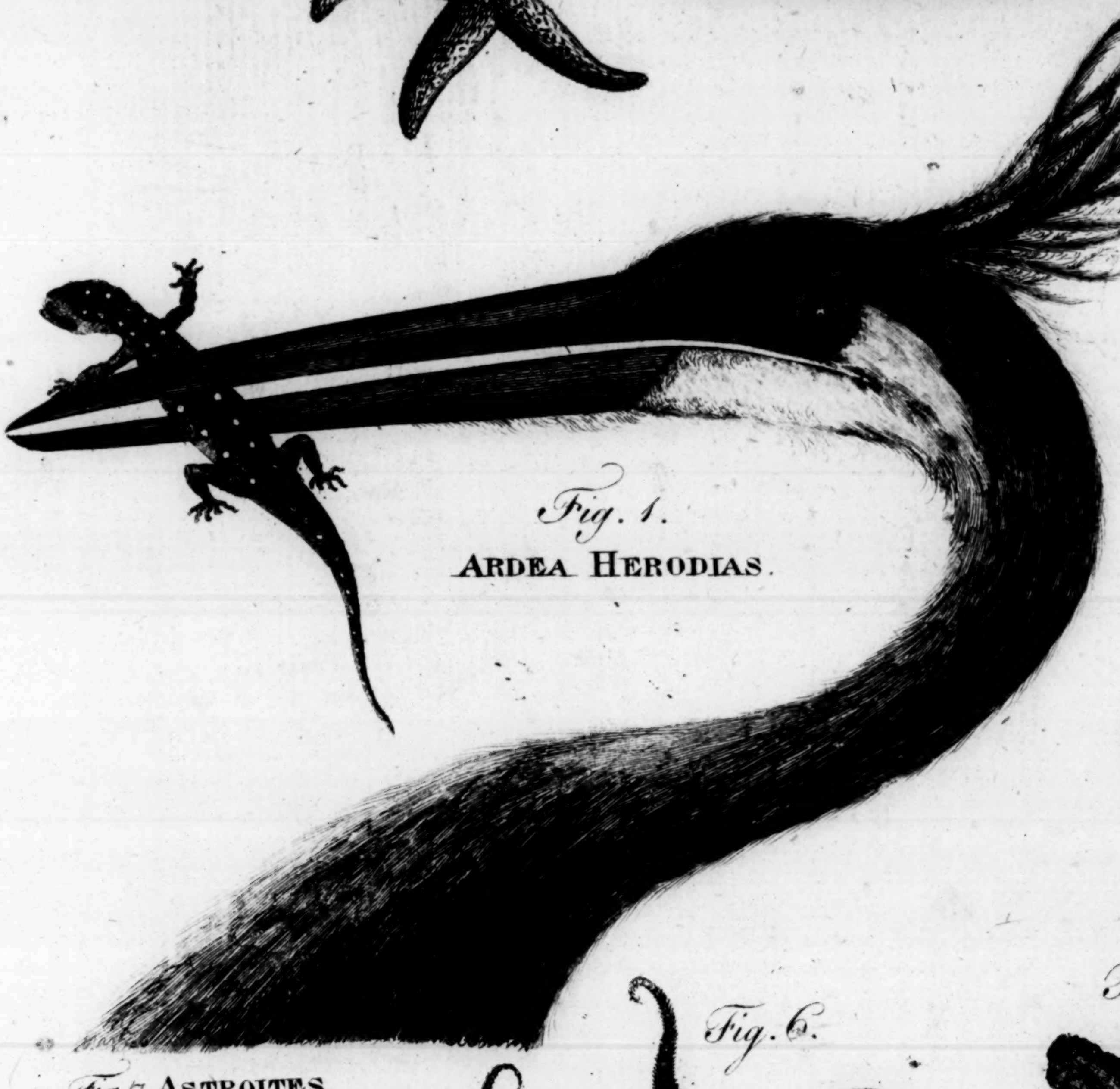


Fig. 1. ARDEA HERODIAS.

ASTERIAS

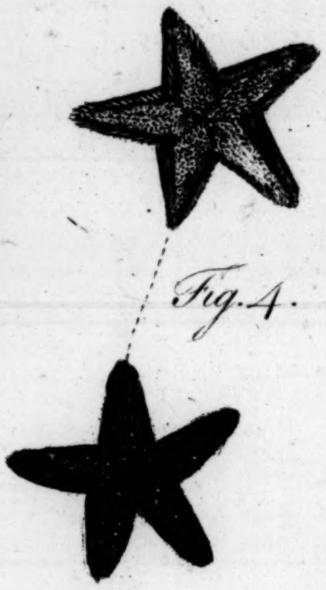


Fig.4.

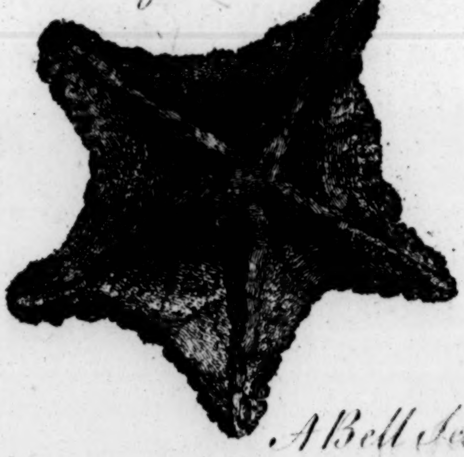


Fig.5.

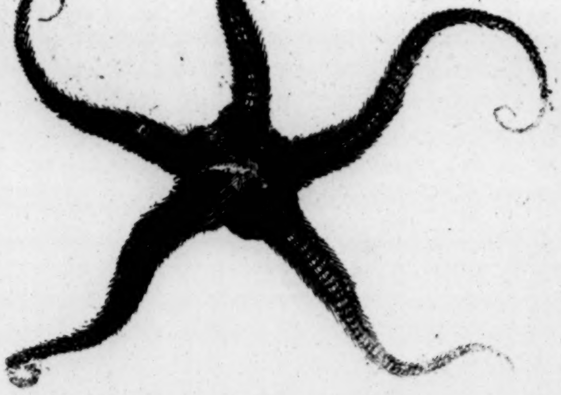
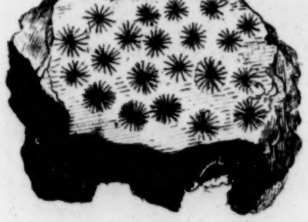


Fig.6.

Fig.7. ASTROITES.



A Bell Sculpt

plants; of which there are no leſs than 30 diſtinct ſpecies: but as none of them are poſſeſſed of any remarkable properties, we reckon a particular deſcription unneceſſary.

Culture. All the ſpecies of this genus may be raiſed from ſeed ſown either in autumn or ſpring; but the greateſt part of them being perennial plants, and increaſing greatly at the roots, are generally propagated by parting their roots early in the ſpring, and they will grow in almoſt any ſoil or ſituation; and the larger ſorts increaſe ſo faſt, that, if not prevented, they will in a little time run over a large ſpace of ground. They grow beſt in the ſhade; but the lower kinds do not run ſo much at the root, but ſhould be taken up and tranſplanted every other year; which will make them produce much fairer flowers. Some few ſorts, which are natives of warm climates, will require artificial heat to raiſe them, if not to preſerve them.

Aster, or *Stella Marina*, in zoology. See Asterias.

ASTERABAD, a province in the north-eaſt part of Perſia, having Tabriſtan on the weſt, part of the Caſpian Sea and part of Jorjan on the north, Koraſan on the weſt, and Koumas on the ſouth. It is a mountainous country, except near the banks of the rivers that almoſt ſurround it, where it is pleaſant, and fruitful, producing grapes of a prodigious ſize. In other parts the ſoil is ſandy and barren. Aſterabad is the chief town, which gives name to a gulph in the Perſian Sea, at the bottom of which it ſtands. E. Long. 54. 35. N. Lat. 36. 50.

ASTERIA, in zoology, a name by which ſome authors have called the *falco palumbarius*, or *goſhawk* *.

* See *Falco*.

Asteria is alſo the name of a gem, uſually called the *cat's eye*, or *oculus cati*. It is a very ſingular and very beautiful ſtone, and ſomewhat approaches to the nature of the opal, in having a bright encluded colour, which ſeems to be lodged deep in the body of the ſtone, and ſhifts about, as it is moved, in various directions; but it differs from the opal in all other particulars, but, above all, in its want of the great variety of colours ſeen in that gem, and in its ſuperior hardneſs. It is uſually found between the ſize of a pea, and the breadth of a ſixpence; and is almoſt always of a ſemicircular form, broad and flat at the bottom, and rounded and convex at the top; it is naturally ſmooth and poliſhed, and is uſually wore with is natural poliſh. It has only two colours, a pale brown and a white; the brown ſeeming the ground, and the white playing about in it, as the fire-colour in the opal. It is conſiderably hard, and will take a fine poliſh, but is uſually worn with its native ſhape and ſmoothneſs. It is found in the Eaſt and Weſt Indies, and in Europe. The iſland of Borneo affords ſome very fine ones, but they are uſually ſmall; they are very common in the ſands of rivers in New Spain; and in Bohemia they are not unfrequently found immerſed in the ſame maſſes of jaſper with the opal.

Asteria is alſo the name of an extraneous foſſil, called in Engliſh the *ſtar-ſtone*. Theſe foſſils are ſmall, ſhort, angular or ſulcated columns, between one and two inches long, and ſeldom above a third of an inch in diameter: compoſed of ſeveral regular joints; when ſeparated, each reſembles a radiated ſtar. They are, not without reaſon, ſuppoſed to be a part of ſome ſea-fiſh putrified, probably the aſterias, or ſea-ſtar *. The aſteria is alſo called *aſtrites*, *aſtroites*, and *aſteriſcus*. They may be reduced to two kinds; thoſe whoſe whole bodies make the form of a ſtar; and thoſe which in the whole are irregular, but are adorned as it were with conſtellations in the parts. Dr Liſter, for diſtinction's ſake, only gives the name *aſteria* to the former ſort, diſtinguiſhing the latter by the appellation of *aſtroites;* other naturaliſts generally uſe the two indiſcriminately. The aſteria ſpoken of by the ancients appears to be of this latter kind. The quality of moving in vinegar, as if animated, is ſcarce perceivable in the aſtroites, but is ſignal in the aſteria. The former muſt be broken in ſmall pieces before it will move; but the latter will move, not only in a whole joint, but in two or three knit together. The curious frequently meet with theſe ſtones in many parts of England: at Cleydon in Oxfordſhire they are found rather larger than common, but of a ſofter ſubſtance; for, on being left a ſmall ſpace of time in a ſtrong acid, they may eaſily be ſeparated at the joints in ſmall plates.

* See *Aſterias*.

ASTERIAS, star-fish, or sea-star, in zoology, a genus of inſects of the order of vermes moluſca. It has a depreſſed body, covered with a coriaceous coat; is compoſed of five or more ſegments, running out from a central part, and furniſhed with numerous tentacula; and has the mouth in the centre.—The conformation of the mouth is this: the under part of each lobe runs towards a point with the reſt at the centre of the body; and theſe ſeveral productions of the rays make a ſort of lips, the ends of each of which are armed with a number of ſharp teeth, which ſerve to take and convey the food into the body. From this mouth there goes a ſeparate canal to all or many of the rays, which runs through their whole length, and becomes gradually narrower as it approaches the extremity. The tentacula reſemble the horns of ſnails, but ſerve the animal to walk with. They are capable of being contracted or ſhortened: and it is only at the creature's moving that they are ſeen of their full length; at other times, no part of them is ſeen but the extremity of each, which is formed like a ſort of button, being ſomewhat larger than the reſt of the horn.

Moſt of the ſpecies of aſterias are found in the Britiſh ſeas. 1. The glacialis, with five rays, depreſſed, broad at the baſe, yellow, and having a round ſtriated operculum on the back, is the moſt common; it feeds on oyſters, and is very deſtructive to the beds. 2. The clathatra, or cancellated ſea-ſtar, with five ſhort thick rays, hirſute beneath, cancellated above, is found with the former, but more rare. 3. The oculata, with five ſmooth rays, dotted or punctured, is of a fine purple colour, and is found about Angleſea *. 4. The hiſpida, with five rays, broad, angulated at top, and rough with ſhort briſtles, is of a brown colour, and likewiſe found about Angleſea †. 5. The placenta, with five very broad and membranaceous rays, extremely thin and flat, is found about Weymouth ‡. 6. The ſpherulata, with a pentagonal indented body; a ſmall globular bead between the baſe of each ray; the rays ſlender, jointed, taper, and hirſute on their ſides; found off Angleſea *. 7. The caput meduſæ, or arboreſcent ſea-ſtar, with five rays iſſuing from an angular body; the rays dividing into innumerable branches, growing ſlender as they recede from the baſe. Theſe the animal, in ſwimming, ſpreads like a net to their full

* See Plate XLII. fig 3.

† Fig. 4.

‡ Fig. 5.

* Fig. 6.

length; and when he perceives any prey within them, draws them in again, thus catching it with all the dexterity of a fiſherman. It is an inhabitant of every ſea. 8. The decacnemos, has ten very ſlender rays, with numbers of long beards on the ſides; the body is ſmall, and ſurrounded beneath with ten ſmall filiform rays. It inhabits the weſtern coaſts of Scotland.—There are ſeveral other ſpecies mentioned by authors; ſome of them of 10, 12, 13, or even 14 rays.

Ariſtotle and Pliny called this genus αϛηρ, and *ſtella marina*, from their reſemblance to the pictured form of the ſtars of heaven; and they aſſerted that they were ſo exceedingly hot, as inſtantly to conſume whatſoever they touched.

The foſſil world has been greatly enriched by the fragments and remains of the ſeveral pieces of ſtar-fiſh, which have been converted into ſtones *.

* See *Aſteria*.

Asterias, the ancient name of the bittern †.

† See *Ardea*.

ASTERISK, a mark in form of a ſtar (*), placed over a word or ſentence, to refer the reader to the margin, or elſewhere, for a quotation, explanation, or the like.

ASTERIUS, or Asturius, a Roman conſul, in 449. We have under his name, A Conference on the Old and New Teſtament, in Latin verſe: in which each ſtrophe contains, in the firſt verſe, an hiſtorical fact in the Old Teſtament; and in the ſecond, an application of that fact to ſome point in the New.

ASTEROPODIUM, a kind of extraneous foſſil, of the ſame ſubſtance with the aſteriæ, or ſtar-ſtones to which they ſerve as a baſe *.

* See *Aſterias* and *Star-ſtone*.

ASTHMA. See the *Index* ſubjoined to Medicine.

ASTI, a city of Montferrat in Italy, ſeated on the Tanaro, and capital of the county of the ſame name. It is a biſhop's ſee, and well fortified with ſtrong walls and deep ditches; and is divided into the city, borough, citadel, and caſtle. There are a great many churches and convents, as well as other handſome buildings; and its territory is well watered, abounding with groves, pleaſant hills, and ſpacious fields. It was taken by the French in 1745, and retaken by the king of Sardinia in 1746. E. Long. 8. 15. N. Lat. 54. 50.

ASTIGI, indeclinable; a colony, and conventus juridicus, of Bætica, ſurnamed *Auguſta Firma*, ſituated on the Singulus, which falls into the Bætis; called alſo *Collonia Aſtigitana*, (Pliny); now *Ecya*, midway between Seville and Corduba. W. Long. 5°. Lat. 37. 20.

ASTOMI, in anthropology, people feigned without mouths. Pliny ſpeaks of a nation of Aſtomi in India, who lived only by the ſmell or effluvia of bodies, taken in by the noſe.

ASTORGA, a very ancient city of Spain, in the kingdom of Leon, with a biſhop's ſee, is ſeated on the river Tuerta, and well fortified both by art and nature. It ſtands in a moſt agreeable plain, about 150 miles north-weſt of Madrid. There are excellent trouts in the river. W. Long. 6. 20. N. Lat. 42. 20.

ASTRACAN, a province of Ruſſia, and the moſt eaſterly part of Europe, bounded on the north by Bulgaria and Baſkiria; on the ſouth, by the Caſpian Sea; on the weſt by the Volga, which divides it from the Nagayan Tartars and Don Coſſacks; and on the eaſt, by the great ridge of mountains which part it from Great Tartary. The province extends from the 46th to the 52d degree of latitude. The ſummer is long, and intenſely hot: the winter continues about three months ſo ſevere, that the Volga is frozen hard enough to bear loaded ſledges. The ſoil is rich and fertile; but the Tartars who inhabit it are ſtrangers to agriculture. On the weſtern and ſouthern ſides of the Volga are heaths of a prodigious extent, ſandy, deſert, and uncultivated: theſe, however, produce vaſt quantities of fine tranſparent ſalt in pits, where the ſun bakes and incruſtates it to the thickneſs of an inch on the ſurface of the water. There are pits in the neighbourhood of Aſtracan which yield this excellent ſalt in ſuch abundance, that any perſon may carry it off, paying at the rate of one farthing a pooſt, which is equal to forty pounds. The metropolis, Aſtracan, is ſituated within the boundaries of Aſia, on an iſland called *Dolgoi*, about 60 Engliſh miles above the place where the Volga diſembogues itſelf into the Caſpian Sea. The city derives its name from Hadgee Tarken, a Tartar, by whom it was founded. It was conquered by Iwan Baſilowitz, recovered by the Tartars in the year 1668, and retaken by the Czar, who employed for this purpoſe a great number of flat-bottomed veſſels, in which he tranſported his forces down the Volga from Caſan.

The city of Aſtracan is about two miles and a half in circumference, ſurrounded by a brick-wall, which is now in a ruinous condition: but, if we comprehend the ſuburbs, the circuit will be near five miles. The number of inhabitants amounts to 70,000, including Armenians and Tartars, as well as a few Perſians and Indians. The garriſon conſiſts of ſix regiments of the beſt Ruſſian troops, who, when this place was alarmed from the ſide of Perſia, had in the adjacent plain erected a great number of ſmall batteries, to ſcour the fields, and obſtruct the approach of the enemy. The houſes of Aſtracan are built of wood, and generally mean and inconvenient. The higher parts of the city command a proſpect of the Volga, which is here about three miles in breadth, and exhibits a noble appearance. The marſhy lands on the banks of it render the place very ſickly in the ſummer: the earth, being impregnated with ſalt, is extremely fertile, and produces abundance of fruit, the immoderate uſe of which is attended with epidemical diſtempers. Sickneſs is likewiſe the conſequence of thoſe annual changes in the atmoſphere produced by the floods in ſpring and autumn. All round the city of Aſtracan, at the diſtance of two miles, are ſeen a great number of gardens, orchards, and vineyards, producing all ſorts of herbs and roots, (except cauliflowers). The grapes are counted ſo delicious, that they are preſerved in ſand, and tranſported to court by land-carriage at a prodigious expence: yet the wine of Aſtracan is very indifferent. The ſummer being generally dry, the inhabitants water their gardens by means of large wheels worked by wind or horſes, which raiſe the water to the higheſt part of the garden, from whence it runs in trenches to refreſh the roots of every ſingle tree and plant. The neighbouring country produces hares and patridges, plenty of quails in ſummer, with wild and water fowl of all ſorts in abundance.

About ten miles below Aſtracan is a ſmall iſland, called *Boſmaiſe*, on which are built large ſtorehouſes for the ſalt, which is made about twelve miles to the eaſtward, and, being brought hither in boats, is conveyed up the Volga, in order to ſupply the country as far as Moſcow and Twere. The quantity of ſalt annually dug for theſe purpoſes amounts to ſome millions of pounds, the excluſive property of which is claimed by the crown, and yields a conſiderable revenue; for the ſoldiers and bulk of the people live almoſt entirely on bread and ſalt. The neighbourhood of theſe ſalt-works is of great advantage to the fiſheries, which extend from hence to the Caſpian Sea, and reach to the ſouth-eaſt as far as Yack, and even 100 miles above Zaritzen. The principal fiſh here caught are ſturgeon, ſtarlett, belluga, and aſſotra. Theſe, being ſalted, are put on board of veſſels, and ſent away in the ſpring, for the uſe of the whole empire, even as far as Peterſburg: but as fiſh may be kept freſh as long as it is frozen, the winter is no ſooner ſet in, than they tranſport great quantities of it by land through all the provinces of Ruſſia. Of the roes of the fiſh called *belluga*, which are white, tranſparent, and of an agreeable flavour, the fiſhers here prepare the caviare, which is in ſo much eſteem all over Europe. Theſe fiſheries were firſt eſtabliſhed by one Tikon Demedoff, a carrier, who ſettled in this place about half a century ago, his whole wealth conſiſting of two horſes. By dint of ſkill and induſtry, he ſoon grew the richeſt merchant in this country: but his ſucceſs became ſo alluring to the crown, that of late years it hath engroſſed ſome of the fiſheries as well as the ſalt-works.

From the latter end of July to the beginning of October, the country about Aſtracan is frequently infeſted with myriads of locuſts, which darken the air in their progreſſion from the north to the ſouthward; and, wherever they fall, conſume the whole verdure of the earth. Theſe inſects can even live for ſome time under water: for when the wind blows acroſs the Volga, vaſt numbers of them fall in cluſters, and are rolled aſhore; and their wings are no ſooner dry, than they riſe and take flight again.

Heretofore the inhabitants of Aſtracan traded to Khuva and Bokhara; but at preſent theſe branches are loſt, and their commerce is limited to Perſia and the dominions of Ruſſia. Even the trade to Perſia is much diminiſhed by the troubles of that country: nevertheleſs, the commerce of Aſtracan is ſtill conſiderable. A few years ago, the city maintained about 40 veſſels, from 1 to 200 tons burden, for the Caſpian traffick. Some of theſe belong to the government, and are commanded by a commodore, under the direction of the admiralty. This office is generally well ſtocked with naval ſtores, which are ſold occaſionally to the merchants. The trading ſhips convey proviſions to the frontier towns of Terkie and Kiſlar, ſituated on the Caſpian Sea; and tranſport merchandize to ſeveral parts of Perſia. Some years ago, the Engliſh Ruſſian company opened a trade from Aſtracan to Perſia over the Caſpian Sea, and ſhips were built for that purpoſe; but this commerce was ſoon prohibited by the Czarina, in conſequence of the miſmanagement of an Engliſh factor, and the jealouſy of the Ruſſians. The merchants of Aſtracan export to Perſia, chiefly on account of the Armenians, red leather, linens, woollen cloths, and other European manufactures. In return, they import the commodities of Perſia, particularly thoſe manufactured at Caſan; ſuch as ſilk ſaſhes intermixed with gold, for the uſe of the Poles; wrought ſilks and ſtuffs mixed with cotton; rice, cotton, rhubarb, and a ſmall quantity of other drugs; but the chief commodity is raw ſilk. The government has engroſſed the article of rhubarb, the greater part of which is brought into Ruſſia by the Tartars of Yakutſki, bordering on the eaſtern Tartars belonging to China. They travel through Siberia to Samura, thence to Caſan, and laſtly to Moſcow. The revenue of Aſtracan is computed at 150,000 rubles, or 33,000 pounds, ariſing chiefly from ſalt and fiſh. The city is ruled by a governor, under the check of a chancery. He is nevertheleſs arbitrary enough, and exerciſes oppreſſion with impunity. The officers of the admiralty and cuſtom-houſe, having very ſmall ſalaries, are open to corruption, and extremely rapacious. At chriſtening-feaſts, which are attended with great intemperance, the gueſts drink a kind of cherry-brandy out of large goblets; and every perſon invited throws a preſent of money into the bed of the mother, who ſits up with great formality to be ſaluted by the company.

The Indians have a Pagan temple at Aſtracan, in which they pay their adoration, and make offerings of fruit to a very ugly deformed idol. The prieſts of this pagod uſe incenſe, beads, cups, and proſtrations. The Tartars, on the contary, hold idol-worſhip in the utmoſt abomination.

ASTRAGAL, in architecture, a little round moulding, which in the orders ſurrounds the top of the ſhaft or body of the column. It is alſo called the *talon* and *tondino*; it is uſed at the bottoms as well as tops of colums, and on other occaſions: it properly repreſents a ring, on whatever part of a column it is placed; and the original idea of it was that of a circle of iron put round the trunk of a tree, uſed to ſupport an edifice to prevent its ſplitting. See Plate XXIX. fig. 2. The *aſtragal* is often cut into beads and berries, and is uſed in the ornamented entablatures to ſeparate the ſeveral faces of the architrave.

Astragal, in gunnery, a round moulding encompaſſing a cannon, about half a foot from its mouth.

ASTRAGALUS, MILK-VETCH, OR LIQUORICE-VETCH; a genus of the decandria order, belonging to the diadelphia claſs of plants. Of this genus there are 39 ſpecies; but none of them ſeem to deſerve particular notice, except the common ſort, which grows wild upon dry uncultivated places, and is recommended by Mr Anderſon to be cultivated as proper food for cattle. See Agriculture, n° 58.

Astragalus, in anatomy. See there, n° 64.

ASTRANTIA, MASTERWORT; a genus of the digynia order, belonging to the pentandria claſs of plants, of which there are three ſpecies; but as they are only preſerved in botanic gardens for the ſake of variety, we omit any particular deſcription of them.

ASTRÆA, in aſtronomy, a name which ſome give to the ſign Virgo, by others called *Erigone*, and ſometimes *Iſis*. The poets feign that juſtice quitted heaven to reſide on earth, in the golden age; but, growin weary of the iniquities of mankind, ſhe left the earth, and returned to heaven, where ſhe commenced a conſtellation of ſtars, and from her orb ſtill looks down on the ways of men.

ASTRICTION, in law. See Thirlage.

Astriction, among phyſicians, denotes the operation of aſtringent medicines.

ASTRINGENTS, in the Materia Medica. See there, n° 36, &c.

ASTROGNOSIA, the ſcience of the fixed ſtars, or the knowledge of their names, conſtellations, magnitudes, &c. See Astronomy.

ASTROITES, or star-stone, in natural hiſtory. See the articles Asteria and Star-stone; and Plate XLII. fig. 7.

ASTROLABE, the name for a ſtereographic projection of the ſphere, either upon the plane of the equator, the eye being ſuppoſed to be in the pole of the world; or upon the plane of the meridian, when the eye is ſuppoſed in the point of the interſection of the equinoctial and horizon.

Astrolabe, is alſo the name of an inſtrument formerly uſed for taking the altitude of the ſun or ſtars at ſea.

Astrolabe, among the ancients, was the ſame as our armillary ſphere.

ASTROLOGY, a conjectural ſcience, which teaches to judge of the effects and influences of the ſtars, and to foretel future events by the ſituation and different aſpects of the heavenly bodies. This ſcience has long ago become a juſt ſubject of contempt and ridicule. See Divination, n° 1.

ASTRONOMICAL, ſomething relating to aſtronomy.

Astronomical *Calendar*, an inſtrument engraved on copper plates, printed on paper, and paſted on a board, with a braſs ſlider carrying a hair: it ſhews by inſpection the ſun's meridian altitude, right aſcenſion, declination, riſing, ſetting, amplitude, &c. to a greater degree of exactneſs than the common globes.

Astronomical *Sector*, a very uſeful mathematical inſtrument, made by the late ingenious Mr Graham.

It is allowed that a micrometer is the moſt accurate and convenient inſtrument for obſerving the place of a planet or comet, when it happens to be near enough to any known ſtar, by taking the differences of its right aſcenſion and declination from thoſe of the ſtar: but this being frequently impracticable, by reaſon that many large places in the heavens are void of ſtars whoſe places are known, it is neceſſary to have recourſe to moveable quadrants, or ſextants, furniſhed with teleſcopic ſights, for taking larger diſtances. But beſides the difficulty and charge of procuring good inſtruments of this kind, the great trouble and uncertainties in obſerving with them are very notorious, ariſing chiefly from the difficulty the obſervers find in making their obſervations and each teleſcope correſpond together at the ſame inſtant while the inſtrument is following the diurnal motion of the heavens. The lovers of aſtronomy are therefore much obliged to the late ingenious Mr George Graham, F. R. S. not only for many uſeful improvements in the mechaniſm of ſeveral aſtronomical inſtruments, but alſo for contriving a very commodious and accurate one for the purpoſe aforeſaid; that is, for taking ſuch differences of right aſcenſion and declination as are too large to be obſerved through a fixed teleſcope; and yet with equal facility and exactneſs too in proportion to the radius of the inſtrument.

5th Plate XLII. fig. 4.

Let A B repreſent an arch of a circle, containing ten or twelve degrees well divided, having a ſtrong plate C D for its radius, fixed to the middle of the arch at D: let this radius be applied to the ſide of an axis H F I, and be moveable about a joint fixed to it at F, ſo that the plane of the ſector may be always parallel to the axis H I; which being parallel to the axis of the earth, the plane of the ſector will always be parallel to the plane of ſome hour-circle. Let a teleſcope C E be moveable about the centre C of the arch A B, from one end of it to the other, by turning a ſkrew at G; and let the line of ſight be parallel to the plane of the ſector. Now, by turning the whole inſtrument about the axis H I, till the plane of it be ſucceſſively directed, firſt to one of the ſtars, and then to another, it is eaſy to move the ſector about the joint F, into ſuch a poſition, that the arch A B, when fixed, ſhall take in both the ſtars in their paſſage, by the plane of it, provided the difference of their declinations does not exceed the arch A B. Then, having fixed the plane of the ſector a little to the weſtward of both the ſtars, move the teleſcope C E by the ſkrew G; and obſerve by a clock the time of each tranſit over the croſs-hairs, and alſo the degrees and minutes upon the arch A B, cut by the index at each tranſit; then, in the difference of the arches, the difference of the declinations, and by the difference of the times, we have the difference of the right aſcenſions of the ſtars.

The dimenſions of this inſtrument are theſe: the length of the teleſcope, or the radius of the ſector, is 2 ½ feet; the breadth of the radius, near the end C, is 1 ½ inch; and at the end D two inches. The breadth of the limb A B is 1 ½ inch; and its length ſix inches, containing ten degrees divided into quarters, and numbered from either end to the other. The teleſcope carries a nonius or ſubdividing plate, whoſe length, being equal to ſixteen quarters of a degree, is divided into fifteen equal parts; which, in effect, divides the limb into minutes, and, by eſtimation, into ſmaller parts. The length of the ſquare axis H I F is eighteen inches, and of the part H I twelve inches; and its thickneſs is about a quarter of an inch: the diameters of the circles are each five inches: the thickneſs of the plates, and the other meaſures, may be taken at the direction of a workman.

This inſtrument may be rectified, for making obſervations, in this manner: By placing the interſection of the croſs-hairs at the ſame diſtance from the plane of the ſector, as the centre of the object-glaſs, the plane deſcribed by the line of ſight, during the circular motion of the teleſcope upon the limb, will be ſufficiently true, or free from conical curvity; which may be examined by ſuſpending a long plumb-line at a convenient diſtance from the inſtrument; and by fixing the plane of the ſector in a vertical poſition, and then by obſerving, while the teleſcope is moved by the ſkrew along the limb, whether the croſs hairs appear to move along the plumb-line.

The axis *h f o* may be elevated nearly parallel to the axis of the earth, by means of a ſmall common quadrant; and its error may be corrected, by making the line of ſight follow the circular motion of any of the circumpolar ſtars, while the whole inſtrument is moved about its axis *h f o*, the teleſcope being fixed to the limb: for this purpoſe, let the teleſcope *k l* be directed to the ſtar *a*, when it paſſes over the higheſt point of its diurnal circle, and let the diviſion cut by the nonius be then noted: then, after twelve hours, when the ſtar comes to the loweſt point of its circle, having turned the inſtrument half round its axis, to bring the teleſcope into the poſition *m n*; if the croſs hairs cover the ſame ſtar ſuppoſed at *b*, the elevation of the axis *h f o* is exactly right; but if it be neceſſary to move the teleſcope into the poſition *u v*, in order to point to this ſtar at *c*, the arch *m u*, which meaſures the angle *m f u* or *b f c*, will be known; and then the axis *h f o* muſt be depreſſed half the quantity of this given angle if the ſtar paſſed below *b*, or muſt be raiſed ſo much higher if above it; and then the trial muſt be repeated till the true elevation of the axis be obtained. By making the like obſervations upon the ſame ſtar on each ſide the pole, in the ſix-o'clock-hour-circle, the error of the axis, toward the eaſt or weſt, may alſo be found and corrected, till the croſs-hairs follow the ſtar quite round the pole: for ſuppoſing *a o p b c* to be an arch of the meridian (or in the ſecond practice of the ſix-o'clock hour-circle), make the angle *a f p* equal to half the angle *a f c*, and the line *f p* will point to the pole; and the angle *o f p*, which is the error of the axis, will be equal to half the angle *b f c* or *m f u*, found by the obſervation; becauſe the difference of the two angles *a f b*, *a f c*, is double the difference of their halves *a f o* and *a f p*. Unleſs the ſtar be very near the pole, allowance muſt be made for refractions.

END OF THE FIRST VOLUME.

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N. B. Errata, Omissions, &c. noticed and ſupplied in the APPENDIX at the end of the Work.